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REPORT OF THE EXECUTIVE SECRETARY ON VERIFICATION RELATED ACTIVITIES FOR THE PERIOD JANUARY-JUNE 2011

This report of the Executive Secretary to the Thirty-Seventh Session of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization also serves as the report to the Thirty-Seventh Session of Working Group B (22 August – 9 September 2011). It gives an account as of 30 June 2011 of the verification related activities undertaken by the Provisional Technical Secretariat of the Commission for the period January-June 2011 and is the second written report of the Executive Secretary to the Commission covering 2011.

KEY PTS-WIDE DEVELOPMENTS

Response to the Tohoku Earthquake and Fukushima Nuclear Power Plant Accident

1. The Tohoku (magnitude 9) earthquake of 11 March 2011, the associated tsunami and the resulting disaster at the Fukushima nuclear power plant provided an unexpected stress test for the entire Comprehensive Nuclear-Test-Ban Treaty (CTBT) verification system. All of the CTBT technologies registered signals in connection with this incident: seismic signals from the main earthquake with thousands of aftershocks; hydroacoustic signals from the conversion of elastic to acoustic waves in the sound channel near the events; infrasound signals from the earthquake, tsunami and explosions at Fukushima; and radionuclide detections over the subsequent weeks as the radioactivity released from Fukushima dispersed over the globe.

2. The radionuclide system provided unprecedented coverage of the release of both noble gases and particulates. More than 1600 particulate samples collected globally showed traces attributable to the Fukushima accident. All of the particulate and noble gas stations in the northern hemisphere and several in the southern hemisphere detected radioisotopes from the release in the five weeks following the accident. Atmospheric transport modelling (ATM) played an important role during the first days by predicting

which stations would be affected by the release. The Provisional Technical Secretariat (PTS) briefed States Signatories six times on the status of the situation, the first time on 15 March 2011. The Commission worked in close cooperation with the International Atomic Energy Agency (IAEA) and other international organizations following the accident to share as much information as possible. Valuable experience was captured in all areas, including communication, operational procedures, staffing, equipment, cooperation with other United Nations and international organizations, sample analysis and processing. The lessons learned will be used for the purpose of streamlining and improving processes in the event of future situations that may require similar action.

Science and Technology Conference

3. The CTBT: Science and Technology 2011 Conference (S&T2011) was held in Vienna from 8 to 10 June 2011 with 600 scientists and diplomats from 104 countries joining over 100 PTS staff in three days of presentations and discussions. Following two previous conferences, held in 2006 and 2009, the purpose was to further develop cooperation between the scientific community and the Commission. The conference provided scientists and scientific institutions with an exceptional opportunity to discuss advances in science and technology relevant to nuclear test ban verification, and to explore scientific applications of the CTBT verification infrastructure. It also fostered partnerships and knowledge exchange between the Commission and the broader scientific community.

4. The conference showcased over 270 oral and poster presentations by scientists worldwide, including from non-signatory States. The presentations were organized around five themes: the earth as a complex system; understanding the nuclear explosion source; advances in sensors, networks and observational technologies; advances in computing, processing and visualization for verification applications; and creating knowledge through partnerships, training and information/communication technology. A sixth theme was added on the recent Tohoku earthquake and tsunami and the Fukushima nuclear power plant disaster that followed. The CTBT verification regime is highly dependent on science and technology, and mechanisms were discussed to continuously engage with the scientific community, as this interaction is essential for the verification regime to stay attuned to scientific and technological progress.

Data Availability

5. Joint efforts of the States hosting International Monitoring System (IMS) facilities, local operators and the PTS were rewarded with a substantial increase in data availability of certified IMS stations in the first half of 2011. This demonstrates a durable positive trend since 2009 (2009, 86.56%; 2010, 87.32%; first half of 2011, 90.13%). With a growing but also ageing IMS network, activities undertaken have thus not only mitigated the effects of obsolescence in the network but also reversed the decreasing trend in data availability observed in 2008.

Operation and Maintenance Workshop

6. An Operation and Maintenance (O&M) Workshop was held in San Diego, California, United States of America, from 9 to 13 May 2011. It was attended by 88 participants from 43 countries. The objective of the workshop was to ensure a common understanding of the roles and responsibilities of the PTS, host countries, station operators, contractors and other agencies in ensuring the successful operation and life cycle support of IMS facilities within the framework of the Treaty, policies, regulations and rules. It also aimed to outline the processes, procedures, communication mechanisms and tools for O&M (both internal and external to the PTS) and explain various implementation strategies and methods available for improving system performance. Inputs were gathered from station operators, contractors and other agencies for the purpose of continuously improving and streamlining the work processes, procedures and tools.

Infrasound Experiment in the Eastern Mediterranean Region

7. The IMS and International Data Centre (IDC) Divisions jointly sponsored an infrasound calibration experiment in the eastern Mediterranean region in January 2011. The experiment consisted of two large explosions (with yields of ~10 and ~100 t) designed to generate an acoustic signal in the atmosphere. The explosions were carried out by the Geophysical Institute of Israel at the Sayarim military test range. Twenty-one countries, including many in the Gulf region, collaborated to deploy sensors and make measurements. Portable arrays which had been tested at the PTS waveform test site in 2010 (Conrad Observatory, Austria) were also deployed, two in Oman, two in Greece (Rhodes and the Peloponnese) and one in Djibouti. More than 50 scientists were involved in more than 20 countries during the field deployment and nine PTS staff members assisted in the field. A workshop on infrasound monitoring technology was held on 26-27 January 2011 during the experiment to involve other States Signatories that had not been able to participate in the deployments. The experiment was successful, with the larger explosion detected at IS34 (Mongolia), 6500 km to the north-east.

MAJOR PROGRAMME 1: INTERNATIONAL MONITORING SYSTEM

Management and Technical Coordination

Planning and Project Management

8. Intense PTS-wide planning activities were carried out with the update of the Medium Term Plan, the preparation of the initial draft 2012 Programme and Budget proposals and a detailed human resources exercise for 2012. Improved shared tools were also developed to increase coordination between Sections in planning IMS sustainment activities.

9. Significant efforts were dedicated to contributing to enhancement of the PTS programme management application (PMApp) initiated by the IDC Division in 2010. Enhancements which will be rolled out in the second half of 2011 include additional

tools for project managers, simplified workflows, increased project budget tracking functionalities and the addition of a human resources tracking module.

PTS-Wide Cooperation and Synergies

10. Initiatives continued to promote synergies of PTS efforts and resources in several areas. Support was provided in particular to the On-Site Inspection (OSI) Division on a number of projects. Staff members of the IMS Division participated in the expert group meeting on communications. Hosted by the OSI Division, the meeting aimed at elaborating on the use of high frequency (HF) radio communications and equipment package design. The meeting also included practical installation and testing of equipment with a subsequent analysis of its performance and relevance to OSI field activities (in light of the planned Integrated Field Exercise (IFE) in 2014). The IMS completed the design and technical evaluations for the local area network (LAN) link between the OSI Equipment Storage and Maintenance Facility (ESMF) at Guntramsdorf, near Vienna, and the Vienna International Centre (VIC). Furthermore, the backup system for the database of the OSI geographical information system (GIS) was put into operation. Finally, the IMS Division contributed to defining the requirements and evaluating the bids for the provision of an OSI noble gas system with high throughput under the European Union (EU) Joint Action Project IV, which will be used for the next IFE.

11. Intense collaboration continued with the IDC Division in numerous areas. Highlights are reported in the respective sections of this report.

12. Numerous bilateral meetings were held with hosting States to maintain close contacts and ease the way forward for projects.

Support of Monitoring Facilities

13. Support of certified monitoring facilities continued with the objective of ensuring data availability as foreseen by the relevant draft IMS Operational Manuals. This work involves planning, management, coordination and support for the full life cycle of each facility component. This includes equipment replacement, station improvement and recapitalization, maintenance and other logistics support, performed as efficiently and effectively as possible. Efforts continued with the goals of preserving the investment of the Commission and ensuring that the downtime of facilities be kept to a minimum at optimal cost in accordance with the guidelines on provisional operations approved by the Commission.

Logistics Support

Shipment and Customs Clearance of IMS Equipment

14. Delays in customs clearance of IMS facilities equipment have a substantial impact on data availability of the IMS network. The PTS therefore continued to systematically review and formalize efficient shipment and customs clearance of IMS equipment transported to and from certified IMS facilities on a country by country basis.

15. These efforts started to be rewarded with encouraging improvements with several countries. Yet, practical solutions are still required in numerous hosting States. These solutions continue to be sought in close cooperation with these States to enable swift import and export of equipment to and from IMS facilities free of taxes and customs duties.

16. The PTS continued to monitor closely the impact of these customs clearance and shipment delays on data availability and the difficulties in collecting reimbursements of taxes or customs expenses. Findings were reported accordingly at the Thirty-Sixth Session of Working Group B (WGB) and will continue to be reported regularly to WGB and as requested by the Policy Making Organ.

Configuration Management

17. The validation, audit and improvement of configuration management for IMS facilities continued. Several meetings of the configuration management board took place and baseline information on two more stations was added to the Database of the Technical Secretariat (DOTS). By 30 June 2011, baseline data had been included in DOTS for 251 (99%) of the certified stations.

18. Further enhancements to DOTS were made with the release of DOTS OPS version 3.4.20. Benefits include improved financial tracking features of IMS equipment, upgraded radionuclide station and National Data Centre (NDC) pages and enhanced tracking of decommissioned Global Communications Infrastructure (GCI) links. The PTS also introduced an IMS map functionality, which adds a rich and dynamic presentation layer to the information stored in the database. The module in DOTS presenting information on agreements related to each IMS certified facility was expanded to cover all legal agreements relevant to IMS facilities (exchanges of letters, facility agreements, agreements on independent subnetworks, agreements with tsunami warning centres, etc.) and was handed over to the Legal Services Section for data management.

19. Further progress was made in implementing the 2009 recommendations of the External Auditor on asset management. Accordingly, a review of Administrative Directive No. 19 was carried out jointly with all relevant stakeholders in the PTS. The latest version of DOTS captures some relevant financial information available in the PTS software application for procurement (ProcSys), such as the purchase order number and the actual purchase cost of equipment. With current levels of human resources, however, the PTS is facing challenges to apply asset management practices beyond these activities.

20. The process of continuous validation through audits and reviews was further optimized. The audits include a systematic annual review involving an examination of the station summary report, verification and validation of all information concerning notifications of configuration changes and targeted physical audits by visiting stations with the older and less reliable configuration baselines. No formal physical audit could take place in the first half of 2011 owing to insufficient human resources in the Logistics Support Unit of the IMS Division.

Logistics Support Analysis

21. The PTS logistics programme invested in an information technology tool for logistics support analysis (LSA). This tool will assist the Commission in the decision making process for identifying the most efficient current and future support structure for the IMS. Staff members of the IMS Division received initial training and an initial set of IMS facilities data was entered for modelling purposes. Preparations are under way to enter the information necessary to enable the Commission to benefit from the LSA tool functionalities in forecasting, planning and making decisions related to the IMS support system. The LSA tool can, in particular, assist in predicting life cycle costs for given operational availability levels and in modelling different scenarios to help the PTS optimize its support of IMS facilities and reduce associated costs. The pace of progress to populate the tool will be dependent on the availability of human resources.

Equipment Support Contracts

22. To ensure more timely preventive and corrective maintenance of IMS facilities where data availability is affected, the PTS continued to manage, implement and improve several equipment support contracts with manufacturers. The PTS benefits significantly from such contracts as they improve its capabilities regarding timely response, resupply, repair, technical assistance, training and upgrading of IMS equipment at optimal cost, availability and reaction time. As of 30 June 2011, one support contract for waveform equipment and six support contracts for radionuclide equipment were in place with the original equipment manufacturers and one further contract was under discussion. Progress was also made in negotiations for the establishment of support contracts for noble gas equipment, which are of critical importance to the PTS following the certification of the first noble gas systems in 2010. The PTS initiated preparations to launch maintenance support contracts covering one or several IMS technologies and facilities. These contracts will contribute to shorter PTS response times by extending the capability of the Maintenance Unit of the IMS Division.

Maintenance of Facilities

Maintenance Visits

23. Maintenance support and technical assistance continued to be provided at certified IMS facilities. Maintenance, upgrade, inspection or technical assistance visits were conducted in the first half of 2011 at PS24 and IS32 (Kenya), RN52 (Philippines), RN18, RN19 and IS13 (Chile), RN33 (Germany), PS39 and IS47 (South Africa), AS35 (Germany/South Africa), IS9 (Brazil) and IS41 (Paraguay).

Operation and Sustainment of Certified Auxiliary Seismic Stations

24. The long term operation and sustainment of auxiliary seismic stations continued to attract political attention. At its Thirty-Sixth Session, WGB reiterated its request to countries hosting certified auxiliary seismic stations to adhere to their responsibilities and welcomed the way forward as presented by the PTS. While progress has been made regarding a substantial number of stations, the challenge of obtaining the appropriate level of technical and financial support remains for several hosting countries.

25. In this regard, the EU provides, through Joint Action Project IV, support for the sustainment of the IMS auxiliary seismic stations that do not belong to parent networks and are hosted in developing countries or countries in transition. This initiative includes assessment and actions to bring the stations back to operation. It also encourages targeted host countries to secure a sustainable support structure for their auxiliary seismic facilities. As part of this project, a technical assistance visit was carried out at AS118 (Bolivarian Republic of Venezuela), where the backup power system was repaired and a full review of the station was performed. New visits to AS37 (Guatemala) and AS77 (Peru) were scheduled for July/August 2011.

26. Combined efforts of the host countries, the EU, the station operators and the PTS are being rewarded. The data availability of auxiliary seismic stations has steadily risen since 2009 (78.4%), reaching 82.2% in 2010 and 86% in the first half of 2011. Following the example of the EU initiative, the PTS continued discussions with other countries where parent networks include several IMS auxiliary seismic stations to seek similar arrangements to improve the level of support for some challenging IMS auxiliary seismic stations.

Station Specific Maintenance Strategy

27. The PTS continued to concentrate further on developing the technical capabilities of station operators. As the entity closest to the IMS facility, the station operator continues to be in the best position to attempt to prevent problems from arising and to ensure timely resolution of problems for a given level of data availability. With this in mind, station visits continued to include systematic hands-on training and exposure to problem resolution for the local station operator, with the objective of ensuring that PTS staff members do not have to travel to a station for the same problem twice.

28. With the same goal in mind, efforts were made to develop further a station by station strategy for preventive and planned maintenance activities. Among other initiatives, the PTS continued updating and standardizing the station specific operational manuals (SSOMs) and documentation for waveform and radionuclide stations which support the O&M specific to each station. An improved and more systematic approach continued to be taken by using all sources of support and information on facility operation. As before, certified IMS facilities with limited technical capabilities received higher priority. As of 30 June 2011, all SSOMs for radionuclide (particulate) stations had been reviewed and the first set of SSOMs for waveform stations had been drafted and sent to the station operators for use in the field.

29. The PTS improved its standards of environmental and safety policies and practice in the first half of 2011. Guidelines for the disposal of IMS equipment and consumables were developed and posted on the web page of the Monitoring Facilities Support Section for further implementation. The PTS also developed workplace health and safety guidelines for working at IMS facilities and organized safety courses for staff travelling to IMS facilities.

Recapitalization

30. The PTS continued to recapitalize components of IMS facilities as they reached their planned end of life. During the first half of 2011, major recapitalization and design improvement activities were under way at PS2 and IS7 (Australia), PS7 and IS9 (Brazil), PS9 (Canada), PS24 and IS32 (Kenya), PS27 and PS28 (Norway), PS45 (Ukraine), IS13 (Chile), IS18 (Denmark), IS39 (Palau), IS41 (Paraguay), IS52 (United Kingdom), RN23 (Cook Islands), RN39 (Kiribati), RN46 and RN47 (New Zealand) and RN27, RN29 and RN31 (France).

Network and Systems Support

GCI

31. Three additional very small aperture terminal (VSAT) links were installed: two in Mali and one in the Cocos Islands, Australia.

32. The IMS and IDC Divisions jointly started identifying the IMS stations which require power supply updates with the aim of reducing GCI outages caused by power failures.

Computer Infrastructure

33. Improvements of computer systems continued to be sought to eliminate temporary downtime of service and to accelerate the data backup process. The backup power system of the computer centre performed well during a major power outage which occurred at the VIC on 26 May 2011, enabling information technology services for the organization to continue uninterrupted.

34. High availability of the computing infrastructure (99.99%) was maintained and routine support was provided to users within the agreed time frame (98% of problems resolved within 24 hours and rapid set-up for new users). Following the deployment of Linux workstations in 2009, another set of 40 workstations was delivered during the first half of 2011 to meet demand. The PTS configured the setting for the new Lenovo workstation model and deployed 20 workstations accordingly. The blade system for the office automation infrastructure was installed and put into operation with the successful migration of all hosted services. The PTS also completed the installation of the new Linux GCI mail and domain name system (DNS) servers.

35. With the approaching end of mainstream support for Windows XP, a migration to Windows 7 and Office 2010 is necessary. Preparations for deployment of Windows 7, including a training portal, were completed. Key benefits after the deployment will include optimization of desktop management, improved and centralized security management on desktops and improved productivity of PTS staff as a result of advanced features in the new operating system.

36. The PTS started evaluating possible activities to enhance the stability and reliability of the Web infrastructure configuration. Progress was made with the extensive inventory of the virtual machines and their configuration. Preparations also continued for redevelopment of the Intranet and the design of the new email infrastructure.

Joint Projects of the IMS and IDC Divisions

37. There was progress in a substantial number of joint projects of the IMS and IDC Divisions in the area of information technology. One key ongoing project was the Oracle database farm architecture, which will help to address permanently the technical inefficiencies in the current database system. Support was provided to migrate the test bed and other Oracle servers to the newly created Oracle grid. Backup and storage systems were also extended to fit new requirements. Support was provided in other major information technology projects. The IMS Division completed the configuration of 20 sets of equipment for NDC capacity building. Substantial support was also provided to the IDC Division to complete the configuration and deployment of the new hardware for the atmospheric transport modelling (ATM) infrastructure. A clone of the PTS active directory was provided for the identity management and single sign-on project in order to start testing of the integration of existing services with the software platform. In addition, the hardware for the vDEC was upgraded.

38. The IMS Division contributed to a number of other PTS projects and activities, including the introduction of enhanced capabilities and new functionalities for the public web site, the PTS information technology risk assessment and security audit initiatives and the new open meeting platform to permit remote access to conferences.

Engineering and Development

IMS Establishment

39. The management of the aftermath of the nuclear power plant accident caused by the earthquake and subsequent tsunami in Japan led to a change in the focus of activities within the PTS, in particular for the radionuclide monitoring programme. PTS radionuclide experts contributed to unprecedented efforts in analysing samples and reporting findings of samples collected globally from the IMS network. While providing a unique system-wide test opportunity from a CTBT verification point of view, this event had an impact on the pace of progress in the radionuclide monitoring activities, delaying in particular the certification of radionuclide particulate stations and noble gas systems.

40. Nevertheless, the momentum to complete the IMS network was maintained, with substantial progress being made in the installation programme and political advances achieved with the support of countries to establish some of the remaining IMS facilities where the PTS was not able proceed in previous years. While no certifications of IMS facilities took place in the first half of 2011, preparations for certification or installation in 2011 are well under way at 13 IMS stations.

41. Four IMS stations were installed in the first half of 2011, bringing the total number of installed IMS stations to 276 (86%). Given their remote locations and technical complexities, these stations represent substantial achievements for the Commission.

42. A summary of the status of the establishment of the IMS is presented in Tables 1-3.

Table 1. Status of the IMS Station Installation and Certification Programme as of 30 June 2011

IMS Station Type	Installation Complete		Under Construction	Contract Under Negotiation	Not Started
	Certified	Not Certified			
Primary seismic	42	4	1	0	3
Auxiliary seismic	99	12	3	2	4
Hydroacoustic	10	1	0	0	0
Infrasound	43	1	4	1	11
Radionuclide	60	4	6	5	5
Total	**254**	**22**	**14**	**8**	**23**

Table 2. Status of IMS Noble Gas System Installations and Certifications as of 30 June 2011

Total Number of Noble Gas Systems: 40	Installed: 27	Certified: 3

Table 3. Status of Radionuclide Laboratory Certifications as of 30 June 2011

Total Number of Laboratories: 16	Certified: 10

Seismological Monitoring System

43. In the primary seismic monitoring network, progress continued in the preparation for installation of PS35 (Russian Federation) and advances were made to initiate the establishment of PS11 (Central African Republic). PS34 (Russian Federation), which was certified in 2010, was promoted to IDC operations. By the end of June 2011, the total number of installed primary seismic stations was 46 (92%), of which 42 (84%) were certified.

44. In the auxiliary seismic monitoring network, installation work was completed at AS7 (Bangladesh) and AS62 (Mali). As of 30 June 2011, the number of installed auxiliary seismic stations was 111 (93%), of which 99 (83%) were certified. Preparations continued for the installation in 2011 of AS33 (France) after approval of new coordinates by WGB at its Thirty-Fifth Session. Arrangements are also well under way to install AS82 in 2011 and AS90 and AS92 in the first half of 2012 (all in the Russian Federation). Following positive developments with Papua New Guinea, the PTS continued contractual negotiations for the installation and construction of AS76. AS91 (Russian Federation) was promoted to IDC operations and AS7 (Bangladesh) to the IDC test bed in preparation for their certification in the second half of 2011.

Hydroacoustic Monitoring System

45. By 30 June 2011, 10 stations (91%) of the hydroacoustic monitoring network were certified. Work continued to identify a long term sustainable solution for the deployment of HA4 (France).

Infrasound Monitoring System

46. Further progress was made in the establishment of the infrasound monitoring network, with the installation of IS19 (Djibouti) and consequent data transmission to the IMS laboratory. Construction started at IS6 (Australia), which is scheduled to be installed in the second half of 2011. Preparations also continued for the construction of IS37 (Norway) to start in the second half of 2011. Following positive developments with Papua New Guinea, the PTS also continued contractual negotiations for the installation and construction of IS40. By the end of June 2011, 44 stations (73%) of the infrasound monitoring network were installed and 43 (72%) were certified. The relocation of IS25 (France) from French Guiana to Guadeloupe was presented at the Thirty-Sixth Session of WGB. Discussions on this topic will continue at the Thirty-Seventh Session of WGB.

Radionuclide Monitoring System

Particulate Stations

47. The installation and initial testing phases were completed at RN44 (Mexico), bringing the total number of installed IMS radionuclide particulate stations to 64 or 80%, out of which 60 (75%) are certified. Equipment installation continued at RN7 (Australia), while preparations for the installation of equipment at RN55 (Russian Federation) progressed. Following positive developments with Brazil, the PTS resumed contractual negotiations for the installation and construction of RN12. Finally, the PTS initiated the procurement process for the large project of establishing RN32 (France) in Antarctica.

Radionuclide Laboratories

48. Progress was also made in the IMS radionuclide laboratory network. Of the 16 laboratories foreseen by the Treaty, 10 (63%) are certified. Preparations for the certification of three additional laboratories progressed between January and June 2011. A certification visit was conducted at RL9 (Israel), while steps were made towards the certification of RL10 (Italy) and RL13 (Russian Federation). The quality assurance/quality control (QA/QC) activities for the radionuclide laboratories also continued, with the evaluation of the 2010 Proficiency Test Exercise (PTE) and further analysis of results. Progress in the QA/QC programme included the revision of the PTE evaluation software. A surveillance visit was carried out at RL16 (USA).

Noble Gas Systems

49. In accordance with the request of the Commission, the noble gas monitoring technology continues to be treated as a high priority. However, the pace of progress for the certification of noble gas systems slowed down in the first half of 2011 owing to the temporary refocusing of activities on the Fukushima accident and to cross-contamination issues at several noble gas systems. Nevertheless, the PTS managed to make progress, with the installation of a noble gas system at RN13 (Cameroon) and with the preparations for the installation of noble gas systems at RN43 (Mauritania), RN44 (Mexico) and RN60 (Russian Federation) and for the certification of six additional noble gas systems scheduled in the second half of 2011. Noble gas system certification visits were carried out at RN66 (United Kingdom) and RN77 and RN79

(USA). Moreover, the PTS conducted a coordination visit for the upgrade of the noble gas system at RN16 (Canada). As of the end of June 2011, upgrade work was ongoing or in preparation for six noble gas systems.

50. Investigations of the cross-contamination issues affecting SPALAX noble gas systems, conducted in cooperation with the Commissariat à l'énergie atomique (CEA), Health Canada and Environnement S.A (the manufacturer of SPALAX), are enabling the PTS to resume certification of these systems in the second half of 2011. A cross-contamination issue was also resolved at RN74 (USA). The factory acceptance test of the SAUNA mobile noble gas system under EU Joint Action Project III was successfully completed.

51. The QA/QC activities for noble gas systems continued with reanalysis of 64 samples from 17 stations, analysed at four laboratories. Certification requirements for noble gas equipment in IMS radionuclide laboratories have been elaborated and are documented in CTBT/PTS/INF.96/Rev.8 (to be presented to WGB at its Thirty-Seventh Session).

52. Data from the 27 noble gas systems (ARIX: 3; SAUNA: 14; SPALAX: 10) at IMS radionuclide stations in provisional operations at the end of 2010 are being sent to the IDC and processed in the testing environment. Significant efforts were undertaken to ensure a high level of data availability through preventive and corrective maintenance and regular interactions with station operators and system manufacturers.

Engineering and Development Programme

53. The PTS continued a dynamic engineering and development programme in the first half of 2011 to continue increasing data availability and data quality. This included the development and implementation of cost effective solutions to address engineering problems arising at certified IMS stations. Moreover, engineering initiatives progressed to enhance IMS monitoring facilities and noble gas systems and to improve the performance and capabilities of associated technologies.

54. The strategy implemented to improve the performance and the robustness of the IMS stations relies essentially on designing, validating and implementing solutions to improve testability, maintainability, reliability and resilience. The underlying element is based on an open system design strategy that consists of standardizing interfaces and increasing modularity. At the heart of this strategy, the IMS standard station interface (SSI) was further enhanced. The development of the following new SSI modules was initiated: calibration, key management, command and control, and integration of the state of health (SOH) system.

55. Recognizing the need for interaction between station operators and the PTS beyond the traditional O&M tasks, and that involvement of station operators in technology development is essential for cross-fertilization, capacity development and long term sustainment of stations, a new engineering and development Web portal was launched (*http://eng.ctbto.org*). It provides open access to engineering documentation, projects and products as well as a forum for technical discussions.

Engineering Processes

56. There was continuous review, evaluation and improvement of formalized engineering processes with the following results:

    (a) Technical drawings were completed for the first set (40) of certified IMS waveform stations and were started for 10 radionuclide and 12 more waveform stations.

    (b) A standardized failure analysis system for IMS stations was further developed, including failure analysis for noble gas systems. Results of a failure analysis of waveform stations carried out in 2011, results of the 2010 failure analysis of radionuclide stations and a summary of level 3 IMS station maintenance visits were presented in a PTS non-paper released on the Experts Communication System (ECS) regarding measures taken to improve data availability. Findings of radionuclide failure analysis and progress on station issues were also presented and discussed in the radionuclide expert group at the Thirty-Sixth Session of WGB.

    (c) A technical risk register was completed for primary seismic stations and progress continued in populating the register with data for infrasound stations. This register constitutes a major technical basis for the planning of recapitalization and station improvement activities.

State of Health System

57. The system-wide SOH system was further enhanced by integrating an SOH visualization that included all key elements of the system (IMS, GCI and IDC), available for external users (integrated portal: *https://sohtest.ctbto.org*). The SOH system is essential for supporting trend analysis, which can lead to efficient preventive action.

Improvements at IMS Facilities

58. Progress also continued in the design of solutions to support improvements of IMS stations. Highlights included the following:

    (a) Call-off contracts were concluded for the provision of standard alarm systems with a view to enhancing security aspects at relevant IMS stations. Preparations were started to implement such systems at 13 stations in 2011 and 2012.

    (b) Orders were placed to replace the obsolete intra-array communication systems at nine waveform stations with the standard system designed in 2010. Such a new standard is adaptable to radio, fibre optic or copper wire media.

    (c) Progress was made in modelling efforts for the infrasound wind noise reduction system. Joint modelling work was done with the Département analyse, surveillance, environnement (DASE) of the CEA.

    (d) A new AutoDRM acquisition module was redesigned and installed at nine auxiliary seismic stations in the Russian Federation, improving substantially the performance of the stations.

(e) As part of assessment activities for new microbarometers, the in-house testing of ISGM-3M sensors (Russian Federation) was finalized and a test report was prepared. Results include evaluation of the self-noise of the sensors and side by side comparison of the sensors.

(f) The lightning protection and power supply systems were improved at four IMS facilities. Lightning and power surges have been identified as two of the main causes of extended data outage at IMS stations.

(g) A study of station response and data reprocessing of the collocated stations PS2 and IS7 (Australia) started. Both stations require substantial redesign and improvements.

(h) Seven three-component hybrid broadband sensors were installed at PS27 (Norway) and are under evaluation jointly with NORSAR.

(i) The programme to test generators for the supply of liquid nitrogen to cool detectors progressed. The PTS continued the assessment of the liquid nitrogen generator (ELAN 2) installed at the radionuclide test station in the VIC and started a project with the manufacturer to address current shortcomings and build the next generation LN2 generator for the cooling of detectors. Alternative cooling systems are critical to improve the reliability of radionuclide stations where the detection system, in particular the cooler, is currently the major cause of downtime.

(j) The PTS followed the improvements made in 2010 in the data availability performance of the SPALAX noble gas system in cooperation with the CEA. Design improvements were compiled and cooperation continued with the CEA, Health Canada and Environnement S.A to address the implementation schedule and further improvement plans.

(k) Data loggers for manual radionuclide particulate stations were tested. A model was selected for implementation as a standardized logger fitting all such stations.

(l) The new Linux based software for the RASA noble gas system was installed at RN75 (USA) for testing. Preparations were also started to improve RASA systems in cooperation with the Pacific Northwest National Laboratory (RL16) in the USA.

(m) The development and manufacture of an upgrade prototype of the SAUNA noble gas system continued. The major components of the system have been assembled.

Repair of HA3/IS14

59. The PTS progressed with the major repair project at IMS stations HA3 and IS14 (Chile) in accordance with the plans set out in CTBT/PTS/INF.1103. The first of the five phases of the project was completed with the site survey of the new cable routes in the Juan Fernández Islands. It was carried out to assess possible changes in the distribution of sediment and obstacles on the sea floor resulting from the tsunami in 2010. The latest high resolution multibeam sonar hardware and data processing software were used to produce the best images so far of the sea floor. This will lead to better cable routeing and protection measures for future repairs and replacements of hydrophone systems.

60. The PTS also initiated an independent expert evaluation to review the specifications for the design, manufacture and installation of the system replacement, new cable routes and the associated scope of work, addressing in particular risks and quality assurance.

61. In parallel, the procurement process for the signal marker buoy replacement at HA3 was completed.

62. Preparations progressed for the second phase of the project to replace the shore station. In close cooperation with the Chilean authorities and the station operator (the Chilean National Authority, the Chilean Commission for Nuclear Energy (CCHEN)), options were evaluated to locate the building and equipment on higher ground above historically recorded tsunami inundation levels. Best efforts are being made to replace the collocated central recording facility by mid-December 2011, thereby returning IS14 to full operation.

Technology Development: Technology Foresight

63. The PTS is engaged in a technology foresight exercise in support of its commitment to uphold the relevance of its technology intensive system, as well as to ensure awareness of developments in science and technology that could enhance the performance and efficiency of systems and operations. This is a process whereby scientists and technologists meet, interact, debate and jointly define future courses for CTBT related research and development. It involves an iterative cycle of workshops on various themes, the definition of pilot projects and funding of these projects from various sources. Several steps were taken in the first half of 2011 to continue to engage the Commission and the wider science and technology community in technology foresight.

64. In support of these activities and in the framework of EU Joint Action Project IV, the PTS launched a new web site with an online survey and collaboration tool (*http://tfcs.ctbto.org*). The technology foresight exercise is structured around seven technology themes: monitoring infrastructure and communication technology, monitoring enabling technologies, data handling and processing enabling technologies, value-adding and application technologies, geospatial information technology, underground nuclear explosion observables and measurement technology, and technology concepts and systems analysis for non-proliferation and arms control verification. A first assessment to identify major topics and technology trends in these areas was completed and released in the form of a ‘technology watch’ document and a wiki. Preparations for contracting bibliometric expertise were also completed.

65. A highlight of the technology foresight activities in the first half of 2011 was S&T2011 in June. In addition to the technology advances presented at the conference, a technology foresight survey was completed by more than 80 participants and provided valuable inputs. The results will be made available on the web site.

66. Preparations started for the 2011 Infrasound Technology Workshop to be held in Jordan from 30 October to 5 November 2011, the 2011 IMS radionuclide laboratories workshop planned for 24-27 October 2011 in Vienna in cooperation with radionuclide laboratory RL2 in Seibersdorf, Austria, and the 2011 workshop on noble gas monitoring. The PTS contributed, as joint convener, to the set-up of sessions on science

and nuclear test ban monitoring and scientific results for sea floor observatories at the 2011 meeting of the International Union of Geodesy and Geophysics (IUGG), where it also submitted abstracts. The PTS also participated actively in events at the 2011 meeting of the European Geosciences Union (EGU) and held side meetings with many experts on CTBT technologies. Finally, the PTS contributed to a workshop of the Institute for Nuclear Materials Management (INMM) and was invited to present a paper on IMS hydroacoustics at the conference of the Acoustical Society of America (ASA) in Seattle, Washington.

Calibration

67. In addition to improving the performance of IMS stations, the PTS pays great attention to ensuring a trustworthy IMS network. It therefore continued to develop and perform calibration activities.

68. The PTS progressed with the following calibration activities during the first half of 2011:

(a) The IMS Division started coordinating with the IDC Division and station operators the implementation of the calibration of primary seismic stations in accordance with the schedule presented at the Thirty-Fifth Session of WGB. Full frequency calibration of the primary seismic array was performed at 30 IMS stations during the first half of 2011. Procedures documentation, implementation methodology, automatic reporting and analysis of pulse and random binary calibration were developed accordingly and the assessment of results was started.

(b) Development work continued on a prototype beta–gamma calibration software for verification of station calibrations.

(c) Development of the calibration module for seismic stations equipped with the SSI was initiated in March 2011.

MAJOR PROGRAMME 2: INTERNATIONAL DATA CENTRE

Management and Technical Coordination

Project Management

69. The IDC Project Coordination Office worked closely with the IDC Director and Section Chiefs on numerous PTS-wide tasks, including the update of the Medium Term Plan, preparation of the initial draft 2012 Programme and Budget proposals, and an intensive and detailed human resources exercise for 2012 based on the foreseen programme of work. Furthermore, the Project Coordination Office was fully involved in the tracking and communication of information in relation to the Fukushima accident, from the ATM of the radionuclide particles and the tracking of internal and external communications to the capture of lessons learned. Furthermore, the mobilization of additional human resources, both internally and from outside the PTS, was necessary owing to the significantly increased workload generated as a result of the massive increase of data from the earthquake, tsunami and nuclear accident.

70. In continued support of the PTS focus on project based management, the IDC Division undertook procurement of additional PRINCE2 foundation and practitioner courses for 2011 and 2012, the first of which will take place in July 2011. The IDC-initiated PMApp, which was rolled out PTS-wide in 2010, underwent significant enhancement and streamlining in the first half of 2011 on the basis of feedback from the project manager and the need for more detailed tracking of deliverables against plan. The new version is planned to be rolled out PTS-wide by the end of the third quarter of 2011.

Enterprise Resource Planning

71. The Enterprise Resource Planning (ERP) project is well under way, including recruitment of the project team and evaluations of several ERP systems being implemented in various United Nations organizations. The evaluations led the project management team to a practical solution of 'piggybacking' on an existing system whose processes best fit PTS requirements. The savings in time and expense are necessary to complete the project within the ambitious time and budgetary constraints.

Public Key Infrastructure

72. A test of the Public Key Infrastructure (PKI) was started in March 2011 with the aim of examining the authentication capability of the IDC, IMS stations and NDCs. The following countries volunteered and nominated individuals, stations and/or NDCs to participate in the ongoing test: Armenia, Canada, France, Germany, Ghana, Italy, Israel, Japan, Norway, Oman, Romania, Spain, Tunisia, Uganda, the United Kingdom and the USA.

73. The objectives of the test are to improve established PKI concepts, procedures and processes, identify training requirements for the PKI stakeholders (PTS, PKI operators and NDCs) and check compliance with PTS authentication and command and control reference materials. Lessons learned from this test will guide the large scale deployment of the PKI for IMS facilities.

PTS Information Security Risk Assessment

74. A PTS-wide information security risk assessment was completed during the first quarter of 2011. The assessment was successful in identifying vulnerable areas that required improved security measures in order to augment the information technology security posture. One key deliverable is an information security road map, which provides recommendations on tasks and activities to be carried out in order to ensure continual security improvement.

75. An information security governing policy was drafted and is currently being reviewed and discussed within the PTS. Once finalized, this policy will be put to senior management for consideration and endorsement.

GCI Security

76. The security of the GCI continued to be reviewed and improved. This included further discussions with the GCI contractor in mitigating risks and implementing recommendations from the completed GCI security review.

Performance Monitoring and Testing

77. The IDC Division continued to implement its part of the Quality Management System (QMS) through improved processes, which are documented, monitored and tested when appropriate as part of normal activities. Continual improvement is sought in both the processes and in the metrics used to measure them. For example, using the new requirements in the draft operational manuals, working definitions for data availability metrics were developed that allow the PTS to monitor IMS data more effectively.

78. The timeliness and completeness of IDC automatic waveform bulletins were evaluated and actions were taken to bring the timeliness of these products into compliance with the new requirements in the draft IDC Operational Manual.

79. Performance monitoring and testing activities contributed to progress towards commissioning of the IDC. To facilitate the progress a preliminary draft of an IDC validation and acceptance testing plan was being brought to completion.

Monitoring and Data Analysis

80. Higher than normal seismicity during the Christmas and New Year holiday period and the aftershocks following the Tohoku earthquake of 11 March 2011 had a considerable impact on the delivery of the Reviewed Event Bulletin (REB). For the first six months of 2011, the number of events in the REB was 40% greater than average. Some 10 000 of these events were aftershocks from the Tohoku earthquake. The issuance of the REB was delayed during the analysis of this aftershock sequence and was brought within WGB guidelines by the end of June 2011.

81. Similarly, the tsunami generated by the Tohoku earthquake and the Fukushima accident had an impact on the radionuclide data products. More than 400 particulate spectra were categorized as Level 5 during this period, compared with 12 for the previous year. The increased workload due to the analysis of these complex spectra delayed the release of the Reviewed Radionuclide Report (RRR) in March and April 2011. Additional human resources were used to assist the PTS in bringing the delivery of both the REB and radionuclide products within WGB guidelines.

82. Review of noble gas data in IDC operations commenced with the installation of new radionuclide software. On 10 June, the first noble gas RRR was released and the noble gas data from certified stations continued to be reviewed by an analyst on a daily basis. Currently, three certified noble gas systems are undergoing review in operations.

83. Data from three noble gas systems at stations RN66 (United Kingdom), RN74 (USA) and RN79 (USA) and from one particulate station (RN44, Mexico) were tested in preparation for the promotion of these stations to operations.

84. Following the return of infrasound analysis to IDC operations in February 2010, analysis was undertaken by a joint review team within the IDC as analysts continued to gain experience in this technology.

Capacity Building and Training

Capacity Building

85. Capacity building efforts focused on Africa and on Latin America and the Caribbean with the support of the EU under Joint Action Projects II and IV. Briefings were provided to these regional groups in this regard.

86. PTS activities included NDC development workshops, advanced regional training courses and expert visits in the field for on the job training. For some States Signatories, the PTS provided a set of NDC basic equipment which allowed these countries to either strengthen or establish their NDCs. The objective of this capacity building project is to increase the capability of States Signatories to participate fully in the verification regime and to enhance their civil and scientific activities by obtaining, analysing and reporting on the data and products available from the PTS.

87. Under EU Joint Action Project III, sets of basic NDC equipment provided to Algeria, Mozambique and the United Republic of Tanzania were installed, and on-site training will be provided in the near future. Under the Regular Budget of the Commission, NDC equipment was installed and commissioned in Kenya and Vanuatu. In addition, arrangements are being made for the installation of the equipment in the Central African Republic, Haiti and Senegal. Technical visits of experts for the installation and commissioning of this equipment and for training are being prepared.

88. The implementation of the memorandum of understanding between the United Nations Educational, Scientific and Cultural Organization and the Commission continued, in particular through the joint assistance for Haiti. The assistance will include the installation of basic equipment for the establishment of an NDC as well as on-site training. It is also foreseen that this equipment will be used in the near future for the establishment of a tsunami warning centre.

Training, Workshops and Technical Meetings

89. A technical training programme for three station operators of the SPALAX noble gas system was held in Paris from 11 to 15 April 2011. The participants received training on the technical basis of a SPALAX system and the practical capabilities to perform repairs that may be necessary during its operation. Furthermore, they benefited from hands-on training and practical lessons on SPALAX equipment that are imperative for its maintenance.

90. A training programme on O&M for 15 IMS waveform station managers was held in Vienna from 6 to 8 June 2011. The course provided a basic knowledge and technical understanding of the procurement process and familiarized station managers with the preparation and adjustment of the station budget. In addition, it enhanced the

understanding of the station managers in regard to the planning of the O&M of IMS stations.

91. A technical meeting on seismoacoustic data fusion took place in Vienna from 6 to 7 June 2011. The purpose of the meeting was to discuss the enhancement of the seismoacoustic data fusion activities and the detection capability of the IMS seismic, hydroacoustic and infrasound networks. Furthermore, it examined the utility of infrasound as a potential event screening tool, determined to what extent infrasound pipe filter responses can be removed from automatic processing, and initiated an infrasound detector comparison exercise and examined methods to determine the transfer function from H to T phases.

92. A technical meeting on novel processing and visualization methods for large event and aftershock processing took place from 6 to 7 June 2011 in Vienna. The meeting provided a forum to discuss strategies to process the large number of aftershocks that follow a large event and increase the analyst workload. Experts in machine learning, signal processing, data mining, artificial intelligence and data visualization were invited to recommend strategies that can be pursued with specific projects.

Software Applications

Software Integration

93. The PTS continued the project to replace the software for delivering much of its data and products to States Signatories with a more modern, extendable, reliable and scalable system. During 2011, the system is undergoing further systematic in-house testing as well as user-driven testing by cooperating NDCs. The requirements for the data acquisition part of the system, used to gather radionuclide data as well as auxiliary seismic data, were compiled and the replacement work started in June 2011.

94. New radionuclide analysis software was installed in IDC operations in the Linux environment on 9 June 2011. A first RRR for particulate stations was released on 9 June and the first noble gas RRR was made available on the secure web page on 10 June. The software includes the complete data processing pipeline for particulate and noble gas data, the automatic analysis and additional tools for the data review by analysts. In addition, products are generated for both noble gas and particulate samples, including Automatic Radionuclide Reports (ARRs), RRRs, Radionuclide Laboratory Reports (RLRs) and Standard Screened Radionuclide Event Bulletins (SSREBs). New product formats have been implemented as discussed in the radionuclide expert group. Products for noble gas data are now available in HTML format, replacing the ASCII based ARRs and RRRs which are still produced for the particulate data. In addition, XML based products were created for beta testing. This extension was requested by the radionuclide expert group in order to supply radionuclide databases at NDCs. A new Web service to display the concentrations of particulates and noble gases registered by IMS monitoring facilities was deployed and integrated into the IDC secure Web server.

95. All radionuclide software components were developed over the past six years. This new system provides improved throughput with generally better quality. The methodology applied in the new software and the corresponding computational code can safely be

used in the general purpose gamma ray spectrometry framework of the IDC. In addition, the new software package supports the analysis of noble gas data and enables this technology to become fully operational.

96. Following the introduction of infrasound processing into operations, the Software Applications Section of the IDC Division continued to provide guidance in the daily analysis of detected infrasound events and to assist with the training of analysts. All basic analyst training was completed in early 2011. Infrasound specialists in the Software Applications Section continued to work closely with analysts and with the Engineering and Development Section of the IMS Division to test and validate new and updated stations and help solve operational problems. The software for automatic and interactive infrasound analysis continued to be tuned and modified to reduce false alarms and improve the detection rate.

Mobile Noble Gas Monitoring Systems

97. As a follow-up to EU Joint Action Project II to measure the global background level of radioxenon, Joint Action Project III was initiated to develop new mobile measurement systems to perform long term measurements with atmospheric variations. Both a SPALAX system (Environnement S.A, France) and a SAUNA II (Gammadata Sauna Systems AB, Sweden) were manufactured. The SAUNA II system was installed in a transportable xenon laboratory provided by the Pacific Northwest National Laboratory (USA) and the completed system was delivered to the PTS on 6 June. The system began normal operations at the VIC on 16 June and has been undergoing further testing. The SPALAX equipment was installed in a mobile container and is undergoing factory acceptance testing, with delivery scheduled for September 2011.

98. After these systems are delivered to the PTS, a two week training course is planned. Subsequently, the systems will be shipped and deployed. The project will serve to provide further information on how radiopharmaceutical facilities affect CTBT related noble gas analysis and to refine substantially the global radioxenon inventory. It will increase the knowledge of how to distinguish Treaty-relevant events from normal background events.

99. After a period of negotiations, two sites, in Indonesia and Kuwait, were identified for deployment of the mobile noble gas monitoring systems. The local experts of the hosting institutes will be trained in the operation of these systems in September 2011. The current plan is for measurement campaigns shipped in October to start in November 2011. Analysis of data is expected to begin by the end of the measurement campaign in June 2012.

Strengthened Cooperation with the Scientific Community

100. Under EU Council Decision 2010/461/CFSP, the PTS was provided with funding to help keep abreast of global technological and scientific advances and maintain the credibility of the CTBT verification system. To help meet this objective, a series of seven workshops related to CTBT technologies was planned. During the first half of 2011, four workshops were held on multispectral methods, seismoacoustic data analysis, novel processing and visualization methods for large event and aftershock

processing, and active seismic methods for OSI. The outcomes of the workshops are to be used to define promising projects to improve the monitoring system. The Decision also provides for computer system administration support for the vDEC and support for technology foresight studies to assist in focusing PTS development efforts.

101. The vDEC platform was deployed and an operator contracted to manage the procedures to run the IDC software, upload data and provide software configuration services and guidance. To facilitate use for S&T2011, a legal framework was established to enable scientists to have cost-free access to the platform. Several researchers took advantage of this opportunity to acquire data for presentations at S&T2011. The vDEC platform is also providing a means for contractors and consultants to work remotely and several projects are actively using vDEC to coordinate their work with the PTS.

Operations

Operations Centre

102. The Operations Section continued to manage the single point of contact email account for station operators and authorized users (*support@ctbto.org*). During the first half of 2011, over 650 requests received from authorized users were addressed and 466 were resolved. The Operations Section also continued to work on the development of new procedures for dealing with requests for support from authorized users and the definition of key performance indicators (KPIs) to monitor the services provided to users.

103. The design of version 2.0 of Alert Manager was started in order to match new specifications in the SOH system. Alert Manager will create IMS Reporting System (IRS) reports in the JIRA (incident reporting and tracking system) version of the IRS when the monitored parameters in the SOH system (input voltage, GCI packet loss, data availability, entrance door open, GCI traffic, etc.) are outside a valid range. This software will evaluate the metric for each parameter every 10 minutes for 24 hours a day, 7 days a week.

104. All necessary plug-ins for migrating the IRS to JIRA were developed and are in the testing phase. Data migration scripts are under development. A period of six months in which the old IRS and the JIRA-IRS will be used in parallel will be started in November 2011. The integration of all PTS-wide incident reporting and tracking systems is under development using JIRA as the core tool.

Operation of Monitoring Facilities

105. The regular duties of monitoring the facilities that maintain PTS operational capacities continued. One uncertified auxiliary seismic station, one uncertified radionuclide station and one certified primary seismic station were transferred into IDC operations. As of 30 June 2011, the total number of IMS stations and radionuclide laboratories (certified and uncertified) in operations was 266.

106. Negotiations were initiated and contracts for testing and evaluation (T&E) or post-certification activities (PCAs) were in preparation for four stations: IS42 (Portugal),

PS41 and RN65 (Thailand) and IS19 (Djibouti). After technical and financial evaluation and negotiations with station operators, revised PCA budgets were approved for stations in Kiribati (RN39) and Malaysia (RN42). Proposals for stations in Finland (PS17) and Ukraine (PS45) were submitted for approval. In addition, revised budget proposals were technically evaluated for four stations: RN13 (Cameroon) and HA9, RN68 and IS49 (United Kingdom).

107. The PTS continued to standardize the services provided under PCA contracts. New stations received the O&M plan template during the PCA negotiations and the standardization is reflected in the proposed services as well as in the evaluation criteria for these services. The focus during this period was on establishing metrics to evaluate the performance of station operators based on the planned maintenance activities and the performance of the stations. Software is under development to assist in the evaluation of station operator performance against the proposed PCA services.

108. To propagate understanding of the requirement for standardization of PCA services, a course for station managers was included in the training programme for station operators. The emphasis of the programme was on the planning and reporting of O&M and the PTS procurement process related to PCA activities. The course was provided to managers of new stations and managers of stations that have not recently renegotiated their PCA budget.

109. The PTS continued to provide support to station operators by monitoring the SOH of stations and providing advice to station operators on the resolution of incidents affecting data availability and quality. These efforts contributed to improvements in data availability during the first half of 2011. The average data availability has increased by around 3% and is the result of improved synergy among the different entities involved in station O&M: the PTS, station operators and the GCI contractor.

110. The Monitoring Facilities Operations Unit of the IDC Division actively participated in several IDC and PTS-wide projects such as the calibration of seismic stations, the implementation of a data quality monitoring system for waveform stations, the PKI experiment (paragraphs 72-73) and the development of station specific documentation.

111. The PTS continued with the smooth transition of 22 noble gas systems into operations. The Monitoring Facilities Operations Unit is responsible for the monitoring and incident handling of these systems, evaluating monthly reports and jointly evaluating contracts for T&E and PCAs. A new software for the radionuclide operations support system is under development to enhance the functionality of daily monitoring and quality review of raw data for all radionuclide stations, including particulate and noble gas systems, and to prepare for the integration of radionuclide monitoring into the Operations Centre.

112. The regular QA/QC of the radionuclide network and Level 5 sample management continued. After the Fukushima accident and the consequent release of radionuclides, which affected the entire northern hemisphere and several zones in the southern hemisphere, 421 samples from 37 IMS radionuclide particulate stations were categorized as Level 5. Considering the high workload and limited availability of certified radionuclide laboratories, it was decided by the PTS that each station detecting Level 5 samples related to the accident would not send all such samples to the certified

laboratories but would send at least one, though no more than necessary to clarify the detection. By 30 June, 54 Level 5 samples (split into 108 half-samples) had been sent to laboratories for analysis. Assessment of comparisons between station and laboratory results for these Level 5 samples will be discussed during the IMS radionuclide laboratories workshop in October 2011 (paragraph 66).

Operation of Networks and Systems

113. As of 30 June 2011, 223 GCI links, including very small aperture terminals (VSATs), virtual private networks (VPNs) and multiprotocol label switching (MPLS) links, were active and being monitored on the GCI II network. In addition, work continued on migrating the 26 VPN links that were managed by the PTS in January 2011.

114. In January 2011, the PTS initiated a project for the migration of its site to site VPN links under the control and management of the GCI contractor. A total of 28 VPN links, which include existing and several new VPN links, were on schedule to be fully under the management of the GCI contractor by mid-July. By the end of June, 22 VPN links had been migrated.

115. The GCI availability suffered a decline in February and April due to communication link failures in the area of the Norway satellite teleport. Measures have been taken to improve the redundancy of the communications link at this location. Tests conducted in May confirmed improved reliability.

116. GCI II activities concentrated on quality checks of all network monitoring systems and of the performance of the GCI sites against the requirements of the service level agreement. Two quarterly planning and approval meetings were held with the GCI contractor. The meetings reviewed all aspects of GCI II performance to date and identified issues for attention in engineering and operations.

117. At the end of June 2011, the GCI service review was nearing completion. Measures to address the findings will be consolidated into a prioritized work plan so that resolution by the GCI contractor can begin in the second half of 2011.

118. Following a competitive bidding process the Internet service provider (ISP) contract between the PTS and COLT Telecom was extended and the contract with Telekom Austria/A1 was terminated. Kapper Network-Communications GmbH has been acting since 15 June 2011 as the second ISP for the PTS. As part of the contract renewal the effective Internet bandwidth for the PTS has been increased from 10 megabits/second for each ISP to 50 megabits/second for each link. This increased bandwidth should be sufficient to meet the requirements expected during the next three years.

119. The PTS firewall was upgraded to the latest software release which is available for the deployed configuration. This version includes all recent software improvements and bug fixes.

120. The old one-time-password server software was replaced with a redundant appliance configuration hosting the latest RSA authentication server software. At the same time,

all 500 RSA SecurID one-time-password tokens with an expiration date of 30 June 2011 were replaced with new tokens.

121. As disclosed on 17 March 2011, RSA, which is now the Security Division of the EMC Corporation, was the victim of a cyberattack. In an "Open Letter to RSA Customers" later in 2011, it was reported that a prominent RSA customer was subject to another attack on 2 June 2011 involving information items stolen during the attack against RSA in March 2011. As a consequence, RSA announced a remediation programme which may include an option to replace all SecurID one-time-password tokens of the PTS with more recently manufactured tokens. No security incidents related to this issue have been observed at the PTS so far.

Automatic Processing Systems

122. The bulk of the work concerning automatic processing systems consists of the ongoing support of the processing pipeline, which includes normal configuration changes, such as station and detector installations, activations and deactivations, and troubleshooting when the pipeline fails to work as expected. Troubleshooting requires, on occasion, observation and intervention outside office hours.

123. The tsunami of 11 March 2011 and subsequent events affected the processing system in many ways. Previously unseen data volumes required significant manual intervention to keep the pipelines working as expected. Among the changes made was a quick configuration of a 'data pool' for Japanese auxiliary stations, which reduced the data volume over the satellite link to manageable levels, demonstrating the usefulness and potential savings of the data pool concept.

124. All major databases of the verification system and several auxiliary databases (such as ProcSys and DOTS) were migrated to a 'database farm', a newly built grid of computers for increased operational reliability. Most databases were converted to Oracle 11g in the process. In constructing the database farm 'cluster', support was needed from other sections, such as the Operations Section of the IDC Division and the Network and Systems Support Section of the IMS Division. A small project to investigate the feasibility of replacing Oracle database servers with open source alternatives was concluded positively.

125. The installation of new radionuclide analysis software in IDC operations involved a significant migration effort for the Automatic Processing Systems Section.

126. Support for ongoing software development efforts in the IDC continued, with configuration management and software life cycle management being carried out for the Software Applications Section.

127. The Automatic Processing Systems Section developed a system to keep track of software change requests, and implemented this on the JIRA platform. The system is operational.

MAJOR PROGRAMME 3: ON-SITE INSPECTION

Key Major Programme Developments

128. Key developments within Major Programme 3 related to the implementation of the OSI action plan (CTBT/PTS/INF.1020 and CTBT/PTS/INF.1106) as well as the preparation of the concept for the planning, preparation and conduct of the next IFE (CTBT/PTS/INF.1105). In addition, work focused on the continuation of implementation of the second training cycle and further development of standard operating procedures (SOPs) and equipment specifications, as well as activities pertaining to the establishment and operationalization of the ESMF.

Management and Coordination

129. A fine tuning of the structure of the OSI Division was done with the establishment of the Policy Planning and Operations Section. By strengthening the policy and operations functions in the Division, additional importance has been given to the strategic development of the OSI verification element and its components.

Training

130. Most training efforts were invested in the continued development of the second training cycle for surrogate inspectors. This cycle is aimed at adding another 50 trained experts from States Signatories to the roster of surrogate inspectors. The main focus of work was the preparation of the advanced courses for surrogate inspectors conducted in the second half of June and the beginning of July 2011. The scope and content of the main advanced training programme, which were established following a series of training planning meetings in 2009 and an advanced training coordination meeting in December 2010, were used for the development and preparation of the training activity in June.

131. The programme for the advanced courses of the second cycle was developed by the Training Section of the OSI Division. The new version of the advance course curriculum is based on the lessons learned from the IFE in 2008 and the first training cycle for surrogate inspectors. The curriculum includes mostly teamwork and team interaction and fewer lectures; more emphasis is given to study at a pace determined by the individual and to interaction between trainees. The combined training of the sub-teams includes hands-on activities conducted in the ESMF for familiarization with the equipment and procedures developed as part of the development of the OSI regime. The training concludes with a four day exercise in a military area in Hungary, where the trainees practise inspection exercises according to a given scenario. The training is delivered by staff of the OSI Division together with national experts from States Signatories; some of the trainers are trainees in the course who are experts in specific techniques.

132. Of the 64 participants in the introductory course of the second training cycle in 2010, 55 trainees, from 43 States Signatories, are participating in the advanced courses.

133. As in previous years, a special OSI introductory course was conducted as an outreach activity for staff of Permanent Missions. The aim of the course was to familiarize new staff members with OSI issues and the status of development of the OSI regime.

Policy Planning and Operations

134. Activities during the first half of 2011 focused on the initiation and further implementation of the OSI action plan projects that have been envisaged for 2011. In addition, work continued to further develop the concept and implementation design for the next IFE.

135. As requested by WGB at its Thirty-Fifth Session, the PTS prepared a detailed concept paper for the preparation and conduct of the next IFE (CTBT/PTS/INF.1105), which was presented at the Thirty-Sixth Session of WGB in February 2011. The Preparatory Commission at its Thirty-Sixth Session approved this concept and tasked the PTS to begin implementation of the concept in the most cost effective way, and to report on the progress achieved to WGB.

136. Accordingly, the PTS initiated the planning activities for the next IFE and, inter alia, prepared terms of reference for a host country selection process and a draft project initiation document that included a preliminary task force mandate and first considerations regarding a potential task force group structure and respective assignments as well as expertise required for populating the team accordingly.

137. On the basis of guidance from WGB, an expert advisory mechanism for the next IFE was reinstated by the PTS. The first meeting of experts under this mechanism was successfully held from 23 to 24 May 2011. The nine external and 12 PTS experts discussed issues such as the developed IFE concept, general scenario planning, terms of reference for the host country selection process and the IFE evaluation approach. As a result of the meeting, feedback and comments made by the experts were taken into account and adjustments to the host country requirements were made. Furthermore, the input given was embedded into the design of the IFE concept and the further planning of the project.

138. In this context, the handbook on planning and management of OSI field exercises resulting from completion of the exercise management guidance portfolio (OSI action plan sub-project 1.8) was used as a guidance document for the preparation of the next IFE and remains an adjustable document. Any lessons learned will be adopted through amendment of the handbook, allowing the PTS to plan, prepare and execute exercises more effectively and efficiently in the future.

139. The follow-up of the OSI 2010 directed exercise (DE10) was completed. DE10 was hosted by Jordan from 1 to 12 November 2010 in the Dead Sea area and focused on testing ground based visual observation and communications during an OSI. A Technical Report was produced for distribution at the Thirty-Seventh Session of WGB. Information material was produced, including film clips for broadcasters worldwide and a 22 minute film showing the preparation and conduct of the exercise, which was presented at the Thirty-Sixth Session of WGB. Lessons identified during the exercise

have been incorporated into the relevant SOPs for ground based visual observation and communications.

140. Following the OSI inspection team communications project (action plan sub-project 1.3) and DE10, a follow-up OSI expert group meeting on communications was held from 30 May to 3 June 2011 in Baden, Austria. Ten participants from six States Signatories and six experts from the PTS (including two from the IMS Division) participated in the event in order to evaluate the performance of modified and improved communications equipment first tested during DE10. Furthermore, experts provided input to the development of a concept of operations for OSI communications, discussed communications related aspects relevant for the training of inspectors and exchanged views on possible risk mitigation options in the event of interference in the system.

141. With reference to the development of operational procedures for the launch phase of an OSI (action plan sub-project 1.4), a number of coordination meetings within the PTS were carried out. As a result, a framework for cooperation between the IDC Division and the OSI Division was developed. The framework summarizes identified areas of cooperation, points of contact in both Divisions and time lines. Special emphasis is given to the design of IDC–OSI interaction, a list of technical issues related to data/product exchange between the two Divisions, and data requirements of the OSI Divisions before, during and after an OSI. Furthermore, a list of possible input from national technical means in the pre-inspection phase and an initial list of the information/data required by the inspection team for preparation of the initial inspection plan were developed.

142. As a result of the comments and recommendations received from tabletop testing of the Integrated Information Management System (IIMS) held in December 2010 (action plan sub-project 1.2), the technical and procedural updating of the IIMS continued.

143. Good progress was made with the inspection team functionality (ITF) project (action plan sub-project 1.1). A number of key aspects of ITF were developed. The concept of reconnaissance and hypothesis testing missions as the building blocks of the technical activity of an inspection was introduced. Furthermore, the key requirements for a standardized, robust search logic to be applied for the entire duration of an OSI were developed. The proposed search logic was fully tested theoretically through major field activities such as the IFE in 2008 and DE10 with excellent results. The agenda, structure and time lines for the inspection team meetings were finalized. Additionally, the proposed changes to the reporting procedures were discussed and consolidated. All the results achieved in the project were reflected in a poster presented at S&T2011.

144. In the framework of the ITF project, two expert meetings funded by EU Joint Action Project IV were conducted, focusing on techniques not yet developed for OSI purposes. The first meeting, held in Rome from 30 March to 1 April with the support of the Italian National Institute for Geophysics and Volcanology (INGV), focused on multispectral and infrared (MSIR) imaging. The major objective of the meeting was the development of MSIR imagery techniques in the framework of an OSI, including operational, technical and human resource aspects. Fourteen invited experts from eight States Signatories and six PTS staff members participated in the meeting. The expertise of the participants covered all the aspects needed for the successful conduct of the meeting:

knowledge of observables from underground nuclear explosions; MSIR imagery from the point of view of operations, equipment, data analysis and data interpretation; and knowledge about the Treaty and the draft OSI Operational Manual. More than forty points in all these sub-areas were identified and agreed by the participants. Some of them will have a strong impact on the way MSIR techniques are developed in the OSI framework. A PTS Information Paper on this subject was prepared for consideration by the Thirty-Seventh Session of WGB.

145. The second expert meeting funded by the EU, held in Vienna from 30 May to 1 June 2011, focused on active seismic techniques for OSI. Eleven experts from eight States Signatories and seven PTS staff members participated. Several key points were identified in relation to, inter alia, equipment, methodology and training. Moreover, a proposal was drafted for a road map to develop OSI active seismic techniques before the next IFE. A report on the meeting and a PTS Information Paper describing the main outcomes will be produced.

146. An exchange of letters was finalized between the Government of the United Kingdom and the PTS in order to start preparations for a third expert meeting funded by the EU. This meeting, to be conducted in Edinburgh from 9 to 11 November 2011, will focus on drilling.

Documentation

147. OSI Workshop-19, entitled "Development of OSI Equipment List: Initial Period Techniques", was conducted from 16 to 20 May 2011 in Baden, Austria. A total of 53 OSI experts from 26 States Signatories and 20 staff members from the PTS attended the workshop. This result oriented workshop was broken down into six working groups of experts that were organized by technology. The primary focus was on the development of the equipment lists (including equipment specifications) for the following technologies: video and still photography, the Seismic Aftershock Monitoring System (SAMS), radioactive noble gas sampling and measurement, position finding and visual observation, MSIR, and rapid gamma radiation survey, radionuclide sampling and high resolution gamma radiation measurement. Table 2 of Task Leader Paper CTBT/WGB/TL-4/40 was used as a basis for developing the lists. A draft OSI equipment list for initial period techniques was produced during the workshop.

148. Considerable progress was made regarding the standardization and consistency of SOPs (action plan sub-project 5.5). The standardization and consistency check of existing SOPs was completed and the SOP/work instruction approach for the further development and revision of subsidiary documents was accepted as the way forward. Additionally, work was initiated in drafting a new SOP on developing and revising OSI subsidiary documents.

149. Effort was devoted to harmonizing style sheets for the various QMS document types (see also paragraph 163). The OSI documentation management system was updated with new subsidiary documents and revised templates.

Logistics and Operations Support

150. The PTS continued to implement the Integrated Inspection Support System (IISS) concept. This included significant work on the implementation of several action plan sub-projects concerned with providing operational and logistics support to the OSI regime, such as an OSI databank, the Operations Support Centre (OSC), a rapid deployment system, certain health and safety aspects and a combined purpose ESMF.

151. In accordance with the guidance received from the Commission and its subsidiary bodies, the PTS established the ESMF in a local warehouse. Following procurement of the facility, it was first made secure by a local security company and then prepared for use and fitted out with appropriate infrastructure, including furniture, racks and office equipment. A detailed 'movement and occupation plan' was then implemented to move all of the OSI equipment, both technical and ancillary, to the new facility. All equipment has now been offloaded and placed on racks or elsewhere within the storage site. A physical check of the inventory is currently being performed together with equipment maintenance. In addition to storing equipment, the facility will facilitate the ongoing maintenance, calibration and testing of OSI equipment.

152. In accordance with its status as a combined purpose facility, the ESMF is currently being established with appropriate infrastructure to facilitate training and exercises on or adjacent to the premises. It is also being equipped to house the 'test version' of the OSC prior to the first build-up exercise in 2012. In readiness for this exercise, a work plan for the further development of OSC functionality, addressing contextual concerns, infrastructure issues and future PTS-wide training issues, is currently being devised.

153. Following the conclusion of the first stage of the Intermodal Rapid Deployment System (IMRDS) project and the delivery of the first 10 containers tailored specifically to OSI requirements, the containers were positioned in the new ESMF, where trial loading is taking place.

154. The PTS continued to develop the OSI databank, which will be a highly adaptable OSI support solution capable of facilitating the initial planning and preparation for an inspection as well as being capable of supporting the inspection team once in the field. Following the earlier completion of the high level architecture and implementation plan, the base architecture of the OSI databank, including the core hardware and software elements and policies, was established prior to the initiation of the procurement of external support to further develop the project. Possible vendors were identified, terms of reference for future software development were revised and finalized and a draft request for proposals was prepared.

155. An element of the databank specifically tied to the ESMF is the Hardcat equipment management system. This is designed to track all OSI assets throughout their life cycle and facilitate rapid deployment and tracking of the same assets to, on and from an OSI. Work was completed to define the user requirements and a single source vendor (Hardcat) was selected. Following a kick-off meeting with the company, trials on a stand-alone installation were concluded to test different server environments. Equipment categories and asset structures for equipment and consumables, as well as in-store and in-field location categories, were drafted and possibilities for uploading

current data were examined. Additionally, the barcoding, asset, procurement and stock modules were tested to tailor the software to OSI needs.

156. The PTS continued to review and update its health and safety regime. It concluded a review of related health and safety documentation, standards and SOPs to highlight where future modifications will be required. The review covered radiation protection standards and the related SOP, the aviation safety standard, the existing health and safety handbook and the physical and mental fitness standard.

157. A post-review redrafting of health and safety documentation, standards and SOPs was undertaken. Amendments to the radiation protection SOP; the base of operations SOP, the aviation safety standard and the fitness standard were circulated for comment in order to align them to changes in the radiation protection standard. Additionally, a guide for inspection team leadership in creating and maintaining a strong health and safety culture was outlined. Two SOPs, one on electrical safety and the other on emergency preparedness and response, remain under review.

Equipment Procedures and Specifications

158. Technical meetings were held with PTS and outside experts within the framework of component 4 (development of an OSI radioxenon system) of EU Joint Action Project IV. The technical document that emerged from the meetings reflects PTS inter-Divisional experience with noble gas systems. Subsequently, the procurement process was initiated, terms of reference were issued and bids were received. After some technical clarification, one potential supplier was identified and involved in final commercial negotiations. On the basis of inputs from external and internal experts, an initial draft of a concept of operations for noble gas sampling was introduced for further discussion. This draft provided a basis for two relevant discussions during OSI Workshop-19. During a technical visit to China, the potential to synergize the existing line of Ar-37 noble gas equipment with the development of the radioxenon equipment line was identified. This step is being taken to ease the envisaged operational constraints of both noble gas systems.

159. The equipment items required to complete one set of field equipment for SAMS was delivered, subjected to an acceptance test and finalized for future field exercises. In addition, on the basis of the lessons learned from the IFE in 2008 and the directed exercise in 2009 (DE09), the equipment and the software suite were updated and fine tuned to serve the second training cycle for surrogate inspectors. A novel approach to noise removal from seismic data was presented during the International Scientific Studies Conference in 2009. This approach was taken into account by the PTS and adapted to the needs of an OSI. This research project is ongoing, but the initial results obtained on test and field data (from the 2008 IFE and DE09) are promising. The full implementation of such an advanced noise removal technique would make SAMS a highly effective tool even in noisy or disturbed environments.

160. Redrafting of the SOPs for the continuation period techniques (CPTs) in line with the ISO 9001 requirements of the PTS was initiated. The logical redesign of the SOPs already available for ground based geophysical inspection methods will provide the starting point for a structured documentation of the equipment related SOPs.

161. Good progress was made with the establishment of the calibration and maintenance facility within the ESMF. A set of standard tools for servicing and troubleshooting the electronic parts of core equipment is now available and its effectiveness will be tested during the ramp-up towards the next IFE.

MAJOR PROGRAMME 4: EVALUATION AND AUDIT

Evaluation

Quality Management

162. As requested by the Commission, the main purpose of the QMS is to ensure that continuous, reportable quality measures are implemented so as to provide its customers, the States Signatories and the Commission, with the necessary confidence in its functioning and its products and services. The QMS is being developed along with the verification system, i.e. it is a 'living system' that is being adjusted as a result of the emphasis placed by the organization on customers and continual improvement.

163. As part of the ongoing work to consolidate QMS procedures, efforts focused on developing the record management procedures. This includes developing and testing the procedures for coding and control of QMS related documents as well as the workflow of the QMS document management system. Representative of the IMS, IDC and OSI Divisions were involved in the testing, contributed to the development and provided feedback to the Evaluation Section.

Process Metrics Manual and Performance Reporting Tool

164. With the aim of consolidating the basis for the PTS to conduct self-evaluation of the performance of the verification system, the first revision of the PTS Process Metrics Manual was compiled in 2010, on the basis of the definitions of KPIs contained in the versions of the draft IMS and IDC Operational Manuals in documents CTBT/WGB/TL-11/2-5/Rev.10 and CTBT/WGB/TL-17/2/Rev.1 respectively. In addition, a first version of the Performance Reporting Tool (PRTool) was completed. PRTool comprises a Web platform to display the information on performance for most of the KPIs and their trends. The PTS Process Metrics Manual and PRTool are being developed further to update KPI definitions, incorporate and test detailed computation procedures and to harmonize methods with performance reports.

165. The capabilities of PRTool are being continually expanded. KPIs can be investigated by process and product. They can also be retrieved by date, by geographical region or for an individual country or even a specific IMS station. In other words, this approach enables the assessment of performance at many different levels. PRTool is therefore setting ambitious standards of transparency and accountability. It allows States Signatories to monitor the PTS programme implementation with the possibility of going back to any given year and making a judgement on the value gained for the resources invested. This interactive tool can be used to generate more than one thousand standard views.

166. The PRTool design proved its potential and flexibility after the Fukushima accident when a new information technology application (based on the PRTool design) dealing with radionuclide concentrations and radioisotope ratios (named CRTool) was launched expeditiously. The graphical displays provided by CRTool were efficiently used during the briefings for States Signatories on developments related to the Fukushima event.

167. States Signatories continued to have online access to performance information expressed in terms of the KPIs related to the strategic goals of the Commission. This access is enabled through hyperlinks in the Programme and Budget document for the respective year, which is available on the ECS. The same approach will be implemented for the final 2012 Programme and Budget document following adoption by the Commission. The hyperlinks provide direct access to many features of PRTool.

Tracking Status of NDC Recommendations

168. The status of implementation of recommendations made by NDCs continued to be tracked. The open source database (adopted also by the PTS to track problem tickets related to the operation of IMS stations) was customized to track the status of implementation of recommendations presented at previous NDC evaluation workshops. The status of these recommendations will be discussed in detail at the NDC Evaluation Workshop in Bucharest in October 2011 (paragraphs 171-172).

Evaluation of OSI Activities

169. The evaluation of OSI activities focused on the preparation for the evaluation of the next IFE and its preceding activities (selected training activities, action plan projects and core build-up exercises). Feedback was received following the meeting convened in May under the OSI expert advisory mechanism (paragraph 137) for the further development of an evaluation approach for this purpose.

170. The evaluation of the advanced training course of the second training cycle for surrogate inspectors, which took place from 20 June to 8 July 2011, was undertaken. An evaluation framework was prepared for this purpose. The evaluation of the training course provides an opportunity for testing and improving the evaluation methods and tools.

NDC Evaluation Workshops

171. Preparations for the 2011 NDC Evaluation Workshop, which will be held in Bucharest from 3 to 7 October, are being made in close coordination with the Government of Romania and the National Institute for Earth Physics in Magurele. The PTS issued an announcement about the workshop at the end of June 2011.

172. NDCs and CTBT technical experts are encouraged to participate in the NDC Evaluation Workshop, as their feedback is essential for the PTS to continue improving its products and services. The agenda for the workshop follows the recommendations of the Thirty-Sixth Session of WGB (CTBT/PC-36/WGB/1).

173. The NDC Preparedness Exercise 2010 (NPE10) started on 1 October 2010 and continued to be carried out in accordance with the plans presented by the German NDC during the Thirty-Fifth Session of WGB. At the Thirty-Sixth Session of WGB, the German NDC gave an update on progress. Also at that session, WGB encouraged additional NDCs to participate. Reports on NPE10 will be given by participating NDCs and discussed during the forthcoming NDC Evaluation Workshop.