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Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty
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BACKGROUND DOCUMENT BY THE PROVISIONAL TECHNICAL SECRETARIAT OF THE PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION PREPARED FOR THE CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE CTBT (NEW YORK, 2025)

TREATY

1. The Comprehensive Nuclear-Test-Ban Treaty (CTBT) prohibits all nuclear weapon test explosions and any other nuclear explosion, whether for a military or any other purpose. It covers all environments and does not set a threshold from which the prohibitions should apply. The preamble of the Treaty states that its objective is "to contribute effectively to the prevention of the proliferation of nuclear weapons in all its aspects" and "to the process of nuclear disarmament".

2. The CTBT, and the international norm against nuclear weapon test explosions, have grown in strength since the adoption of the Treaty in 1996. In order to enter into force, the CTBT must be ratified by all 44 States listed in Annex 2 to the Treaty. These are the States which formally participated in the work of the 1996 session of the Conference on Disarmament, thus having contributed to the final stage of the negotiations on the CTBT, and which appear in one or both of the lists, compiled by the International Atomic Energy Agency (IAEA), of States with nuclear power reactors (as of April 1996) and of States with nuclear research reactors (as of December 1995).

3. Significant progress has been made towards the goal of entry into force and universalization of the Treaty. To date, the CTBT has been signed by 187 States and

* Reissued for technical reasons on 19 September 2025.

ratified by 178 States, including 35 of the 44 States listed in Annex 2. Since the 2023 Article XIV conference, Papua New Guinea completed its ratification procedure.

2023 ARTICLE XIV CONFERENCE

4. Under Article XIV, if the Treaty has not entered into force three years after the date of the anniversary of its opening for signature, a conference of those States that have already ratified it shall be held to decide by consensus what measures consistent with international law may be taken to accelerate the ratification process and to facilitate early entry into force. States which have signed but not ratified the Treaty will also be invited to attend the conference as observers.

5. The thirteenth Article XIV conference was held on 22 September 2023 in New York with more than 86 States participating. In addition, several international and regional organizations, as well as non-governmental organizations attended. The conference adopted a Final Declaration calling upon all States which had not yet done so to sign and/or ratify the Treaty (CTBT-Art.XIV/2023/6, Annex). The declaration includes a number of measures to promote the entry into force of the CTBT.

6. In the course of the follow-up to the 2023 Article XIV conference, and in accordance with paragraph 10 (c) of the Final Declaration, Norway and Panama, which served as the Presidency of the conference, were selected as coordinators of the process "to promote cooperation aimed at promoting further signatures and ratifications". Through a silence procedure which ended at 12:00 noon on 29 January 2025, the Philippines and Sweden were appointed to serve as Presidents-designate in preparing for the 2025 Article XIV conference in New York.

PREPARATORY COMMISSION

7. In advance of the entry into force of the Treaty and the establishment of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), a Preparatory Commission was established by States Signatories on 19 November 1996. Its purpose is to carry out the necessary preparations for the effective implementation of the CTBT and to prepare for the first session of the Conference of the States Parties to the Treaty. The 187 States Signatories are members of the Commission.

8. The Commission is tasked with undertaking all necessary preparations to ensure that the verification regime foreseen by the CTBT is capable of fulfilling its operational mission at entry into force, this includes, inter alia, the provisional operation of the International Data Centre (IDC) and the International Monitoring System (IMS). The Commission is made up of a plenary body responsible for directing policy and composed of all States Signatories, as well as a Provisional Technical Secretariat (PTS) which assists the Commission in its duties and carries out such functions as the Commission determines.

PROVISIONAL TECHNICAL SECRETARIAT

9. As of 31 July 2025, the PTS is comprised of 340 staff members from 92 countries. The number of staff at the Professional level was 227. The PTS is committed to a policy of equal employment opportunity, with a particular emphasis on improving the representation of women, especially in the scientific and technical areas within the Professional category. Eighty-one women held Professional positions as of 31 July 2025, corresponding to 35.6% of the Professional staff.

10. The approved Budget of the Commission for 2025 amounts to US$139.31 million. From 1997 up to and including the financial year 2025, the total budgetary resources amounted to $1772.95 million and €1175.13 million. In equivalent US dollars this corresponds to a total of $3145.76 million calculated using the budgetary rate of exchange of $1 = €0.856 effective 15 July 2025. Of this total, around 80% has been dedicated to verification related programmes, including $557.57 million (around 18%) for the Capital Investment Fund for the installation and upgrade of IMS stations.

VERIFICATION REGIME

11. The CTBT provides for the establishment of a unique global verification regime that consists of an IMS, a consultation and clarification process, on-site inspections (OSIs) and confidence building measures. Data from IMS stations are to be sent via a secure global network (the Global Communications Infrastructure (GCI)) to an IDC for processing and analysis, and IMS data and IDC products are to be made available to States.

International Monitoring System

12. The IMS is to consist of a network of 321 monitoring stations and 16 radionuclide laboratories. The mission of these facilities is to produce data for the detection of nuclear explosions. These data are to be provided to States Parties for verification of compliance with the Treaty after entry into force.

13. As of 30 June 2025, 301 (94%) IMS stations had been installed, of which 292 had been officially certified as meeting the specifications of the Commission. In addition, since mid-2023, one auxiliary seismic station (AS92) was certified. As a result of political agreements and successful outreach activities, progress is being made in the establishment of stations in a number of States where there had been no or little progress. This will lead to additional IMS facility certifications in the coming years. Installation of additional noble gas systems will be a particular focus in the next few years. As of 30 June 2025, of the 40 noble gas detection systems envisaged by the Treaty, 32 had been installed, of which 26 systems have been certified (65%).

14. In addition, the continued political support from a number of countries hosting IMS facilities brings the prospect of a complete IMS network closer.

International Data Centre

15. The mission of the IDC is to support the verification responsibilities of States by providing data, products and services necessary for effective global monitoring after the entry into force of the Treaty.
16. The IDC continues in its provisional mode of operation and supports States Signatories by acquiring and forwarding continuous real time data, selected data segments and radionuclide spectra from the IMS. The IDC processes the IMS data along with compiled meteorological data and distributes the resulting products to support the verification responsibilities of States as well as their civil and scientific efforts. On average 14 terabytes of data and products are distributed every year. States are supported through an online help desk, data retrieval services, training courses, workshops and the provision of software and equipment.

17. The GCI is a closed network purposefully built to transport IMS data to the IDC and distribute the IDC product. The network is a hybrid mixing satellite, terrestrial and broadband technologies. This communication infrastructure covers over 100 countries and territories, with eight States Signatories operating a locally managed subnetwork. The network undergoes regular reviews, updates and refresh, to ensure that it remains secure and continues to provide very high data availability. The GCI is currently in its third generation.

18. Through the International Noble Gas Experiment, support from European Union Council Decision funds, contributions in kind from the United States of America (USA), and voluntary contributions from Japan, the PTS has been optimizing the capability of detecting signals from nuclear explosions against the global background of natural and human-made radionuclides. The overall goal is to enhance the detection capability of the IMS noble gas systems in order to make them as sensitive as possible to nuclear explosions.

19. The third phase of IDC seismic, hydroacoustic and infrasound (SHI) software re-engineering commenced in December 2018. This IDC-led effort to make the SHI processing platform modern, flexible, maintainable, updatable and traceable will include a new pipeline, improved analyst interface and state of health capabilities. The new system will integrate contributions from several States Signatories. The US government has donated releases of their Geophysical Monitoring Software, which is being developed for the modernization effort of the US National Data Centre (NDC); much of the software is fully compatible with PTS requirements. The IDC is using this software as a baseline and adding IDC specific components. The IDC remains focused on the enhancement of the state of health system to implement IDC monitoring requirements, such as mission capability, alerting and external data access. The latest version of the interactive analyst interface was received from the USA NDC in January 2025 and experts from 25 different NDCs are in the process of testing the capabilities of this software.

20. In addition, the IDC received a voluntary contribution from NORSAR (NDC of Norway) of an updated interface for threshold monitoring. Threshold monitoring is currently deployed internally in production and is planned to be externally available once the archived data is processed in the new data format.

21. The IDC is preparing itself for the automatic processing of data from all the next generation noble gas systems. Over the last several years, radionuclide data processing software was also modernized, and will achieve the same goals of having modern, maintainable, code. In addition, software was developed and enhanced in a coordinated approach to enable a single software platform to handle both particulate and noble gas processing. The new interactive analysis software went into operation in the third quarter of 2024.

22. The DTK-(G)PMCC software, that is based on the Progressive Multichannel Correlation method, has been continuously enhanced since its first promotion into IDC Operations, in partnership with the French NDC.

23. Since 2021, the PTS released major upgrades of both the radionuclide and the SHI data analysis software provided to NDCs. In addition, the release process was modernized to enable NDCs to install and update their software more easily. The project was supported financially through EU Council Decision V, VI, VII, VIII and IX. The new version of the software enables NDCs to combine IMS data and IDC products more easily with data from local and regional stations and from other global networks. In addition, atmospheric transport modelling analysis software has been updated. The PTS continuously enhances and extends the capabilities of software for NDCs.

Sustaining and Maintaining the International Monitoring System

24. In accordance with Article IV of the Treaty, the PTS supervises, coordinates and ensures the operation of the IMS and its component elements. Preparing a global verification regime is not just about building stations. It is about taking a holistic approach to establishing and sustaining a system that meets the verification requirements of the Treaty and ensures minimal downtime of IMS facilities. Operational experience with the system has increased over time, leading to the establishment of an IMS sustainment structure and concerted efforts for more effective operations, preventive maintenance, logistical and engineering strategies and programmes. These sustainment activities are essential to preserve the investment already made by States Signatories.

25. The PTS has continued its activities in configuration management, supportability analysis, establishment of equipment support contracts, shipping and customs clearance and equipment sparing in support of improving IMS station operability and uptime. It has also continued to recapitalize IMS facility components reaching the end of their operational lives and to address unscheduled maintenance in a timely fashion. Furthermore, owing to the central role played by station operators in resolving problems on site and hence contributing to high levels of data availability, the PTS has continued to invest in training courses for station operators that are tailored to their needs. Monitoring and tracking software has been enhanced to further facilitate the tasks of monitoring, detecting and resolving incidents in the IMS network.

26. The development of a sustainment strategy for the IMS has been a major focus of the PTS since 2023. The PTS has released seven Information Papers that address the methodology that the PTS followed when assessing the needs of the stations, the financial requirements of the stations based on a thorough analysis of the age and expected life span of the equipment, as well as a sensitivity analysis that aims to present the variations within the

financial scenarios that were developed. In addition, the importance of the station operators in the sustainment of the IMS stations was emphasized and the capacity building initiatives within the context of the IMS sustainment strategy was described. It is foreseen that as the strategy is implemented, it will be assessed and updated every six years.

27. Operation and maintenance, and other sustainment activities, of IMS auxiliary seismic stations remain the responsibility of the host countries and the costs are borne by the host States Signatories or through extrabudgetary voluntary cash or contributions in kind. Currently, the Preparatory Commission funds from its regular budget the costs of transmitting to the IDC and authenticating data from auxiliary stations. Typically, these costs cover the standard station interface computers and devices (e.g. uninterruptable power supply) that enable authentication of data from auxiliary stations and the transmitting of this data to the IDC. A preliminary analysis of the technical sustainment needs of the auxiliary seismic stations in response to a request by Working Group B (WGB) was performed and presented in an Information Paper. The analysis followed the same methodology that was used for the entire IMS, and an initial estimation of the financial requirements associated with auxiliary seismic sustainment was also provided.

28. Increasing the number of facility agreements and arrangements between the Commission and the States hosting IMS facilities is important for providing the required support for the functioning and sustainment of the IMS. As of 31 July 2023, facility agreements had been signed with 50 of the 89 host States, and 42 of these agreements had entered into force. The development and implementation of mechanisms foreseen by the facility agreements and arrangements, such as timely customs clearance and tax exemptions for equipment brought into an IMS host State, have proven to increase the efficiency and cost effectiveness with which stations can be repaired and sustained.

29. The PTS has continued to focus on engineering and development activities with the aim of improving the robustness of IMS monitoring facilities and enhancing the performance and capabilities of associated technologies. This is being achieved through designing, validating and implementing solutions throughout the life cycle of IMS stations. Positive progress has been made in the development of type approval procedures for critical equipment used at IMS installations. This activity has required the close collaboration of the International Bureau of Weights and Measures, specialised metrology laboratories and equipment manufacturers.

30. The quality assurance/quality control programme of the IMS network continues to be a focus of the PTS to ensure verifiable data. Calibration of primary and auxiliary seismic, T phase and infrasound stations are scheduled and performed on an annual basis with the support of station operators. Similarly, a comprehensive quality assurance/quality control programme is in place for all radionuclide stations. The radionuclide stations are supported by radionuclide laboratories that are evaluated annually on performance through Proficiency Test Exercises (PTEs). The PTEs are a means of monitoring the quality of analytical results provided by certified laboratories. The PTEs for both particulates and noble gas analyses continue to produce good results by the participating laboratories.

31. Up to date and reliable technical documentation for each IMS station is essential to ensure its sustainability and to maintain a high level of data availability. The PTS continues to make progress populating its Quality Management System (QMS) with station specific documentation.

32. There are currently two major technological developments in progress:

    i. The next generation of noble gas systems that have improved sensitivity and enhanced reliability are under development, testing and implementation. One type of noble gas system has been in certified operation at radionuclide stations RN11, RN38, RN49 and RN63. Installations of three other types of noble gas systems are scheduled for the near future.

    ii. A first prototype modular cable latch that enables the disconnection of a node from the trunk or internode cable any time at a hydroacoustic station after deployment without disturbing the other elements of the underwater hydroacoustic triplet has been tested successfully. Full modularity will be considered for the next generation of hydroacoustic stations.

33. Significant efforts and re-engineering of the information technology infrastructure has ensured high availability of all information technology equipment and systems in use. For instance, the availability of infrastructure supporting critical IDC verification capabilities was 99.51% for the period January to June 2025. Through a combination of different approaches, including redundancy, secure storage and clustering, the effects of hardware failure and human error have been minimized.

34. High levels of data availability from IMS stations are being achieved. This has been achieved through the operation and sustainment strategy of the PTS and the joint efforts with delegations, national governments, station operators and national institutions. By the end of 2024, the data availability levels remained high for certified IMS stations with average data availability of 87.82% for the primary seismic station network, 97.54% for the infrasound station network, 84.52% for the hydroacoustic station network and 84.14% for the auxiliary seismic station network. The radionuclide network performed at data availability levels of 95.53% (particulate stations) and 87.32% (noble gas systems) in 2024.

35. Post-certification activity contracts, agreements and arrangements support station operators in operating and maintaining primary SHI and radionuclide IMS stations, and noble gas systems after certification. There are post-certification activity contracts in place for 170 certified IMS stations and noble gas systems. The PTS has developed standardized operation and maintenance plans, which by 2025 had been implemented by 141 stations. This approach helps to keep operational costs at a reasonable level while ensuring sufficient funding to keep the stations well maintained. Keeping the operational costs of IMS stations at a reasonable level is a joint responsibility of the PTS and the host country.

On-Site Inspections

36. On-site inspections represent the ultimate verification measure for compliance with the Treaty. An OSI can only be invoked after the entry into force of the Treaty. The sole purpose of OSI is to clarify whether a nuclear weapon test explosion or any other nuclear explosion has been carried out in violation of the Treaty and to gather facts which might assist in identifying any possible violator.

37. The Commission has continued to build up the OSI verification regime in accordance with Treaty requirements. Considerable progress has been made not only with the further development of OSI technical and operational capabilities but also with the implementation of the current OSI exercise and training programmes.

38. The programme of work 2024-2025 of the OSI Division builds on the implementation of earlier divisional work programmes with a primary focus on the improvement of OSI technical and operational capabilities and facilitating and supporting the current exercise and training programmes. It is in line with the OSI strategic plan and supports the Programme and Budget for 2024-2025. A new OSI programme of work 2026-2027 has recently been published which focuses on testing and validating work that had been completed in the preceding years related to advancing OSI methodology and techniques, policies and documentation, as well as training and capacity building.

On-Site Inspection Technical and Operational Capabilities

39. In order to further enable the conduct of inspection activities and techniques, emphasis has been put on a systematic review and status assessment of current capabilities relating to inspection techniques and deployment. This has led to the design and implementation of specific projects that are aimed at addressing identified capability gaps (e.g. Argon-37 measurement, active seismic surveys, OSI drilling), projects that are aimed at refreshing previously obtained equipment (e.g. multispectral and infrared measurement equipment), and projects for consolidating preparedness to ensure availability and deployability of OSI equipment.

40. Emphasis has also been placed on the completion of the QMS documentation relating to the use of OSI equipment and on preparing tailored hands-on and online technical training materials that cover deployment, field operations support and the integrated application of inspection activities and techniques.

On-Site Inspection Exercise Programme

41. OSI exercises allow various inspection activities, techniques, processes and procedures to be tested or validated in an integrated fashion and play an integral role in efforts to develop the OSI element of the verification regime in preparation for entry into force of the CTBT. The OSI exercise programme for 2022-2025 was approved by the Preparatory Commission in June 2022 and includes a series of increasingly challenging exercises: two tabletop exercises for senior management in 2022 and 2023, three directed exercises in 2023, a build-up exercise in 2024 and an Integrated Field Exercise (IFE) in 2025.

42. All of these exercises, except the IFE, have been conducted to date. The most recent exercise, the build-up exercise, took place in Hungary as planned and focused on the integrated application of OSI techniques during the continuation period of an inspection in a mountainous environment. Considerable lessons were identified that have been and are being addressed, ranging from infrastructure, logistics and operations, to health, safety and security, communications, application of OSI techniques to exercise design and management.

43. The IFE was originally planned to be held in Sri Lanka and the OSI Division had been making preparations accordingly. However, in February 2025, Sri Lanka announced that it was no longer able to host the IFE. In May 2025, the Preparatory Commission approved the recommendation of the Executive Secretary to undertake and conclude negotiations with Namibia as the host country for the IFE in 2026 (IFE26). Work to undertake and conclude negotiations for the required agreements is progressing accordingly.

44. IFE26 will be the third exercise of its kind after IFE08, which took place in Kazakhstan in 2008, and IFE14, which took place in Jordan in 2014.

On-Site Inspection Training Programme

45. The CTBT mandates that "each inspector included in the list of inspectors and inspection assistants shall receive relevant training. Such training shall be provided by the Technical Secretariat pursuant to the procedures specified in the Operational Manual for On-Site Inspections". Development of the OSI training programme commenced in early 1997 to initially investigate the requirements for inspectors working within the confines and requirements of the Treaty. Over the years the training programme has built on these early efforts and developed into a robust programme with successful completion of three training cycles during the period 2007-2021 in conjunction with the development of the draft OSI Operational Manual and related OSI methodologies, techniques, equipment, procedures and documentation.

46. The OSI linear training programme was launched in 2022 to integrate the training of newly nominated surrogate inspectors with refresher training for those already on the roster. Developed on the basis of lessons from earlier training cycles and an expert meeting on OSI training in 2021, the programme follows a modular and flexible structure. It supports the progressive development of surrogate inspector capabilities in line with the programme of work of the OSI Division, with a particular emphasis on maintaining core competencies, promoting cross-functional integration, and enhancing geographical and gender representation within the roster. Since its launch, the programme has delivered multiple iterations of in-person training alongside a robust portfolio of online learning. A total of 34 e-learning modules are complemented by immersive and interactive digital tools such as virtual reality tours and 360 degree visualizations.

47. As of today, the PTS has established a roster of about 240 surrogate inspectors. These experts have been nominated by States Signatories or are designated PTS staff and have successfully completed one of the training cycles or participated in the current linear training programme. Surrogate inspectors remain on the roster as long as their designations by the nominating States remain unchanged, their skills and knowledge are refreshed and they are physically fit.

SIX ANNOUNCED NUCLEAR TESTS BY THE DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

48. The accuracy of the location identified by the IDC based on primary and auxiliary seismic stations of the IMS depends on the number of detections contributing to it. For the nuclear tests announced by the Democratic People's Republic of Korea, this number increased from 22 for the DPRK-1, conducted on 12 October 2006 with mb (IDC)=4.08, to 189 stations for the DPRK-6, conducted on 3 September 2017 with mb (IDC)=6.07. This increase is due to both a larger number of certified stations in 2017 and to the higher magnitude of the DPRK-6 test. Correspondingly, the confidence ellipse area decreases from 880 square kilometres for DPRK-1 to 109 square kilometres for DPRK-6. Aftershock activity continued in the test area of the Democratic People's Republic of Korea. More than 50 aftershocks have been detected and analysed after the last test in 2017. These aftershocks continued for several years until late 2023.

49. The performance of the verification system was timely and effective and proved the value of the investment made in its establishment.

50. The announced tests were detected by the IMS facilities and the data were shared with States Signatories in near real time. The States Signatories received the reviewed data products within the defined timelines. The Commission also held briefings to discuss the findings of the verification system.

51. The response of the IMS and the IDC to the announced tests established that their capabilities are nearing full maturity. In addition, the tests underlined the significance of the OSI mechanism as a complementary element of the verification regime and the need for constant testing and validation of the regime.

52. The international reaction to the announced tests was swift and strong. Many countries condemned the nuclear tests and considered such actions to seriously threaten international peace and security. They called on the Democratic People's Republic of Korea to cease any further tests and to immediately sign and ratify the Treaty.

QUALITY MANAGEMENT AND PERFORMANCE MONITORING

53. The QMS is the mechanism of the PTS to provide confidence among States Signatories regarding the effective operation of the PTS and its verification system. By establishing tools and procedures for performance monitoring and evaluation, the QMS fosters a culture of quality throughout the Organization. These efforts are directed towards measuring, assessing, and monitoring improvements in products and services of the PTS. The QMS also evaluates OSI exercises and, as part of the progressive commissioning process, the IDC experiments, primarily utilizing experts from relevant technical and scientific organizations nominated by States Signatories. This approach ensures objective contributions to the enhancement of the verification elements.

54. Valuable exchanges of experience and knowledge have been facilitated through a series of NDC Workshops and Preparedness Exercises. These events mark important progress along the learning curve for NDCs, serving as key platforms for performance assessment

and for articulating their needs related to verification proficiency. In addition, they promote deeper dialogue and collaboration among experts across the various monitoring technologies and the PTS, thereby reinforcing the overall effectiveness of the verification regime.

CTBT: SCIENCE AND TECHNOLOGY CONFERENCES

55. Mindful of the obligation under Article IV of the Treaty that States Parties cooperate with the CTBTO "in the improvement of the verification regime, and in the examination of the verification potential of additional monitoring technologies", the CTBT: Science and Technology (SnT) process was established in 2011 to engage with the global scientific and technological research community.

56. This process is continuing in 2025 with the eighth in a series of biennial SnT conferences planned by the Commission for September 2025. Building on the last conference success, SnT2025 will be expanding the hybrid format for the five-day conference from 8 to 12 September with the conference taking place in the Hofburg Palace from Tuesday 9 to Friday 12, while Monday 8 will be an online day. Over 1400 registrations have been submitted, which added to the record number of abstracts submitted, of which 700 were accepted after thorough review by the SnT2025 Scientific Programme Group. SnT2025 will bring innovation across all conference programme elements. The PTS developed a balanced conference programme with speakers and panelists across geographic regions, genders and generations. The SnT2025 project will focus on providing benefits to the verification regime today and for the future as the science and technology process is a technology foresight initiative with the aim of advancing verification technologies and techniques.

57. The conference will boast a fully integrated, engaging and homogenized programme from a high level plenary to online presentation sessions, from talks on emerging technologies to interactive exhibitions. One of the novelties for SnT2025 is the introduction of daily approaches with: Monday the Online day, when the conference takes place only in an online format, Tuesday the High Level day, with the high level plenary setting the scene, Wednesday the Quantum day, with a focus on technological innovations, Thursday the Together day with events showcasing NDC collaborations, OSI exercises and various cooperation efforts and Friday the Future day when the focus shifts towards what lies ahead for the CTBT community. Daily sessions are scheduled according to these approaches to ease participant navigation through the dense programme.

INTEGRATED CAPACITY BUILDING AND TRAINING

58. The Commission attaches high importance to training and capacity building in order to strengthen the ability of States Signatories to effectively fulfil their verification responsibilities under the Treaty and to fully benefit from their participation in the verification regime, in particular through the use of IMS data and IDC products, both for verification purposes and for their own civil and scientific applications. The Commission is committed to pursuing a more strategic, targeted, and measurable approach to ensure

that training is fully aligned with verification requirements and remains responsive to the evolving needs of States Signatories.

59. In addition to traditional training methods, information and communication technologies such as e-learning offer broader opportunities to expand and further enhance capacity building. Training and capacity building are provided to States Signatories that have access to IMS data and IDC products (around 2000 authorized users from 153 States) as well as to those that do not yet have access (34 States) and those that do have access but make limited use of the information. Hybrid and multilingual formats have been increasingly utilized to reach wider audiences.

60. The training targets a variety of audiences, namely IMS station operators, technical staff of NDCs, OSI inspectors, officials, diplomats and PTS staff. Currently, 38 English e-learning modules have been translated into all official languages of the Commission, bringing the total to 120 modules. Since 1999, more than 12 700 NDC technical staff and IMS station operators from 187 States Signatories were trained. The current training programme includes around 30 NDC and station operator events annually, for all four technologies, complemented by capacity building system installation activities that support operational readiness. Recent multilingual activities have included a Workshop on CTBT Technologies for French-speaking NDCs in Tunisia, a Russian-speaking station operator training in the Russian Federation, and earlier Arabic-speaking NDC workshops, all of which have contributed to stronger regional networks.

61. The need to invest in the next generation of nuclear non-proliferation and disarmament specialists is a key driver of the education activities of the Commission. These activities aim to broaden knowledge of the Treaty and to develop capacities in States Signatories to effectively confront the political, legal, technical and scientific challenges facing the Treaty and its verification regime. To this end, the Commission has continued to develop its Knowledge and Training Portal, which contains issue-specific training modules, a database of CTBT related resources and materials, and an archive of lectures on the Treaty and the science and technology that underpinning its verification regime. The Knowledge and Training Portal increasingly serves as a hub for structured feedback and knowledge management, ensuring that training content remains relevant and up to date.

62. The Commission has also continued to update and to modernize its publicly available CTBT e-learning modules and introductory CTBT tutorial using a modern and interactive e-learning framework. This set of newly developed modules will help to prepare stakeholders for the CTBTO educational initiatives, support outreach activities, and improve the CTBTO Youth Group induction mechanism on its portal. The modules will also be utilized for awareness raising and outreach to the general public, and may be made available for incorporation into academic curricula. These updates are complemented by multilingual outreach activities under the NDCs4All initiative, fostering inclusive participation and promoting greater use of IMS data and IDC products across regions.

OUTREACH ACTIVITIES

63. The outreach activities of the PTS aim to encourage the signature and ratification of the Treaty, enhance understanding of its objectives, principles and verification regime and of

the functions of the Commission, and promote the civil and scientific applications of the verification technologies. These activities entail interaction with States, international organizations, academic institutions, the media and the general public.

64. Most interaction with States to raise awareness about the Treaty and promote signature and ratification takes place in the context of bilateral consultations and correspondence. While special emphasis has been placed on those States listed in Annex 2 to the Treaty and those hosting IMS facilities, virtually all States have been approached in the outreach efforts of the Commission since September 2023. In addition to regular dialogue with Permanent Missions in Vienna and those representations based in Berlin, Geneva and New York, visits by PTS staff were conducted in a number of capitals. Consultations were also held, at all levels, on the margins of global, regional and subregional conferences and other gatherings.

65. A number of missions, events and activities are organized by the PTS which allow for bilateral consultations with participants from both signatory and non-signatory States. A PTS outreach mission to Tonga (May 2025) was led by the Executive Secretary.

66. The Commission continued to take advantage of global, regional and subregional conferences and other gatherings to enhance understanding of the Treaty and to advance its entry into force and the build-up of the verification regime. The Commission was represented at meetings of e.g. the African Union, the Gulf Cooperation Council, the International Atomic Energy Agency, the Inter-Parliamentary Union, the North Atlantic Treaty Organization, the Parliamentary Assembly of the Mediterranean, the United Nations Office in Geneva, the United Nations Office in New York (General Assembly and First Committee), the United Nations Office for Outer Space Affairs and the United Nations Office for Disarmament Affairs.

67. During these meetings and conferences, the Executive Secretary met with a number of heads and other senior officials of international and regional organizations including the Director-General of the International Atomic Energy Agency, the Secretary-General of the Inter-Parliamentary Union, the Secretary General of the Parliamentary Assembly of the Mediterranean, the Director of the United Nations Office for Outer Space Affairs, the Director of the Common Agenda/Summit of the Future Team; the President of the United Nations General Assembly, the High Representative for Disarmament Affairs of the United Nations, the Secretary General of the Gulf Cooperation Council, the Director-General of the United Nations Office at Vienna/Executive Secretary of the United Nations Office on Drugs and Crime and the Special Representative of the United Nations Secretary-General to the African Union.

68. Participation by the Executive Secretary in major events and high level bilateral talks constitutes a key element of PTS outreach efforts. These included the following: Wilton Park Conference (December 2023); 19th Summit of the Non-Aligned Movement (January 2024); Munich Security Conference (February 2024); Conference on Disarmament (February 2024); United Nations Security Council Ministerial Meeting (March 2024); 3rd and 4th Antalya Diplomacy Forum (March 2025 and April 2025); Moscow Nonproliferation Conference (April 2024); second and third session of the Preparatory Committee for the 2026 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (May 2024 and 2025); high level meetings of the

United Nations General Assembly Sessions to mark the International Day against Nuclear Tests (September 2024 and 2025); 79th session of the United Nations General Assembly (September 2024); 11th High Level Seminar of the African Union on Peace and Security in Africa (November 2024); 20th International Institute for Strategic Studies Manama Dialogue (December 2024); Fourth General Assembly of the African Seismological Commission (February 2025); ASEAN Regional Forum Intersessional Meeting on Non-Proliferation and Disarmament (March 2025); Carnegie International Nuclear Policy Conference (April 2025); Nobel Laureate Assembly's event marking the 80th anniversary of the Trinity test (July 2025); Hiroshima and Nagasaki Peace Memorial Ceremonies (August 2025).

69. The Executive Secretary also attended a range of other conferences, meetings and seminars where he gave keynote speeches or participated in panels or discussions on the Treaty. During these conferences, meetings and seminars around the world and at meetings in Vienna, the Executive Secretary met with prominent figures from academia, leading think tanks and other non-governmental entities. He also attended events related to nuclear non-proliferation and disarmament convened by individual governments.

70. The PTS has continued to promote preparations for national implementation of the CTBT through its programme of legislative assistance to States on the measures to be taken in accordance with Article III of the CTBT. A guide to national implementation, including model legislation and commentary, is available on the CTBTO public web site.

71. As part of its outreach programme, the CTBTO held two diplomatic workshops in Vienna, in October 2023 and in November 2024, respectively. During the reporting period, the CTBTO also held two regional workshops. Simultaneous interpretation in all official languages of the Commission was provided at the events. The CTBTO Regional Workshop for States Signatories of the African Region in The Gambia from 31 May to 1 June 2024 aimed to deepen understanding of the CTBT, with a focus on promoting full adherence across Africa, while also ensuring that all States Signatories benefit from Treaty membership. The workshop brought together 27 attendees from 23 countries. The two-day event featured a series of engaging sessions, with live interpretation to and from French, delving into various topics. The CTBTO Regional Workshop for States Signatories of the Latin America and Caribbean Region was held in Jamaica from 3 to 4 April 2025. Over 60 participants representing 24 States Signatories from across the region were there, as were journalists and representatives of regional international organizations. The workshop served to strengthen national capacities on knowledge on the CTBT and related matters, particularly in relation to the verification regime of the Treaty. Live interpretation was available to and from Spanish. These regional workshops complement the support provided through workshops for Permanent Missions.

72. Throughout the reporting period, the PTS continued its strategic communications activities aimed at increasing awareness and promoting understanding of the Treaty and its verification regime. Main target groups included States, media, civil society, educational and scientific institutions, think tanks and the general public, with a particular emphasis on youth. A proactive media outreach strategy ensured a more responsive, and effective engagement with journalists, which resulted in an increased global visibility for the CTBT across print, online, and broadcast channels. Online digital communications efforts were strengthened significantly, with digital channels becoming a primary mean

to engage with diverse audiences. By introducing new social media tools, continuously monitoring audience responses and adopting a data-driven approach, reach and effectiveness of the digital campaigns of the CTBTO have increased. Key highlights promoted included high-level engagements of the Executive Secretary, new ratifications, and signatures of facility agreements. Among public outreach initiatives are the NDC4All initiative, the CTBTO Mentoring Programme, as well as capacity building activities, training courses and IFE preparation activities. In 2024, a new permanent exhibition at the Vienna International Centre was launched. The exhibition enables visitors to interact with the technologies and tools used by the Organization to detect nuclear test explosions. The CTBT: Science and Technology 2025 (SnT2025) conference was extensively promoted, securing strong global and diverse participation, both in-person and online. As the CTBT approaches its 30th anniversary, beginning in September 2025, preparations to mark this significant milestone have been initiated. The anniversary will serve as an opportunity to build visibility around the Treaty and the efforts towards its universalisation and entry into force,

73. A significant portion of the outreach activities of the Commission is carried out using voluntary contributions provided by States Signatories. Among the activities conducted by the PTS on the basis of such contributions was the project facilitating the participation of experts from developing countries in technical meetings of the Commission, funding the maintenance and operation of auxiliary seismic stations in developing countries, thus enhancing the data processing capabilities and data availability for States Signatories. Voluntary contributions have also been provided for training to build capacity in developing countries and to enhance understanding of the work of the Commission with a particular focus on the young generation including the expanding CTBTO Youth Group, applications and development of the CTBT verification technologies and the benefits accruing from membership of the Commission, including the potential benefits derived from the civil and scientific applications of the verification technologies.

CIVIL AND SCIENTIFIC BENEFITS OF THE TREATY

74. There are a range of civil and scientific applications for the verification technologies of the Treaty that can benefit States Signatories. The abundance of data and products available to States Signatories can facilitate their civil and scientific activities, including, for example, natural disaster warning and preparedness, sustainable development, climate change research, knowledge expansion and human welfare. Since 2011 a total of 225 contracts have been signed, providing researchers from 33 countries free access to IMS data through the virtual Data Exploitation Centre.

75. As an example of the civil and scientific applications of the verification technologies, the Commission has agreed on terms under which IMS seismic and hydroacoustic data can be made available to recognized tsunami warning organizations. Twenty-one such agreements or arrangements with 20 countries are currently in place for which data from approximately 120 IMS stations are being sent. Tsunami warning organizations have confirmed that the use of IMS data increases their ability to identify potentially tsunamigenic earthquakes and to issue more rapid warnings.

CONCLUSION

76. Since the 2023 Article XIV conference, considerable progress has been achieved in the promotion of the Treaty and the advancement of its verification regime. The continued call for urgent entry into force has featured prominently in the agenda of the international campaign for nuclear non-proliferation and disarmament and has led to a surge in progress towards universalization. The verification regime of the Treaty has moved closer to completion, further improving its operational readiness and thereby increasing the confidence in its capability to detect any nuclear explosion test in any environment.