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International Conference on Nuclear Security: Commitments and Actions

5–9 December 2016

Report by the Director General

Summary

- The International Conference on Nuclear Security: Commitments and Actions was held at the Agency's Headquarters in Vienna, Austria, from 5 to 9 December 2016. The conference attracted more than 2100 registered participants from 139 Member States, 47 of which were represented at the ministerial level, and 29 intergovernmental and non-governmental organizations. The conference provided a forum at which experiences and lessons learned could be discussed and ideas exchanged to identify emerging trends and to consider the medium and long term objectives for nuclear security globally.

International Conference on Nuclear Security: Commitments and Actions

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Report by the Director General

A. Introduction

1. The International Conference on Nuclear Security: Commitments and Actions was held at the Agency's Headquarters in Vienna, Austria, from 5 to 9 December 2016. This was the second conference of this type convened by the Agency, following that held in July 2013. It was attended by government ministers; senior officials and policymakers responsible for nuclear security; experts and representatives from a wide range of specialized disciplines and organizations that contribute to nuclear security; representatives of international, intergovernmental and non-governmental organizations with relevant competencies; regulatory bodies and other national competent authorities, including national security and crisis management agencies; law enforcement and border control agencies; and industry and other entities engaged in activities relevant to nuclear security.

2. The conference attracted some 2100 registered participants from 139 Member States, 47 of which were represented at ministerial level, and 29 organizations. This high level of participation, even higher than in 2013, is a reflection of the continuing importance attached to nuclear security worldwide and of the value that States and organizations place on the inclusive forum provided by the conference. It also confirms the widespread recognition that, while activities relating to nuclear security are the responsibility of individual States, regional and global nuclear security can be greatly enhanced through collective commitments supported by national actions and international cooperation.

3. The conference was convened to discuss the experiences and achievements to date of individual States and of the international community as a whole in strengthening nuclear security; to enhance understanding of current approaches to nuclear security worldwide; to identify emerging trends; and to provide an inclusive forum at which ministers, policymakers, senior officials and nuclear security experts could formulate and exchange views on the medium and long term objectives for nuclear security globally.

4. The conference was composed of a ministerial session, high level sessions and parallel technical sessions.¹

¹ The full programme of the conference is available on the Agency's website at:
<https://www.iaea.org/events/nuclear-security-conference>.

B. Ministerial Session

5. The Minister for Foreign Affairs of the Republic of Korea, HE Mr Yun Byung-se, assumed the role of President of the conference. The Resident Representatives of Brazil and Nigeria, HE Mr Laércio Vinhas and HE Mr Abel Adalakun Ayoko, acted as coordinators of the preparatory process for the conference and co-chaired the informal open-ended consultations among Member States on the draft Ministerial Declaration.

6. The conference opened with addresses by the President of the conference and by the Director General. In the subsequent Ministerial Session, 90 ministers and other heads of delegation delivered national statements.

7. All acknowledged the importance of national commitment to strengthen nuclear security globally, and the need for international cooperation and assistance to complement and support national actions. Many expressed appreciation for the Agency's central role in coordinating such international efforts and providing such assistance when requested.

8. An important achievement of the conference was the adoption by consensus of the Ministerial Declaration, which is attached as an annex to this report. The Declaration demonstrates Member States' strong commitment to strengthening nuclear security.

C. High Level and Technical Sessions

9. Following the ministerial session, a brief introductory session provided a bridge between the ministerial and high level sessions, introducing the technical programme of the conference. Introductory remarks were made by the Director General, Mr Yukiya Amano; HE Mr Laércio Vinhas, Resident Representative of Brazil to the Agency; HE Mr Abel Adalakun Ayoko, Resident Representative of Nigeria to the Agency; Mr Kim Won-Soo, High Representative for Disarmament Affairs on behalf of the United Nations; and Mr Jacek Bylica, Special Envoy for Non-proliferation and Disarmament of the European External Action Service on behalf of the European Union.

10. The introductory session was followed by six high level sessions focusing on key broad areas of nuclear security. Each of these sessions comprised a series of invited papers, followed by a panel discussion and questions and comments from the floor. The high level sessions covered:

- International Legal Instruments for Nuclear Security
- International Bodies and Initiatives for Nuclear Security
- Nuclear Material and Nuclear Facilities
- Radioactive Material and Associated Facilities
- Nuclear and Other Radioactive Material Out of Regulatory Control
- National Nuclear Security Regimes, Including Nuclear Security Culture

11. In parallel, 30 technical sessions covered specific topics, including: the legislative and regulatory framework for nuclear security; physical protection of nuclear material and nuclear facilities; security in the transport of nuclear and other radioactive material; computer and information security; insider threats; detection systems and measures for nuclear and other radioactive material out

of regulatory control; nuclear forensics; response to nuclear security events; and new and emerging threats.

12. The President's Report on the conference, also attached as an Annex, highlighted the key issues and main conclusions from the conference.

D. Way Forward

13. The proceedings of the conference will be published in the course of 2017.

14. Where appropriate, the outcomes of the conference, including the Ministerial Declaration, have been taken into account by the Secretariat in defining priorities for activity areas in the Nuclear Security Plan 2018–2021.

Ministerial Declaration

Adopted by the International Conference on Nuclear Security: Commitments and Actions Vienna, Austria, 5 December 2016

1. We, the Ministers of the Member States of the International Atomic Energy Agency (IAEA), gathered at the International Conference on Nuclear Security: *Commitments and Actions*, remain concerned about threats to nuclear security and therefore committed to continuously maintaining and further strengthening nuclear security through national actions, which may involve international cooperation, primarily through the IAEA, as well as through other relevant international organisations and initiatives, in accordance with their respective mandates and memberships.
2. We reaffirm the common goals of nuclear non-proliferation, nuclear disarmament and peaceful uses of nuclear energy, recognize that nuclear security contributes to international peace and security, and stress that progress in nuclear disarmament is critically needed and will continue to be addressed in all relevant fora, consistent with the relevant obligations and commitments of Member States.
3. In the spirit of the 2013 Ministerial Declaration of the International Conference on Nuclear Security: *Enhancing Global Efforts*, we welcome the advances made by IAEA Member States in developing and enhancing their national nuclear security regimes. We also welcome the positive impact of the Agency's increasing nuclear security efforts, while noting that much more work needs to be done.
4. We underline the importance of keeping pace with evolving challenges and threats to nuclear security. We affirm the important role of science, technology and engineering in understanding and addressing such challenges and threats, and commit ourselves to stay vigilant and continue to take steps to confront, reduce and eliminate them.
5. We reassert that the responsibility for nuclear security within a State rests entirely with that State, in accordance with its respective national and international obligations, to maintain at all times effective and comprehensive nuclear security of all nuclear and other radioactive material under its control.
6. We call upon all States to ensure that measures to strengthen nuclear security do not hamper international cooperation in the field of peaceful nuclear activities.
7. We recognize that bilateral, regional and international cooperation can serve to strengthen nuclear security, and support, in this context, the central role of the IAEA in facilitating and coordinating international cooperation and in organizing Information Exchange Meetings with other organizations and initiatives on nuclear security.
8. We acknowledge and support the IAEA's core nuclear security activities that assist States, upon request, in their efforts to establish effective and sustainable national nuclear security regimes, including guidance development, advisory services, and capacity building. Moreover, we encourage Member States to contribute to the Agency's nuclear security assistance by sharing national expertise, best practices and lessons learned.
9. We recognise physical protection as a key element in nuclear security, and support the further development of the IAEA's assistance in areas of importance to Member States such as nuclear forensics, nuclear security detection architecture and response, information security, transport security, and insider threat mitigation, recognizing the need for appropriate measures to protect sensitive

information in achieving this objective. In particular, we support the IAEA's efforts to assist Member States to strengthen computer security, recognizing the threat of cyber-attacks against nuclear installations.

10. We welcome the entry into force of the Amendment to the Convention on the Physical Protection on Nuclear Material (CPPNM), look forward to its full implementation, and encourage IAEA's continued efforts to promote universalization. We encourage all Member States that have not yet done so to become parties to the Amended CPPNM and also in other international nuclear security instruments such as the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT).

11. We will continue providing the necessary technical, human and financial resources, including through the Nuclear Security Fund, in line with our respective capacities and commitments, as required for the Agency to implement its nuclear security activities and to provide, upon request, the support needed by Member States.

12. We recognize that highly enriched uranium (HEU) and separated plutonium in all their applications require special precautions to ensure their nuclear security and that it is of great importance that they be appropriately secured and accounted for, by and in the relevant State. We encourage the Member States concerned, on a voluntary basis, to further minimize HEU in civilian stocks and use LEU where technically and economically feasible.

13. We commit to maintain effective security of radioactive sources throughout their life cycle, consistent with the Code of Conduct on the Safety and Security of Radioactive Sources. Moreover, we encourage the IAEA to promote and facilitate technical exchanges of knowledge, experiences and good practices on the use and security of high activity radioactive sources.

14. We commit to continue taking active steps to combat illicit trafficking of nuclear and other radioactive material, to protect and secure all such material to ensure that it cannot be used by non-State actors in criminal or terrorist acts, and to continue efforts on our territories to prepare for recovering such material in case it has fallen out of regulatory control, taking into account relevant international instruments. We emphasize the importance of strong national legislative and regulatory frameworks for nuclear security.

15. We support the IAEA's and Member States' efforts to strengthen nuclear security culture and provide education and training opportunities in nuclear security, including by using national and regional Centres of Excellence and Nuclear Security Training and Support Centres, to ensure that the current and future generations of nuclear security professionals are well equipped to meet the challenge of ensuring effective and responsive national nuclear security regimes.

16. We welcome the consensus reached on the 60th GC Nuclear Security Resolution, and remain determined to build upon it. This Declaration and the 2016 International Conference on Nuclear Security will be taken into account in the consultation process between the Secretariat and the Member States on the IAEA's 2018–2021 Nuclear Security Plan. We call upon the IAEA to continue to organize international conferences on Nuclear Security every three years and encourage all Member States to participate at a Ministerial level.

International Conference on Nuclear Security: Commitments and Actions

Vienna, Austria, 5–9 December 2016

President's Report

9 December 2016

Introduction

The *International Conference on Nuclear Security: Commitments and Actions* was convened at the IAEA's Headquarters in Vienna on 5–9 December 2016. This was the second conference of this type convened by the IAEA, following that held in July 2013. It was attended by government ministers; senior officials and policy makers responsible for nuclear security; experts and representatives from a wide range of specialized disciplines and organizations that contribute to nuclear security; representatives of intergovernmental and non-governmental organizations with relevant competences; regulatory bodies and other national competent authorities; national security and crisis management agencies; law enforcement and border control agencies; and industry and other entities engaged in activities relevant to nuclear security.

The conference attracted some 2100 registered participants from 139 Member States, 47 of which were represented at ministerial level, and 29 organizations. This high level of participation, even higher than in 2013, is a reflection of the continuing importance attached to nuclear security worldwide and of the value that States and organizations place on the inclusive forum provided by the conference. It also confirms the widespread recognition and experience that, while activities relating to nuclear security are the responsibility of individual States, there are regional and global interests in nuclear security matters that can be greatly enhanced through collective commitments supported by national actions and international cooperation.

The conference provided an inclusive forum where participants from all IAEA Member States could discuss progress and challenges and exchange ideas to identify trends and lessons learned. It was also a valuable forum to consider medium and long term objectives for international nuclear security efforts. These will be an important input to the development of the IAEA's Nuclear Security Plan for 2018–2021. The Plan will provide a blueprint for the IAEA's nuclear security activities over this period and facilitate the evaluation of the IAEA's nuclear security programmes.

In his opening remarks, the IAEA Director General, Yukiya Amano, recalled three key items that he had highlighted at the 2013 Conference. He welcomed the entry into force in May 2016 of the Amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM) and urged all Member States to adhere to the CPPNM and its Amendment. He also urged Member States to make use of the IAEA's peer review and advisory services, as needed, to help them meet their obligations. And he noted the progress in developing consensus international guidance through the Nuclear Security Guidance Committee (NSGC), and urged all Member States to take part in the NSGC's work. He also highlighted a number of examples from around the world of concrete steps that have been taken by States, with support from the IAEA, to strengthen different aspects of nuclear security.

In his remarks, the President of the Conference, His Excellency Mr Yun Byung-se, the Minister of Foreign Affairs of the Republic of Korea, highlighted the challenges that nuclear security still faces, and identified three ways to meet those challenges: a partnership of the IAEA's Member States working together in a spirit of innovation, creativity and consensus; commitments and actions by States and the international community to deliver timely and concrete actions; and an enduring nuclear security architecture based on international norms such as the CPPNM and its Amendment, the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) and United Nations Security Council Resolution 1540. He urged States not to wait until an incident of nuclear terrorism occurs but to take steps now, and called on the IAEA to "take the helm" of global nuclear security efforts based on its decades of experience.

Both the Conference President and the Director General recognized the progress that has been made in nuclear security, but emphasized the need to avoid complacency by continuing to strengthen nuclear security worldwide and remaining vigilant against emerging and evolving threats.

The conference began with a **ministerial segment**, in which a total of 90 statements were delivered by Ministers and other Heads of Delegation on behalf of their States and regional groups. A Ministerial Declaration, adopted by consensus in the ministerial segment, is available on the conference web site.

The ministerial segment was followed by a **scientific and technical programme** comprising six high level discussions on broad themes central to nuclear security and 31 parallel technical sessions on specialized scientific, technical, legal and regulatory issues concerning nuclear security.

Working with the session co-chairs, rapporteurs recorded the main conclusions and key issues from each of the high level and technical sessions in rapporteur's reports. This President's Report highlights the main conclusions and key issues of the conference as a whole, drawing on these reports from the high level and technical sessions. While every effort was made to ensure that this Report is an accurate and balanced reflection of the Conference, ultimately it is the President's Report, not a consensus report.

The conference reaffirmed the principle that the responsibility for nuclear security within a State rests entirely with that State, but equally recognized the importance of international cooperation and the central role of the IAEA.

The six high level sessions of the conference developed these principles under the titles which follow, addressing not only frameworks for international cooperation but also the development and strengthening of national nuclear security regimes.

The technical sessions addressed in more detail a wide range of specific scientific, technical, legal and regulatory issues from all areas of nuclear security. Rapporteurs captured the main conclusions and key issues from each technical session. Key conclusions from the technical sessions are summarized briefly below under the most relevant High Level Session.

International Legal Instruments

High Level Session

During High Level Session 1, participants discussed several international instruments relevant to nuclear security, with a focus on the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment, which were recognised by participants as key elements of the international legal framework for nuclear security. Participants also recognized that the entry into force of the Amendment strengthens nuclear security due to the expanded scope of the CPPNM and its Amendment compared to the original CPPNM, in particular in the areas of nuclear material in domestic use, storage and transport and the security of nuclear facilities.

Participants emphasized the importance of the IAEA's efforts to universalize adherence to the CPPNM and its Amendment, and recognized the need to prepare for the CPPNM review conference due in 2021. In addition, some participants called for States to comply with Article 14 of the Amendment by providing information on national laws and regulations.

The challenges regarding the implementation of legal instruments for nuclear security were recognized by the panellists, who also acknowledged the need for support at all levels in implementation of these legal obligations. Participants noted that some types of non-binding instruments and tools, such as the IAEA Nuclear Security Series Fundamentals and Recommendations, were helpful in implementing legal obligations. However, participants also noted that legal instruments are not, on their own, solutions for all nuclear security issues.

Related technical sessions

During the technical sessions on international legal instruments, the discussion among participants focused primarily on the implementation of the Amendment to the CPPNM. Participants stressed the importance of the IAEA continuing to assist States on request with the implementation of the Amendment to the CPPNM. They also urged the IAEA to enhance its efforts to facilitate the exchange of information related to best practices for national implementation of obligations. In addition, participants stressed the need for further information exchange on national implementation of the CPPNM and its Amendment, including through submission of information pursuant to Article 14 and through the CPPNM Points of Contact.

Beyond the CPPNM and its Amendment, participants emphasized the importance of the IAEA's efforts in assisting Member States on request with the implementation of other relevant international instruments, such as the Code of Conduct on the Safety and Security of Radioactive Sources (Code of Conduct). They also noted the importance of coordination between the IAEA and other relevant international organizations and initiatives in order to provide harmonized assistance

International Bodies and Initiatives

High Level Session

During High Level Session 2, participants discussed the role of international bodies and initiatives in nuclear security, focusing in large part on the IAEA and its roles and responsibilities. Participants reaffirmed the IAEA's central role in strengthening nuclear security globally and in coordinating international activities in the field of nuclear security.

Participants recognized that as the coordinating role of the IAEA develops, it needs to be allocated sufficient human and financial resources to carry out this role as well as to manage its nuclear security programme. In addition to the IAEA, the United Nations Security Council Resolution 1540 Committee and other organizations and initiatives such as the Global Initiative to Combat Nuclear Terrorism (GICNT) were recognized by the panellists as important to nuclear security. A panellist stressed that these international organizations and initiatives should not duplicate efforts by the IAEA but supplement them. In addition, participants recognized industry as having an important role in implementing nuclear security, and the essential partnership between governments and NGOs.

One panellist noted that, because the global security environment is subject to rapidly evolving threats, such as the threats associated with emerging technologies and cyber-attacks, national nuclear security regimes need to be flexible, adaptable and resilient. Some participants advocated a new binding legal instrument with more comprehensive coverage of nuclear security. Other panellists argued that, due to this dynamic threat environment and the length of time a comprehensive convention would take to negotiate, such a convention is not appropriate at this time, and acting through voluntary measures remains a more flexible solution.

Nuclear Material and Nuclear Facilities

High Level Session

During High Level Session 3, participants discussed physical protection of nuclear material and of nuclear facilities. In particular, panellists and participants focused on how to achieve high levels of physical protection during all stages of a facility's life. Participants noted that some States are addressing this objective through changes to their regulations. Other participants discussed the need to adopt new regulatory strategies, especially when facing the challenges of designing and siting new facilities as well as decommissioning and dismantling facilities at the end of their life. Participants shared the view that it was difficult to conclude that any particular stage was more challenging than another. Participants recognized that many regulatory systems currently focus on the operating stage of the facility and need to be amended to apply to the earlier and later stages of its life. Participants were particularly concerned about responding to cyber-threats at all stages of a facility's life.

Participants identified a number of practices that could enhance physical protection of nuclear material and nuclear facilities, including requesting IAEA peer review services, developing a robust nuclear security culture, updating regulatory frameworks, considering threat assessments and review of design basis threats (DBTs), taking effective measures against cyber-threats, and sharing of non-sensitive information on a bilateral, regional and international basis, especially on good practices.

Related technical sessions

Participants in the technical session on threat assessment and DBTs for nuclear material and nuclear facilities highlighted a tendency for current DBTs to focus primarily on other physical protection considerations and not to take cyber-threats fully into account. Participants noted that nuclear operations and processes, including physical protection systems, have become increasingly reliant upon computer-based systems, and therefore it is necessary to consider computer security systematically in the threat assessment and DBT. Participants recognised that addressing both aspects — physical protection and computer security — is essential, and guidance needs to reflect both.

Participants in the technical session on the application of physical protection throughout the nuclear fuel cycle stressed the importance of the involvement of industry in the development, acceptance and validation of national nuclear security requirements. They noted that careful consideration of costs and benefits is needed when applying graded approaches to nuclear security in different stages of the nuclear fuel cycle. Participants also noted that there is potential, especially for countries embarking on new nuclear power programmes, to use technology to reduce reliance on human resources; however, this would reinforce the need to appropriately address computer security.

Participants in the technical session on physical protection approaches and evaluation noted that Member States recognize the value and utility of performance based evaluations and exercises used to validate physical protection systems and contingency response plans. They also noted that the IAEA has developed or is actively developing guidance and training courses for International Physical Protection Advisory Service (IPPAS) review missions and for contingency planning and performance based exercises. Participants encouraged Member States to use these courses to enhance their nuclear security regimes. Participants also highlighted other IAEA efforts in this area, notably Coordinated Research Projects (CRPs) on evaluation methods, and how these efforts provide a basis for Member States' competent authorities to work together for the improvement of these approaches and ultimately of physical protection systems.

In the technical session on regulatory aspects of physical protection, participants reaffirmed the importance of the role of the competent authority for verifying continued compliance with the physical protection regulations and licence conditions through regular inspections and for ensuring enforcement actions. The participants also stressed the importance of sharing the experience and expertise of advanced nuclear power countries with States embarking on new nuclear power programmes. The majority of participants identified the cyber-threat and insider threats as leading threats that must be addressed by the national nuclear security regime, and stressed that keeping pace with these rapidly evolving threats represents a significant challenge. Finally, participants in a panel session addressing the insider threat noted that an atmosphere of trust is a prerequisite for a healthy environment where employees feel safe to report mistakes. If this is not the case, mistakes (e.g. leak of sensitive data) may not be discovered until they have already led to severe consequences.

During a discussion addressing the interface between safety and security regulations, participants noted that it could be difficult to integrate safety and security regulations, but that effective coordination between safety and security regulatory activities is necessary.

In the technical session addressing nuclear material minimization, participants urged States to request IAEA assistance in their efforts to convert research reactors and medical isotope production facilities from high to low enriched uranium (HEU to LEU). For example, participants encouraged the IAEA to continue to provide support in removing nuclear materials, arranging transport, procuring LEU cores, providing training on nuclear material transport, supporting emergency preparedness and assisting with other activities as needed.

In the nuclear material control and accounting (NMAC) session participants reinforced the need to understand the importance of a domestic NMAC program and its objective. Participants shared the view that the objective of a domestic NMAC program is "to maintain and report accurate, timely, complete and reliable information on all activities and operations (including movements) involving nuclear material" including "the locations, quantities and characteristics of nuclear material at the nuclear facility".

Three technical sessions addressed the topic of computer security. Participants in a technical session on regulations and policies for computer security in a national nuclear security regime called for efforts to be made, involving the IAEA, to develop guidance and share information on developing and implementing such regulations. Participants noted that this could include guidance on computer security exercises and on computer security assessment, including lessons learned and examples of effective adaptation of other international or national standards.

An extended technical session addressed computer security for industrial control systems (ICSs) in nuclear facilities. Participants urged the IAEA to develop and deliver dedicated computer security training for ICSs, especially to address issues related to “computer security culture” and awareness of the impact of cyber-attacks on these systems. Participants also highlighted the need to provide guidance and training on managing the greater exposure to cyber-attacks on ICS networks resulting from increasing integration and convergence of operational technology and information technology networks. Participants also suggested that the IAEA should consider developing guidance on effective computer security plans — potentially providing template plans — and on managing information security projects. Participants also discussed the relationship between IAEA guidance on computer security and standards of the International Electrotechnical Commission.

Participants called for continued efforts to increase awareness of and participation in the existing IAEA CRP “Enhancing Computer Security Incident Analysis at Nuclear Facilities”, and for increased financial and human resources for the project. Participants noted that the project would particularly benefit from greater outreach to those research institutions that could provide resources for modelling cyber-attacks, including the identification of attack vectors, and could conduct computer security exercises that have the potential to enhance computer security incident response. Presentations made during the session also highlighted the difficulties in finding solutions to address the specific computer security challenges that the nuclear industry faces and discussed the importance of coordinating safety and security in this context. Some participants noted that IAEA publications could provide guidance in achieving better coordination between safety and security.

During the technical session focused on transport security, participants expressed appreciation for Member States’ sharing of experience and knowledge in assessing sabotage risk, especially to nuclear material in transport, and recognized the need to provide support for guidance related to this topic. Participants also urged the Secretariat to encourage Member States and stakeholders to contribute to the CRP on security of nuclear and other radioactive material in transport by participating in research and meetings.

Radioactive Materials and Associated Facilities

High Level Session

During High Level Session 4, participants underlined the importance of nuclear security for radioactive material and associated facilities due to the widespread use of radioactive material for a range of applications. Participants shared the view that States need to address security of radioactive material and associated facilities in a comprehensive manner at all stages of the material’s lifetime.

Participants also highlighted IAEA efforts to support security of radioactive material and facilities in this session. Several presenters called for the timely approval of the draft guidance on the management of disused sources by the IAEA Board of Governors. Participants also shared the view that the IPPAS is beneficial to States with only radioactive material and associated facilities, for reasons including the

political visibility of missions and access to international experts, as well as the development of a comprehensive mission report which allows for the identification and implementation of security improvements. However, recognizing that there has been an increase in the requests for IAEA services such as IPPAS, participants underlined the need for increased resources for the IAEA to meet the needs of Member States in this area. They also acknowledged the importance of IAEA fora such as the Working Group on Radioactive Source Security and Code of Conduct meetings, and participants stressed that States should better utilize these mechanisms to report on progress and remaining challenges.

Related technical sessions

During the two technical sessions focused on security of radioactive material, session participants expanded on the discussion of IAEA's radioactive material security programmes. In particular, they again emphasized the importance of providing the IAEA with predictable regular budget resources to support the programmes. The participants urged the IAEA to continue efforts to promote universal political commitment to the Code of Conduct and its Supplementary Guidance as well as to develop guidance providing support to Member States for assessing threats and responding to nuclear security events.

During one of the technical sessions, participants focused on gaps and challenges related to security of radioactive material. They observed that Member States remain focused on establishing and strengthening the regulatory framework for the security of radioactive material. In particular, they noted that regulatory bodies face challenges in implementing regulations (including limited human resources for conducting inspections), and further guidance in this area is needed. Participants also noted the need for flexibility in the initial implementation of new security regulations, and by regulators in evaluating compliance, and shared the view that communication between regulatory bodies and licensees is important, making use of various methods of outreach to foster better cooperation. Participants noted that this may not only increase transparency but also give industry an opportunity to provide feedback on regulatory requirements.

During a session specifically focused on alternative technologies to the use of high activity radioactive sources, participants focused on actions that the IAEA might consider to facilitate States' decision-making regarding alternative technologies. Notably, participants encouraged the IAEA to share comprehensive and reliable information on available alternative technologies as well as to consider how the IAEA might facilitate a dialogue among Member States and varying stakeholders on this topic. Participants stressed that such a dialogue should be evaluated in relation to numerous factors — including their respective applications, safety, security, and end-of-life management — and would require coordination among multiple IAEA departments and should follow a balanced and neutral approach. Participants encouraged the IAEA to consider paths for providing additional support to Member States on implementation of alternative technologies to the use of high activity radioactive sources.

During the session focused on transport security, participants discussed the need for the IAEA to provide additional support to Member States for the development of nuclear security regulations on the transport of nuclear and other radioactive material.

Nuclear and Other Radioactive Material Out of Regulatory Control

High Level Session

During High Level Session 5, participants discussed existing approaches, emerging trends and areas to be addressed in the detection of, and response to, criminal and intentional unauthorized acts involving nuclear and other radioactive material out of regulatory control.

Participants encouraged the IAEA to continue to coordinate exercises, publish guidance and organize activities to strengthen Member States' capabilities on detection of nuclear and other radioactive materials out of regulatory control and response to nuclear security events. Participants also noted the importance of continued dialogue on these issues and the value of international conferences where national experiences in these areas could be shared and discussed.

Participants highlighted the importance of mechanisms that foster interagency cooperation at the national level, such as working groups, and joint training and exercise programmes. Participants encouraged the IAEA to continue to carry out and coordinate CRPs on detection technologies for nuclear and other radioactive material out of regulatory control and to support the establishment of nuclear security programmes for detection and response in Member States.

Participants also indicated that States are more likely to design an effective national response framework if they clearly identify and define roles and responsibilities, and ensure that the framework includes the full spectrum of response actions to be taken, beginning with the initial response to a nuclear security event, crime scene management, investigations and eventual prosecution of perpetrators.

Related technical sessions

Participants in the session on threat assessment for material out of regulatory control called for efforts to focus on:

- Providing guidance to States on the effective use of information indicators to detect criminal or intentional unauthorized acts involving material out of regulatory control and on effective incorporation of both instrument- and information-based methods when developing detection operations;
- Coordinating the efforts of international and regional organizations to develop a harmonized and consistent approach to sharing nuclear security threat and risk information; and
- Facilitating regional nuclear security exercises to build relationships and trust and to develop information exchange protocols and procedures.

Participants in two technical sessions on detection technology stressed that the nuclear security detection architecture needs to be continuously reviewed, and improved as necessary, to address evolving threats. Participants recognized that exercises were crucial in developing effective national detection architecture. Participants shared the view that new approaches and methodologies are needed to address the technical and organizational challenges in achieving this. Participants suggested several paths for the IAEA to take in addressing Member States' needs in relation to detection technology. Participants encouraged the IAEA to continue the development of guidance on sustaining nuclear security systems and measures for the detection of nuclear and other radioactive material out of

regulatory control. Participants also proposed that the IAEA expand the scope of CRPs on detection technology to address the needs of Member States, and encouraged Member States to participate in these projects. They also called on the IAEA to expand its efforts to provide opportunities for information sharing on detection technology and its application, particularly to address the needs and capabilities of Member States with limited resources, and to provide technical guidance and raise awareness of new and improved detection technologies and processes, including better methods of application of these technologies.

Three technical sessions addressed different aspects of nuclear forensics, focusing on the need to build confidence in nuclear forensics, the science and interpretation of nuclear forensics signatures, and the role of nuclear forensics in a national nuclear security infrastructure. Participants in the first session stressed the need for consistency of practice in nuclear forensics and shared the view that conclusions resulting from the conduct of nuclear forensics examination or analysis of physical objects contaminated by radionuclides should be handled in such a way as to maximize the possibility that the results may be admitted as evidence as part of a legal proceeding. Participants recognised that, in this regard, strong links between nuclear forensic laboratories and law enforcement organisations are vital to address requirements that may exist in different national legal systems in relation to the admission of evidence of this type.

During the second session, participants stressed that the scientific methods supporting the examination need to be fully validated and defensible and emphasized the role of subject matter experts and clearly defined information flows in comprehensive nuclear forensic interpretation. Participants also discussed the issue of statistical confidence in nuclear forensics conclusions and its effect on the weight that such evidence carries in legal proceedings, including the possibility of guidelines to seek greater uniformity in making such determinations. During the third session, participants noted that nuclear forensics needs to be integrated within a national response plan for nuclear security events and stressed that nuclear forensics is predicated on the process of conducting an examination rather than on sophisticated instrumentation or a single measurement.

Participants in the technical session on major public events noted that nuclear security systems and measures for such events have become a major topic for nuclear security internationally. Participants recognized that States hosting such events are increasingly requesting international assistance to complement their existing national nuclear security resources and capabilities, and the IAEA's support in this regard has been particularly welcome. Participants identified effective coordination and cooperation at all levels among the different competent authorities that need to be involved as a key challenge in implementing the nuclear security measures for major public events.

Participants in the technical session on response to nuclear security events recognized a State's responsibility for nuclear security but stressed that threats no longer respect borders or boundaries. In light of the evolving threat environment, participants suggested that further IAEA support for multilateral nuclear security event response exercises is an excellent means to strengthen and sustain nuclear security. Participants pointed out the need for increased transparency amongst fellow Member States on nuclear security event response, including consideration of possible regional and bilateral sharing of information on threats. Participants recommended that further development and promotion of technical guidance on response to nuclear security events, and increased dialogue and fora focused on response to nuclear security events, are the preferred path forward for the IAEA activities in this field.

National Nuclear Security Regimes, including Nuclear Security Culture

High Level Session

During High Level Session 6, nuclear security regimes were discussed, with a focus on steps Member States could take to improve their national nuclear security regimes. Participants particularly stressed the importance of nuclear security culture as a central part of sustaining national nuclear security regimes.

Participants encouraged Member States to continually assess threat and risk, taking into account the evolving threats and new technologies, and adapt their nuclear security regime; provide assistance and guidance to national operators on implementing a sustainable nuclear security culture; continue developing their human resources; and continually evaluate and test their security systems and measures. In addition, participants encouraged Member States to: subscribe to the IAEA Nuclear Security Fundamentals; to meet the intent of the IAEA Nuclear Security Recommendations; to continue to improve the effectiveness of their nuclear security regimes and operators' systems; and to ensure that managers and personnel with accountability for nuclear security are demonstrably competent. Participants recognised that the Integrated Nuclear Security Support Plan (INSSP) is a way to assist Member States in systematically developing and sustaining their national nuclear security regimes.

With respect to the IAEA's provision of guidance, participants urged the IAEA to complete the Nuclear Security Series and, at an appropriate time, to consider consolidating the guidance and providing more guidance on addressing the safety–security interface. In addition, participants urged the IAEA to consider ways to ensure that its Nuclear Security Recommendations are seen to be of comparable importance to its Safety Requirements within the Safety Standards Series.

Related technical sessions

Participants in the technical session on national nuclear security regimes focused on the IAEA's support for national nuclear security regimes. Participants urged the IAEA to work with Member States to incorporate lessons learned, approaches adopted and tested by Member States in developing and sustaining their national nuclear security regimes and address the trends and issues relevant to global nuclear security through assistance activities and guidance. Participants suggested that the IAEA could provide a platform for advanced nuclear power countries to support States embarking on nuclear power programmes in establishing a sustainable national nuclear security regime. Participants also suggested that the IAEA could provide guidance on approaches to nuclear security specific to States with no nuclear power and limited applications using radioactive material. Participants also encouraged the IAEA to develop additional guidance on managing safety–security interfaces, establishing legislative and regulatory frameworks for nuclear and other radioactive material out of regulatory control, including model legislative provisions, and conducting peer reviews focusing on the sustainability of nuclear security regimes.

Participants in the technical session on nuclear security culture noted that achieving sustainable nuclear security depends on the people involved and that security culture is the vehicle for achieving this goal, emphasizing that efforts to promote and sustain a strong nuclear security culture should be an integral part of national strategy for nuclear security. Participants recognised that competent authorities have important roles in promoting a strong nuclear security culture at a national level and

in encouraging licensees to take actions to continuously improve their organizational nuclear security culture. Participants urged the IAEA to continue to take a leading role in a coordinated approach to promote strong and sustainable nuclear security cultures in Member States by developing further practical guidance, promoting the understanding of nuclear security culture, supporting its application in practice, through workshops, conducting expert missions on nuclear security culture assessment, and facilitating and coordinating international experience-sharing opportunities.

Participants in the technical session on nuclear security education noted that the International Nuclear Security Education Network (INSEN) has made great contributions to education and training in nuclear security, and encouraged Member State institutions to join and actively participate in the Network. Participants encouraged IAEA Member States to support their academics and academic institutions that wish to establish nuclear security educational programme and courses with professional development and INSEN participation. Participants noted that a collegial approach involving institutional collaborations through INSEN has been extremely beneficial for nuclear security education, and the IAEA, Member States and other partners were encouraged to continue this approach.

Participants of the technical session on nuclear security training highlighted that high quality and effective training in the area of nuclear security should be recognized as one of the most important prerequisites for achieving sustainable nuclear security regimes and that management commitment to high quality training is important. Participants encouraged States to develop national human resource development plans, to employ a systematic approach to training, applying existing methods and tools for training needs analysis and evaluation of training effectiveness, and to ensure the competence of instructors. Some participants specifically mentioned that to increase the effectiveness of nuclear security training, especially in the international environment, it is important to establish more explicit requirements for trainees and to meet these requirements. Participants also urged Member States to ensure that nuclear security training programmes should address the interface between safety and nuclear security. Regarding the IAEA's programmes on human resource development and training, participants encouraged the IAEA to continue to assist States, upon request, in establishing training programmes for competent authorities. They encouraged the IAEA to tailor nuclear security training programmes to specific needs of States and use e-learning as a prerequisite for instructor-led training. Participants also recommended that good practices in nuclear security training should be collected, analysed and disseminated.

During the technical session on Nuclear Security Training and Support Centres (NSSCs) and sustainability of human resource development, participants encouraged the NSSC Network to coordinate and facilitate regional and international cooperation in human resource development, technical support, and scientific support for nuclear security. Participants encouraged NSSC Network Members and the IAEA to continue to share best practices and lessons learned on establishing and operating NSSCs, including through development of further guidance for States, and on steps that States can take to ensure sustainability of centres over the long term. Participants noted that the IAEA and the NSSC Network can help States to identify further needs or gaps in establishing and operating an NSSC.

Participants in the panel on information management discussed processes, challenges and tools for information management for nuclear security, with a particular focus on information management by the IAEA and how to use the information to improve nuclear security. With regard to the Incident and Trafficking Database (ITDB), the participants encouraged the IAEA and the Member States to focus on acting on the findings of ITDB analytical reports in the near future, and urged Member States to ensure that their reporting provides necessary information. Participants were interested in better

understanding the IAEA's security measures for handling such information, and encouraged the IAEA to provide a description of its methods for information security and to consider establishing agreements with Member States on information classification and management, as appropriate. In addition, participants suggested several new initiatives relevant to information management and use of information by the IAEA, including encouraging the IAEA to consider establishing a combined information exchange and reporting interface for nuclear security. Finally, appropriate uses of open source information as well as the use of advanced information tools were addressed by some of the participants.

Participants in the technical session on threat and risk assessment methodologies recommended greater focus on research and development (for example, through a CRP) to develop new approaches and methodologies to address identified challenges in conducting accurate and practical nuclear risk assessment. Participants encouraged the view that such research and development should include consideration of the wide range of possible scenarios and measures (and the limited evidence and experience available), the diversity of actors involved, and common analytical pitfalls such as failure to account for an adversary's adaptation to security measures encountered. Participants also called for more harmonized guidance for nuclear security threat and risk assessment to enable consistent application across the nuclear security regime.

Participants in the technical session addressing the emerging issue of unmanned aerial vehicles, or drones, observed that legislation and regulations are slow to reflect changing technological environments. The participants shared the view that the threat and potential security uses of unmanned aerial vehicles are emerging issues, and should remain topics of discussion, including potential computer security dimensions.

Participants in the technical session on communicating with the public on nuclear security shared the view that public engagement on nuclear security should be a national priority, but noted that a balance needs to be struck between transparency and confidentiality during such engagement. Participants also observed that States need to be prepared to communicate on a spectrum of scenarios, to balance the different demands of communicating about safety and security, and to work with designated communications and subject matter experts to ensure that messaging is both technically accurate and understandable to the public.

The above commentary provides a summary record of the *International Conference on Nuclear Security: Commitments and Actions*, held in Vienna, Austria, 5–9 December 2016.