



IAEA BULLETIN

INTERNATIONAL ATOMIC ENERGY AGENCY

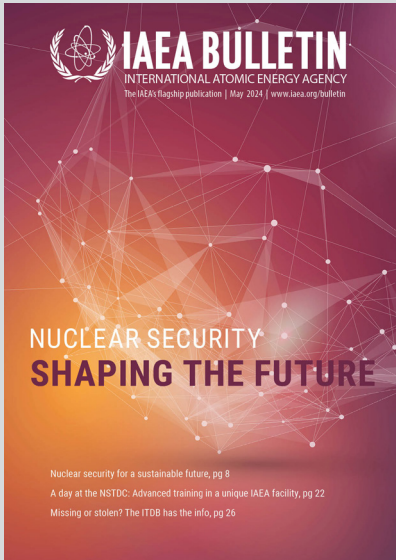
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NUCLEAR SECURITY **SHAPING THE FUTURE**

Nuclear security for a sustainable future, pg 8

A day at the NSTDC: Advanced training in a unique IAEA facility, pg 22

Missing or stolen? The ITDB has the info, pg 26



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The International Atomic Energy Agency's mission is to help prevent the spread of nuclear weapons and to help all countries – especially in the developing world – benefit from the peaceful, safe and secure use of nuclear science and technology.

Established as an autonomous organization under the United Nations in 1957, the IAEA is the only organization within the UN system with expertise in nuclear technologies. The IAEA's unique specialist laboratories help transfer knowledge and expertise to IAEA Member States in areas such as human health, food, water, industry and the environment.

The IAEA also serves as the global platform for strengthening nuclear security. The IAEA has established the Nuclear Security Series of international consensus guidance publications on nuclear security. The IAEA's work also focuses on helping to minimize the risk of nuclear and other radioactive material falling into the hands of terrorists and criminals, or of nuclear facilities being subjected to malicious acts.

The IAEA safety standards provide the fundamental principles, requirements and recommendations to ensure nuclear safety and reflect an international consensus on what constitutes a high level of safety for protecting people and the environment from the harmful effects of ionizing radiation. The IAEA safety standards have been developed for all types of nuclear facilities and activities that serve peaceful purposes, as well as for protective actions to reduce existing radiation risks.

The IAEA also verifies through its inspection system that Member States comply with their commitments under the Nuclear Non-Proliferation Treaty and other non-proliferation agreements to use nuclear material and facilities only for peaceful purposes.

The IAEA's work is multi-faceted and engages a wide variety of partners at the national, regional and international levels. IAEA programmes and budgets are set through decisions of its policymaking bodies – the 35-member Board of Governors and the General Conference of all Member States.

The IAEA is headquartered at the Vienna International Centre. Field and liaison offices are located in Geneva, New York, Tokyo and Toronto. The IAEA operates scientific laboratories in Monaco, Seibersdorf and Vienna. In addition, the IAEA supports and provides funding to the Abdus Salam International Centre for Theoretical Physics, in Trieste, Italy.

Nuclear security: adapting to a changing world

By Rafael Mariano Grossi, Director General, IAEA

Since the IAEA's last International Conference on Nuclear Security (ICONS) in 2020, the world has experienced momentous change, including a global pandemic and a war, in Ukraine, where for the first time a major nuclear power programme finds itself in the crossfire.

International relations are becoming more tense and unpredictable. Technology advances pose a threat to nuclear security and offer new tools with which to enhance it.

The use of nuclear science and technology, often facilitated by the IAEA, has come on in leaps and bounds. Climate change and the drive for energy security are fuelling a desire for nuclear power. At this past Conference of the Parties to the UN Framework Convention on Climate Change, COP28, world leaders for the first time in nearly 30 years of COP meetings agreed nuclear power must be part of the transition to net zero. More than 25 countries have signed a pledge towards tripling nuclear power capacity and at the IAEA's Nuclear Energy Summit in March heads of state agreed on the urgent need for conducive financial conditions.

The use of life-saving and life-affirming applications of nuclear science and technology is growing, from cancer patients gaining access to radiotherapy to farmers benefiting from new crop varieties developed with the help of irradiation.

All these opportunities depend on a strong and adaptive global nuclear security regime and laser-focused vigilance. Groups with malicious intent must not be given a chance to use nuclear and radioactive material to cause panic or harm.

Nuclear security is the responsibility of individual countries, but it also requires close collaboration and the enabling role of the IAEA.

Since 2013, ICONS has been the place for ministers, policymakers, senior officials, and experts to gather, assessing current priorities and preparing for new challenges. ICONS 2024 will cover the themes of policy, law and regulation; technology and infrastructure for

prevention, detection and response; capacity building; and cross-cutting areas, such as the interface between nuclear security and nuclear safety.

The conference is part of a bigger tapestry of the IAEA's work in nuclear security, including its central role in the adoption and implementation of the Convention on the Physical Protection of Nuclear Material (CPPNM) and its 2005 Amendment.

We assist countries in improving their capacity to provide protection both in the physical and cyber world. Support is offered through the Integrated Nuclear Security Sustainability Plan (INSSP) and via peer reviews and advisory services.

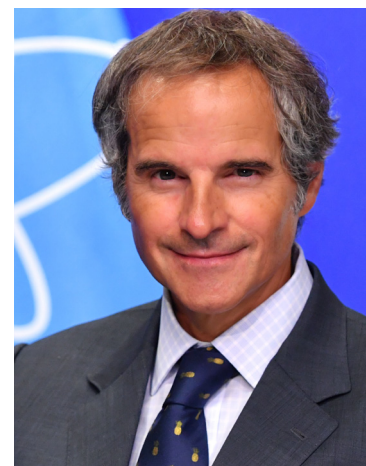
For 20 years, we have helped countries implement nuclear security measures at major public events, such as the Olympic Games and the latest COP meetings. Our Incident and Trafficking Database (ITDB) allows Member States to report nuclear and radioactive material that goes out of regulatory control.

Throughout the years, the IAEA's nuclear security programme has been shaped by countries' needs and the changing landscape of threats, challenges and opportunities.

Our recently inaugurated Nuclear Security Training and Demonstration Centre (NSTDC) is a physical manifestation of the growing need for advanced hands-on training using specialized equipment.

The world needs a well-trained and diverse nuclear security workforce. The IAEA's Women in Nuclear Security Initiative promotes gender equality in nuclear security and at ICONS 2024 the "Nuclear Security Delegation for the Future" gives young participants from 19 countries the chance to participate, learn and contribute.

Nuclear security is about more than preventing nuclear terrorism. It is about providing clean energy; cutting-edge medicine; nutritious food and hope for a better tomorrow. The IAEA is where the world comes together to make sure we keep making that possible.



“Nuclear security is about more than preventing nuclear terrorism. It is about providing clean energy; cutting-edge medicine; nutritious food and hope for a better tomorrow.”

– Rafael Mariano Grossi,
Director General, IAEA



1 Nuclear security: adapting to a changing world



4 Nuclear security through the eyes of the Co-Presidents of ICONS 2024



8 Nuclear security for a sustainable future



10 Milestones in the IAEA's nuclear security programme



14 Towards a stronger global legal framework for nuclear security



16 Needs assessment comes first

The IAEA's optimized approach to strengthening nuclear security



18 Strength in diversity

The impact of the IAEA's work

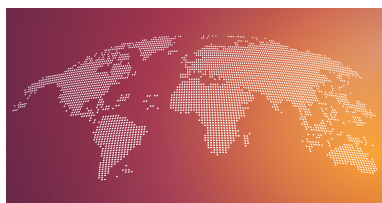


20 Behind the scenes at major public events

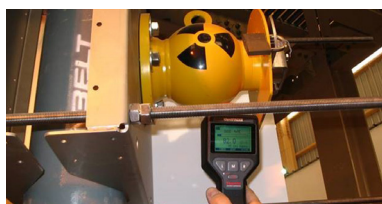
Nuclear security measures



22 A day at the Nuclear Security Training and Demonstration Centre
Advanced training in a unique IAEA facility



24 IAEA Collaborating Centres
Strengthening global nuclear security



26 Missing or stolen?
The Incident and Trafficking Database has the info!



28 Let's talk about nuclear security
National perspectives on the importance of public communication



30 Nuclear security includes all of us

Q&A

32 Strengthening the role of parliaments in nuclear security
An interview with Dr. Tulia Ackson, President of the Inter-Parliamentary Union

PHOTOGRAPHY CONTEST

34 Nuclear security through the lens

IAEA UPDATES

38 IAEA News

40 Publications

Nuclear security through the eyes of the Co-Presidents of ICONS 2024



Tim Watts,
Assistant Minister
for Foreign Affairs,
Australia



Sungat Yessimkhanov,
Vice-Minister of
Energy, Republic of
Kazakhstan

Sungat Yessimkhanov, Vice-Minister of Energy of the Republic of Kazakhstan, and Tim Watts, Assistant Minister for Foreign Affairs of Australia, are the Co-Presidents of the International Conference on Nuclear Security: Shaping the Future (ICONS 2024).

The conference has become a key event for the global nuclear security community. It provides a platform for ministers, policymakers, senior officials and nuclear security experts to come together and deliberate on the future of global nuclear security, and facilitates information exchange, the sharing of best practices, and the promotion of international cooperation.

The Co-Presidents share their views about the significance of the conference, the contribution of nuclear security to sustainable development, and how the future will be shaped by emerging technologies such as AI and by emerging risks and threats in nuclear security.

■ Q: Why do you think participation at ICONS 2024 is important at the ministerial level?

Tim Watts: A strong and sustainable nuclear security system has never been more imperative. In Australia, nuclear science and technology is used in medicine, research and industry. Strong ministerial leadership informed by diverse experiences and perspectives, current approaches, and a greater understanding of technology is required to navigate the challenges and uncertainty that could impact nuclear security.

The conference is a key event for the global nuclear security community. Ministerial involvement is critical to demonstrating our collective commitment to strengthening nuclear security globally. It provides an opportunity for countries to progress aligned commitments and priorities and work closely on their national nuclear security regimes.

The past four years have been a time of momentous change for nuclear security. If there was ever a time for strong ministerial attendance and commitments, that time is now.

Sungat Yessimkhanov: ICONS 2024 is a major event for the global nuclear security community and comes at a critical time for international nuclear security. Despite some risks and challenges — from climate change and natural disasters to global pandemics — AI products and advanced computing technologies offer new opportunities to strengthen nuclear security regimes.

Given that the responsibility for nuclear security rests entirely with States, ICONS 2024 provides a unique opportunity to reaffirm, at the ministerial level, States' commitments to promoting the peaceful use of nuclear energy and fulfilling all of their international obligations in the field of nuclear security.

Q: What changes would you like to see in nuclear security and what is needed to make them happen?

Tim Watts: Nuclear science and technology can make a considerable difference to people's lives. Their development enables us to address some of the most pressing challenges of our time, including those related to health and wellbeing, and food security.

As a world leading producer of nuclear medicines to diagnose and treat cancer and other diseases, Australia recognizes the important role of nuclear security in facilitating the peaceful uses of nuclear technology. On average, every Australian will need at least two nuclear medicine procedures during their lifetime.

As the world continues to leverage nuclear science and technology, we must ensure that nuclear security standards are upheld to prevent the exploitation of this technology for harmful purposes.

Building resilience in all countries by sharing diverse experiences and knowledge is key. All countries can contribute to creating and maintaining a durable and resilient global nuclear security system.

We welcome the increasing number of training activities offered by the Agency. Fair access to knowledge and resources is a crucial aspect of future planning, fortifying against threats, and seizing opportunities. The underlying principles of fair access are instrumental in Australia's collaborative efforts with our regional partners on nuclear security.

The theme of ICONS 2024 is "Shaping the Future". Ensuring that all countries have the capability to future-proof their nuclear security architecture also strengthens a country's contribution to, and sovereignty in, these global conversations. This progress leads toward collective commitments at the national and international levels to enhance nuclear security standards for the benefit of all.

Sungat Yessimkhanov: Kazakhstan has gained unique experience in bringing its largest nuclear weapons testing facility, the former Semipalatinsk test site, into a secure state. Specialists from the National Nuclear Center of the Republic of Kazakhstan (NNC) carried out a wide range of work at this facility to strengthen security measures and install physical barriers to prevent access to test sites, decommissioned wells and tunnels.

Improving nuclear security is a critical task involving multiple stakeholders, including governments, international organizations, the nuclear industry and the public. There are several key elements that should be continuously addressed to ensure robust nuclear security, including personnel development, enhanced regulation and control and the strengthening of international cooperation.

Increased cooperation and information sharing among countries helps to prevent the illicit trafficking of nuclear materials and technologies. International agreements such as the Treaty on the Non-Proliferation of Nuclear Weapons, the Convention on the Physical Protection of Nuclear Material and its Amendment, the International Convention for the Suppression of Acts of Nuclear Terrorism, the Code of Conduct on the Safety and Security of Radioactive Sources and relevant United Nations Security Council resolutions play a crucial role in this regard.

Investing in research and development (R&D) for advanced technologies for nuclear security, such as better methods for detecting nuclear materials, improved surveillance systems and robust cybersecurity measures can strengthen the overall security posture. On the other hand, as technology evolves, new threats to nuclear security may emerge, such as cyber-attacks or the use of drones for malicious purposes. Continually monitoring and adapting security measures to address these evolving threats must be a priority for States and must be supported by the international community.

■ **Q: How can countries prepare their nuclear security regimes for emerging technologies such as AI?**

Tim Watts: International events like ICONS play a fundamental role in creating an environment for collaboration. They help us to prepare our nuclear security system so as to capitalize on, and minimize the harm of, emerging technologies such as AI. We need to shape AI rules and norms related to the nuclear security architecture to protect it from malicious cyberactivity.

A global effort is required to manage these complex and evolving challenges. The diverse expertise of conference attendees, including policymakers, academics, the private sector and non-governmental organizations, will create an environment in which we can work together on shared challenges and respond collectively.

Getting these fundamentals right in domestic frameworks, policies and initiatives creates a sound platform on which to build international cooperation and resilience.

At ICONS 2024, countries will have the opportunity to share how they are building their capacity to respond to AI opportunities that will be of assistance in getting things done in more efficient, economic, effective and equitable ways. Experts' best practices will inform Member States' domestic nuclear security regimes.

Sungat Yessimkhanov: As emerging technologies such as AI continue to evolve, countries will need to adapt their nuclear security measures to mitigate potential risks and reap the benefits.

Governments and relevant organizations should conduct comprehensive risk assessments to identify potential vulnerabilities and threats that may arise from the integration of AI into nuclear security systems. Understanding these risks is essential to developing effective mitigation strategies.

It's important to develop regulatory frameworks and guidelines by updating existing regulations or creating new ones to address the unique challenges posed by AI technologies in the nuclear security domain. By ensuring that robust cybersecurity measures are in place, countries can protect themselves from cyber-threats and cyber-attacks. This includes implementing encryption, access controls, and regular security updates.

■ **Q: What are the major emerging risks and threats in nuclear security around the world?**

Tim Watts: The global community is grappling with emerging risks and threats to nuclear security. As they evolve, so must our nuclear security frameworks and responses.

ICONS 2024 will provide an opportunity for countries to share how they are developing their capabilities and technologies to address risks and threats. It will facilitate discussions to shape the Agency's Nuclear Security Plan for the period 2026–2029 to advance the global nuclear security agenda.

Australia is focused on working closely with its international partners to address supply chain security. Industry is at the forefront of R&D. Ensuring that the principles of nuclear security can be adopted early by industry and government is critical to ensuring nuclear security isn't compromised.

Australia's commitment to the Women, Peace and Security agenda is steadfast and enduring. With ten United Nations Security Council resolutions that many countries, including Australia, have tailored to their contexts through national and regional action plans, we know that diversity, equity and inclusion are central to establishing and maintaining peace and security. This applies to nuclear security, in which the full, equal and meaningful participation and leadership of women is an essential element.

Australia is proud to partner with Kazakhstan to host a side event at ICONS 2024, providing practical insights and actionable guidance on gender equality and inclusive leadership as positive drivers of the future of nuclear security.

Sungat Yessimkhanov: Indeed, the rapid development of new technologies such as AI, quantum computing and uncrewed systems poses new challenges and vulnerabilities in terms of nuclear security. Malicious actors may target critical infrastructure such as power plants or nuclear research facilities to disrupt operations, steal sensitive information or sabotage systems.

With the ever-increasing spread of disinformation, special attention should be paid to the protection of materials that are not highly radioactive and not suitable for making nuclear weapons, but whose use for malicious purposes could have a negative impact on the public, causing ‘radiophobia’ and undermining confidence in the nuclear industry.

Non-State actors, including terrorist organizations, may seek to acquire nuclear materials or technology to build improvised nuclear devices or radiological dispersal devices, also known as ‘dirty bombs’.

The proliferation of nuclear materials and technologies through illicit trafficking networks remains a concern. Trafficking activities may involve the smuggling of radioactive materials, nuclear weapons components or sensitive nuclear technology across borders, potentially enabling State or non-State actors to acquire nuclear capabilities.

Insider threats, which include unauthorized access by employees or contractors with malicious intent, pose a significant challenge to nuclear security. These threats can include theft, sabotage or damage to nuclear materials, facilities or information.

Q: How can nuclear security support sustainable development initiatives around the world in the coming years?

Tim Watts: Nuclear security underpins and enables sustainable development initiatives. For example, food irradiation enables countries to export food products across borders and enhance food safety by eliminating germs and pests. Additionally, radiation equipment used in cancer treatment is a crucial element of initiatives such as Rays of Hope, aimed at reducing the cancer care gap in low and middle income countries. These peaceful uses of radiation to enhance food security and treat cancer are supported by strong and sustainable nuclear security regimes.

Nuclear security needs to be built into our sustainable development initiatives from the outset, and must not be an afterthought or something that is worked on in isolation outside of our social and economic development programmes.

It is time for nuclear security to advance and become embedded in our programmes.

Sungat Yessimkhanov: As the world’s leading exporter of uranium, providing 43% of the global supply, Kazakhstan plays a crucial role in carbon-free power generation on a global scale. The establishment of robust national nuclear security regimes will ensure a guaranteed nuclear energy chain for humanity and promote the implementation of sustainable development initiatives around the world.

Kazakhstan has contributed to the non-proliferation regime and the sustainable development of nuclear energy by hosting the unique IAEA Low Enriched Uranium Bank. In addition, we continue to implement research reactor conversion projects aimed at converting highly enriched uranium fuel to low enriched uranium fuel, thereby helping to reduce the risk of nuclear proliferation. Only last year, we successfully completed the conversion of another research reactor at NNC, which is now fully operating on low enriched fuel.

In this context, strengthening national nuclear security regimes helps to prevent the illicit trafficking of nuclear and radioactive materials, enhances public confidence in the peaceful uses of nuclear and radiation technologies, and promotes sustainable nuclear energy development strategies worldwide.

Nuclear security for a sustainable future

By Elena Buglova



Through collective international actions fostered by the IAEA's work we can shape a sustainable future in which the benefits of nuclear technology are harnessed for the greater good, and in which the risks are effectively managed.

— Elena Buglova, Director,
Division of Nuclear Security,
IAEA

In May 2024, policymakers and experts from across the world will gather at the International Conference on Nuclear Security: Shaping the Future (ICONS 2024), hosted by the IAEA in Vienna, to discuss how the global community can collectively sustain and strengthen the progress made in nuclear security.

Events such as the 2023 Conference of the Parties to the United Nations Framework Convention on Climate Change (COP28) and the first Nuclear Energy Summit, held in March 2024, signal that the nuclear security community must focus its attention on what lies ahead. Nuclear is becoming an indispensable part of the global strategy to meet energy and climate goals, bringing with it the challenge of enabling access to the relevant technologies in a secure manner.

While this has always been the mission of nuclear security practitioners, their task is more important now than ever before. As the peaceful uses and applications of nuclear technology become more widespread in pursuit of the Sustainable Development Goals (SDGs), we must increase our emphasis on making these technologies secure and on mitigating existing or emerging threats.

Enabling the attainment of the Sustainable Development Goals

The intersection of nuclear security with SDG 7 (Affordable and Clean Energy) and SDG 9 (Industry, Innovation and Infrastructure) is clear: national nuclear security threat assessments and a 'security by design' approach are essential both for existing nuclear power programmes and new ones planned in pursuit of the SDGs.

At the same time, nuclear security plays a fundamental role in other important domains where the connection with nuclear security is less obvious. Agriculture and health, for example, require the implementation of effective nuclear security measures in order to prevent malicious acts involving radioactive material or associated facilities. As part of its Rays of Hope flagship initiative, the IAEA has been providing assistance to

low and middle income countries to develop radiation medicine capabilities for life-saving cancer treatments for the advancement of SDG 3 (Good Health and Well-Being). As part of its Atoms4Food joint initiative with the Food and Agriculture Organization, the IAEA is contributing to the attainment of SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 14 (Life Below Water) and SDG 15 (Life on Land) by enabling countries' use of isotope and nuclear techniques for sustainable and climate-smart agriculture, food safety and nutrition.

These initiatives, and others such as NUTEC Plastics and ZODIAC, require that countries develop, maintain and sustain comprehensive nuclear security regimes. The dedicated work of nuclear security professionals from all corners of the globe is contributing to the international community's efforts to collectively pursue the United Nations' 2030 Agenda for Sustainable Development.

What is sustainable nuclear security?

At its core, nuclear security seeks to prevent and detect criminal or unauthorized acts involving nuclear and other radioactive material, and associated facilities and activities. National nuclear security regimes also seek to develop response capabilities that can be effectively deployed if such acts occur.

While physical protection — guns, gates and guards — is certainly an integral component of nuclear security, it represents only a fraction of the work being done to protect the global community from the unthinkable impact of a malicious act involving nuclear or other radioactive material.

Nuclear security extends far beyond the perimeter fences of facilities handling nuclear or other radioactive material. It involves the establishment of effective regulatory oversight to ensure that these materials are used, stored and transported in a secure manner. Moreover, it involves the development of a robust detection architecture and plans and procedures for

responding to cases involving material that may be outside of regulatory control.

In our increasingly interconnected digital world, the nuclear security field has had to adapt and implement strong information and computer security measures to prevent cyber-attacks against critical infrastructure. Moreover, in the spirit of the SDGs — in particular SDG 17 (Partnerships for the Goals) — extensive international cooperation is required in order to ensure that all countries can build the capacities needed to establish and maintain robust yet sustainable national nuclear security regimes.

As the world's central intergovernmental forum for scientific and technical cooperation in the nuclear field, the IAEA assists countries to fulfil their national responsibilities in nuclear security. The IAEA's nuclear security programme is driven largely by a needs assessment approach implemented in cooperation with countries on the basis of their self-assessments. The most recent example of this approach is the opening of the IAEA's Nuclear Security Training and Demonstration Centre (NSTDC) at the Seibersdorf laboratories in Austria in October 2023. The NSTDC provides a centralized state-of-the-art facility to further enhance capacity building in nuclear security by providing hands-on training and by using advanced technology and expertise to cover areas not previously addressed by

international training efforts. In addition, the IAEA continues to keep abreast of scientific, technological and engineering innovations by further advancing the tools available to countries through science and research.

None of the services aimed at establishing sustainable national nuclear security regimes would be possible without the voluntary contributions of donors to the Nuclear Security Fund (NSF), established in 2002. Donations to the NSF ensure that these critical efforts are financially supported and can assist countries to prepare consistently for the nuclear security challenges of the future.

Through collective international actions fostered by the IAEA's work to fulfil its central coordinating role in nuclear security, we can shape a sustainable future in which the benefits of nuclear technology are harnessed for the greater good, and in which the risks are effectively managed. As the global community works to further expand access to, and maintain public confidence in, the peaceful uses of nuclear technology in pursuit of the SDGs, nuclear security must continue to underpin and bolster those efforts.

Deliberations at ICONS 2024 will focus on shaping the future of nuclear security to ensure that nuclear security activities remain sustainable in an ever-changing world, and to prepare practitioners to anticipate and defend against potential threats.

As part of the Rays of Hope initiative, prior to procuring a high-activity radioactive source, the IAEA offers complementary assistance to enhance nuclear security infrastructure upon request.

(Photo: K. Laffan/IAEA)



Milestones in the IAEA's nuclear security programme

The IAEA plays a central role in strengthening the global nuclear security framework, coordinating international activities in the field of nuclear security, and supporting the efforts of countries to fulfil their national nuclear security responsibilities.

The IAEA's Nuclear Security Programme Milestones is an overview of historical and important landmarks covering more than six decades of the IAEA's work in nuclear security. It features concrete developments that have shaped the evolution of the IAEA's nuclear security programme and its implementation.

This timeline demonstrates how the IAEA's nuclear security activities are continuously informed by countries' needs and requests and the ever-changing external environment, adapting to emerging threats, challenges and technological developments.

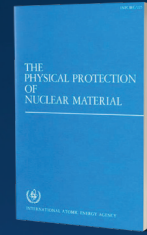


Atoms for Peace

President Eisenhower delivers his 'Atoms for Peace' speech at the United Nations, calling for the creation of an international atomic energy agency.

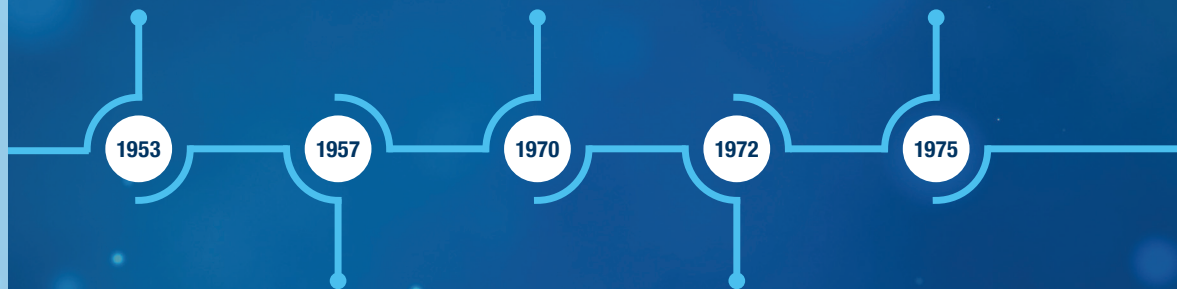
Treaty on the Non-Proliferation of Nuclear Weapons enters into force

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) enters into force, entrusting the IAEA with key verification responsibilities. States Parties to the Treaty subsequently urge the IAEA to elaborate physical protection recommendations and call upon States to enter into agreements to ensure such protection.



Physical Protection of Nuclear Material published (document INFCIRC/225)

The IAEA issues an outline of recommended measures enabling countries to protect nuclear material. The document has been regularly updated and its scope expanded to include nuclear facilities.



1953

1957

1970

1972

1975

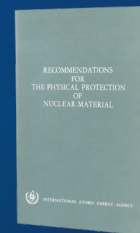
IAEA established

The IAEA Statute enters into force, creating the Agency with the objective to 'seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world'.



First IAEA recommendations for the physical protection of nuclear material published

The IAEA publishes its first *Recommendations for the Physical Protection of Nuclear Material*.



Incident and Trafficking Database established

The IAEA Board of Governors approves the establishment of the Incident and Trafficking Database (ITDB), to combat the illicit trafficking of nuclear and other radioactive material.

First official programme on the security of material established

A dedicated programme on the security of material is included for the first time in IAEA's programme. The Office of Physical Protection & Material Security, later renamed to Office of Nuclear Security, is established. In 2014, the Office of Nuclear Security is renamed to Division of Nuclear Security.



Physical Protection Objectives and Fundamental Principles published

The IAEA Board of Governors endorses a document containing the Physical Protection Objectives and Fundamental Principles, which inform the development of the Amendment to the CPPNM.

1987

1995

1996

1997

2001

2001

2002

Convention on the Physical Protection of Nuclear Material enters into force

The Convention on the Physical Protection of Nuclear Material (CPPNM), adopted under the auspices of the IAEA, enters into force. It is the first international legally binding instrument requiring the physical protection of nuclear material used for peaceful purposes.



First International Physical Protection Advisory Service missions conducted

International Physical Protection Advisory Service (IPPAS) missions focus on the physical protection of nuclear and other radioactive material and of associated facilities and activities. The first missions are conducted in Bulgaria and Slovenia.

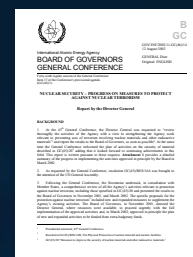


9/11 terrorist attacks in the United States of America

The events of 11 September 2001, known as 9/11, change the global approach to nuclear threats.

Nuclear Security Plan approved; Nuclear Security Fund established

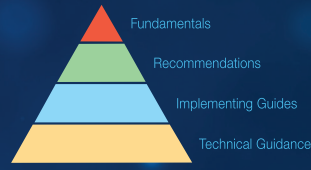
The IAEA Board of Governors approves the first Nuclear Security Plan and establishes the Nuclear Security Fund, a voluntary funding mechanism.





First International Nuclear Security Advisory Service mission conducted

International Nuclear Security Advisory Service (INSServ) missions focus on preventing, detecting and responding to criminal and intentional unauthorized acts involving nuclear or other radioactive material out of regulatory control. The first mission is conducted in Georgia.



IAEA Nuclear Security Series launched

The IAEA Nuclear Security Series (NSS) provides international, consensus-based guidance to countries on all aspects of nuclear security to support States' efforts to fulfil their nuclear security responsibilities.

International Convention for the Suppression of Acts of Nuclear Terrorism enters into force

The International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT), adopted under the auspices of the United Nations, enters into force. It details offences relating to the unlawful and intentional possession and use of radioactive material or a radioactive device and the use or damage of nuclear facilities.

Advisory Group on Nuclear Security established

The IAEA Director General establishes the Advisory Group on Nuclear Security (AdSec), a standing advisory group of experts with high professional competence in the field of nuclear security.

2002

2003

2003

2004

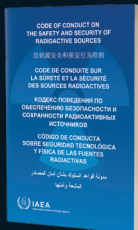
2006

2006

2007

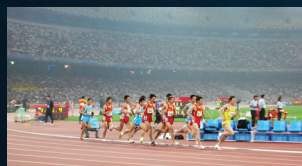
Code of Conduct on the Safety and Security of Radioactive Sources approved

The IAEA Board of Governors approves the revised Code of Conduct on the Safety and Security of Radioactive Sources, which was strengthened following the events of 9/11.



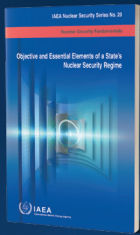
Nuclear security assistance provided for major public events

The Athens Olympic Games is the first case of IAEA nuclear security assistance being provided to a country hosting a major public event, with the aim of enhancing nuclear security readiness.



Integrated Nuclear Security Support Plan programme launched

The Integrated Nuclear Security Support (later renamed to *Sustainability*) Plan (INSSP) programme is established to help countries develop sustainable national nuclear security regimes.



Nuclear Security Guidance Committee established; Nuclear Security Fundamentals endorsed

The IAEA Director General establishes the Nuclear Security Guidance Committee (NSGC). The IAEA Board of Governors endorses the NSS Fundamentals, *Objective and Essential Elements of a State's Nuclear Security Regime*.



First International Conference on Nuclear Security held by the IAEA

The first International Conference on Nuclear Security (ICONS) reaffirms the IAEA's central role in facilitating international cooperation to strengthen nuclear security. Organized at the ministerial level every four years, it is held in 2013, 2016, 2020 and 2024.



Development of the IAEA's comprehensive programme of assistance to Ukraine for nuclear safety and security

At Ukraine's request, the IAEA develops a concrete and detailed technical plan for the provision of safety and security assistance to Ukraine's nuclear facilities and activities involving radioactive sources.



International Nuclear Security Education Network established

The International Nuclear Security Education Network (INSEN) is established as a partnership through which the IAEA, educational and research institutions and other stakeholders cooperate to promote sustainable nuclear security education.

International Network for Nuclear Security Training and Support Centres established

The International Network for Nuclear Security Training and Support Centres (NSSC Network) is established to contribute to global efforts to enhance nuclear security through an effective and collaborative network of nuclear security support centres.

Amendment to the Convention on the Physical Protection of Nuclear Material enters into force

The Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM) enters into force, expanding the scope of the CPPNM. The first Conference of the Parties to the A/CPPNM is held in 2022.



IAEA Nuclear Security Training and Demonstration Centre inaugurated

The Nuclear Security Training and Demonstration Centre (NSTDC) opens at the IAEA Seibersdorf laboratories.



Towards a stronger global legal framework for nuclear security

By Jonathan Herbach

The international legal framework for nuclear security has developed and evolved significantly over several decades. Following the terrorist attacks of 11 September 2001 in the United States of America, countries increased their efforts to strengthen the global legal framework in order to enable them to better prevent, detect and respond to terrorist and other criminal or intentional unauthorized acts involving or directed at nuclear and other radioactive material, associated facilities or associated activities.

More and more countries are joining international legal instruments that promote stronger nuclear security around the world, including countries that do not have domestic nuclear facilities or materials such as those used in nuclear power plants or research reactors.

As of April 2024, a total of 136 States have become Parties to the Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM). The Amendment came into force in May 2016 and was developed as part of the aforementioned broader push to strengthen the global legal framework with the aim of preventing nuclear and other forms of terrorism involving weapons of mass destruction.

“The international legal framework is an essential part of global nuclear security,” says Peri Lynne Johnson, Legal Adviser and Director of the IAEA’s Office of Legal Affairs. “It provides a foundation for establishing effective nuclear security regimes, establishes mechanisms for cooperation and assistance in mitigating and minimizing the radiological consequences of a nuclear security incident, and harmonizes approaches to combating a range of criminal acts”.

The Amendment significantly strengthens the original Convention in a number of ways. It sets out obligations for States Parties to ensure the physical protection of all nuclear material and nuclear facilities used for

peaceful purposes under their jurisdiction. It makes the smuggling of nuclear material and the sabotage of nuclear facilities criminal offences. The Amendment also provides for enhanced international cooperation, including assistance and information sharing in the event of sabotage.

The Convention as amended was reviewed for the first time in 2022, at the Conference of the Parties to the Amendment to the CPPNM, held at the IAEA’s headquarters in Vienna. This gathering was an opportunity for States Parties to assess the implementation and adequacy of the Convention as amended, in light of the prevailing situation at the time.

According to Ambassador Benno Laggner, Co-President of the Conference, “The 2022 A/CPPNM Review Conference was a success: it adopted a consensus outcome document despite the challenging geopolitical context. It provided a forum for sharing information, lessons learned and best practices, and created momentum for further universalization of the CPPNM and its Amendment”.

Efforts aimed at universalization

The IAEA continues to encourage States to adhere to and implement the Convention as amended. Among other benefits, universal adherence to the relevant international legal instruments will help to eliminate weaknesses that could be exploited by terrorists and other criminals intending to carry out malicious acts and evade justice.

“Zimbabwe recently became a State Party to the A/CPPNM and, in demonstration of its continued commitment to a strong global nuclear security regime, legislative review processes are currently under way to ensure that a comprehensive framework is in place to meet our obligations under the Convention,” says Justice Chipuru, Chief Executive Officer of the Radiation Protection Authority of Zimbabwe. “Universalisation of the A/CPPNM will assure us of a safer and more secure world”.

However, further work needs to be done to encourage more States to become Parties to the Convention as amended. As of April 2024, 28 States Parties to the Convention had not yet joined its Amendment, and 33 countries had not joined the Convention or its Amendment.

IAEA assistance to States

The IAEA offers a range of legislative and technical assistance to support the objective of universalization, including regular meetings, regional and national workshops, and missions. In 2023, the IAEA held its first technical meeting specifically focused on universalization.

The IAEA also works bilaterally with States to address nuclear security needs through Integrated Nuclear Security Sustainability Plans (INSSPs). INSSPs take account of adherence to legally binding international instruments and the status of national laws relevant to nuclear security.

The IAEA’s legislative assistance takes a comprehensive approach, covering all aspects of nuclear law, including nuclear safety, security, safeguards and liability for nuclear damage. The IAEA works with Members States on nuclear law, upon request, to help raise awareness and train officials, and to help them develop, assess and revise national legislation in order to meet their obligations under the international legal instruments to which they are party, or which they intend to join. In terms of nuclear security, bilateral legislative assistance is provided in drafting and revising national legal provisions on nuclear security, criminalization and other elements of an adequate national legal framework.

Legally non-binding instruments

In addition to legally binding instruments, several legally non-binding instruments are an important part of the international legal framework on nuclear security. The Code of Conduct on the Safety and Security of Radioactive Sources provides guidance on ensuring adequate safety and security throughout the lifecycle of radioactive sources, from initial production to final disposal. An ever-increasing number of States are expressing a political commitment

The Scope of the CPPNM and its Amendment

	Physical protection	Offences	International cooperation
CPPNM	Nuclear material in international transport	Intentional unauthorised acts involving nuclear material Threat to use nuclear material to cause harm Theft or robbery of nuclear material Ancillary offences (attempt to commit a listed offence and participation therein)	Cooperation and assistance in connection with criminal proceedings and physical protection systems Information exchange to protect or recover unlawfully taken material
	in addition	in addition	in addition
Amendment	Nuclear facilities and nuclear material in domestic use, storage and transport Physical protection regime (e.g. establishment of a legislative and regulatory framework, competent authority)	Smuggling of nuclear material Sabotage of nuclear facilities Coverage of ‘substantial damage to the environment’ New ancillary offences (organization or direction of others to commit a listed offence)	Expanded cooperation, assistance and information sharing in case of sabotage

to follow the guidance set out in the Code, as well as its supplementary Guidance on the Import and Export of Radioactive Sources and Guidance on the Management of Disused Radioactive Sources. As of April 2024, 151 States had made a political commitment to follow the Code.

Furthermore, an increasing number of guidance documents published as part of the IAEA’s Nuclear Security Series (NSS) are available to support countries in strengthening their national systems in order to protect nuclear and other radioactive material and related facilities from unauthorized activities. IAEA publications such as the NSS can provide timely guidance about how to achieve effective nuclear security, including by helping States to implement their obligations under legally binding instruments, and by providing a level of technical detail that could not necessarily be included in a treaty.

Needs assessment comes first

The IAEA's optimized approach to strengthening nuclear security

By Cristina Martin Rodriguez and Christian Deura

Some of the key features of the IAEA's approach to addressing countries' requests for assistance — such as targeted efforts, the efficient use of human and financial resources, and monitoring of progress and accountability — contribute to ensuring robust national nuclear security regimes.

“The IAEA places the assessment of national needs at the core of its nuclear security programme,” says Elena Buglova, Director of the IAEA's Division of Nuclear Security.

One of the primary IAEA mechanisms that supports the needs assessment approach is the Integrated Nuclear Security Sustainability Plan (INSSP). This comprehensive and systematic framework supports countries in identifying and prioritizing nuclear security needs, drawing on the guidance provided in the Nuclear Security Series of publications. These provide international consensus guidance on various aspects of nuclear security to support States as they work to fulfil their nuclear security responsibilities.

“The recently revised INSSP strengthens its focus on sustainability and countries' ownership, and incorporates key performance indicators within the results based management approach, ensuring maximum transparency and continuous improvement,” adds Buglova, highlighting that the INSSP also helps to align the IAEA's fundraising efforts through the Nuclear Security Fund.

With 111 INSSPs under implementation, and an average of 20 missions conducted annually, the INSSP is making significant progress towards the further enhancement of global nuclear security. A closer look at the details of the active INSSPs shows their broad acceptance across different regions: there are 48 in the Africa region, 26 in the Asia and the Pacific region, 19 in the Europe region and 18 in the Latin America and the Caribbean region.

The development of an INSSP starts with a country conducting a self-assessment exercise that makes use of specific IAEA questionnaires closely aligned to the Nuclear Security Series guidance. Reflecting on this effort in the Bolivarian Republic of Venezuela, Gloria Carvalho, Vice-Minister at the Ministry of Science and Technology says: “Applying the INSSP methodology in Venezuela facilitated substantive dialogues with key national stakeholders, leading to consensus on pivotal priorities in nuclear security. We have now established a comprehensive three-year implementation plan to enhance our nuclear security infrastructure”.

In addition to identifying, consolidating and prioritizing needs, the INSSP process facilitates identification of the responsibilities of national entities or organizations and establishes implementation strategies and timeframes for specific actions. This inclusive approach fosters coordination and ownership at the national level, maximizing the effectiveness of nuclear security measures.

Over the past five years, in the period 2019–2024, the top three areas of needs identified by countries within the framework of the INSSP are: physical protection regimes, in particular the security of radioactive material other than nuclear, and the transport security of both nuclear and other radioactive material; information and computer security; education and training; nuclear security culture; and legislative and regulatory frameworks.

The INSSP is an integral part of the activities conducted by the IAEA to assist countries in establishing, maintaining and strengthening their national nuclear security regimes. The IAEA offers a wide range of nuclear security peer review and advisory services — such as the International Nuclear Security Advisory Service (INSServ), the

International Physical Protection Advisory Service (IPPAS) and the Advisory Mission on Regulatory Infrastructure for Radiation Safety and Nuclear Security (RISS) — which are a fundamental part of global efforts to strengthen nuclear security. Findings and recommendations from these services and missions are reflected in the INSSP in order to inform and refine national needs assessments and the implementation of relevant actions.

As an example, Viet Nam hosted its first INSServ mission in March 2023. Based on the findings, Viet Nam is developing a plan to address identified gaps in its nuclear security regime. In her assessment of the INSSP mechanism related to the INSServ mission, Thuy Anh Bui Thi, Director of the International Cooperation Division at Viet Nam’s Agency for Radiation and Nuclear Safety, acknowledges that it is a robust foundation: “Our confidence in the INSSP as

a beneficial tool stems from its basis in the IAEA’s Nuclear Security Series guidance, as well as the fact that it takes into account international expert advice”.

IPPAS assists countries in assessing the effectiveness of their national physical protection regimes; INSServ helps countries to thoroughly assess the effectiveness of their nuclear security regime for nuclear and other radioactive material outside of regulatory control. Complementarily, RISS identifies gaps in a country’s regulatory infrastructure for the safety of radiation sources and the security of radioactive material, with reference to the IAEA Safety Standards Series and nuclear security guidance, together with the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources and Guidance on the Management of Disused Radioactive Sources.

An IPPAS mission includes visits in the host country’s facilities to assess physical protection measures.

(Photo: Swiss Federal Nuclear Safety Inspectorate, ENSI)



Strength in diversity

The impact of the IAEA's work

By Emma Midgley, Vasiliki Tafili

The numerous peaceful applications of nuclear science and technology are enabled by diverse roles in nuclear security. Experts and professionals around the world have shared with us how their work with the IAEA has enhanced their expertise and nuclear security in their countries, keeping pace with the expansion of peaceful uses of nuclear science and technology to meet development goals in clean energy, cancer treatment, and science and industry.



Rômulo Lima, from Brazil, is Head of the Legal Department of the National Nuclear Energy Commission. In recent years, he has worked closely with the IAEA to support Integrated Nuclear Security Sustainability Plan missions and regional workshops to promote the Amendment to the Convention on the Physical Protection of Nuclear Material (A/CPPNM) in the Latin America and the Caribbean region.

“In these missions, I showcase Brazil’s experience and legal work in this area and the advantages the country has gained in nuclear security since joining the A/CPPNM,” he explains. He believes that sharing Brazil’s national experiences is an effective mechanism to encourage other countries to join the A/CPPNM and further advance their legal and regulatory frameworks for nuclear security.

“The establishment of an independent regulatory body, the ratification of the A/CPPNM in 2022, the publication of specific and updated regulations for the physical protection of nuclear facilities and material, and the establishment of a national threat assessment all reflect the efforts of the institutions involved and Brazil’s commitment to nuclear security,” says Lima, adding that “without doubt, the international legal framework to which Brazil has adhered has strengthened the national legal and regulatory framework”.



Ángela Abadía Zapata, from Colombia, has been working in nuclear security for over 15 years, during which time her country’s nuclear sector has gone from receiving IAEA support to

providing experts to assist other countries. Zapata, who works for Colombia’s regulatory authority, the Ministry of Mines and Energy, provides technical support in nuclear security for her country as well as training in the Latin America and the Caribbean region, specifically in the area of the security of radioactive sources during transport.

Following IAEA training and her experience in Colombia, Zapata is an expert in nuclear security, providing assistance to other countries and motivating other women to consider a career in this field.

Zapata recently provided technical support to assist with the drafting of legislation relating to nuclear law in Colombia, leading a gender-focused approach and drawing on her experience in nuclear security and as a champion of Women in Nuclear.

“What excites me most about being part of this sector is that not only do I have the opportunity to contribute to other countries in the region through my knowledge, but I also have the opportunity to contribute to the development of a nuclear security regime in my country, in line with the recent initiatives that are being promoted in Colombia, where the inclusion of advanced nuclear technologies in various sectors is being contemplated,” she says.

“Since I began my professional career in the nuclear sector, I have noticed how the IAEA has continuously provided support to Colombia, including through technical cooperation, from capacity building and training to the formation of experts in different areas; as well as in the execution of various missions in line with national needs and capabilities,” adds Zapata.

Norwenn Cayago Panganiban, from the Philippines, is a fellow of the Marie Skłodowska-Curie Fellowship Programme (MSCFP).

The programme is an IAEA initiative aimed at supporting the next generation of women leaders in the nuclear field through the provision of scholarships and internship opportunities. In 2023, Panganiban attended the Joint ICTP–IAEA International School on Nuclear Security. “The comprehensive curriculum of the school provided a contemporary overview of nuclear security, equipping me with practical skills and knowledge essential for my role as a radiation protection officer in the clinical setting, where radioactive sources are used for diagnostic and therapeutic purposes. I highly recommend this school to others, particularly early career professionals from developing countries, as it offers a unique networking, learning and collaboration platform,” she says.



Panganiban highlights how the support she received from the IAEA has shaped her career in the nuclear field. “The rigorous training and exposure to international best practices have enhanced my technical expertise and leadership skills. Moreover, the MSCFP fellowship gave me access to a supportive network of peers and mentors, opening doors to new opportunities and collaborations. I am grateful for the resources and guidance that have empowered me to contribute meaningfully to global nuclear security efforts”.

As a female professional in nuclear security, Panganiban believes that diversity fosters innovation and resilience: “Challenges such as gender biases and stereotypes persist, but they only fuel my determination to excel and advocate for inclusivity in the sector”.

Nirasha Rathnaweera is part of an expert support team that assesses possible nuclear security alarms at the port of Colombo, Sri Lanka. As the main commercial sea port in Sri Lanka, Colombo is a maritime hub in major global shipping routes. Thousands of trans-shipments — in which cargoes or containers are transferred from one ship to another in complex supply chain operations — are undertaken every year.



Since 2006, the port has used a radiation monitoring system to screen import, export, and trans-shipment cargoes for the presence of illicitly trafficked nuclear and other radioactive material.

“The Colombo sea port in Sri Lanka stands as a pivotal commercial hub, facilitating significant maritime traffic owing to its strategic location along major shipping routes. However, the port’s prominence also elevates concerns regarding the potential smuggling of nuclear and other radioactive material,” says Rathnaweera. “To counter this threat, a robust radiation monitoring programme is imperative”.

Through her participation in the IAEA’s coordinated research project entitled ‘Improved Assessment of Initial Alarms from Radiation Detection Instruments’, Rathnaweera contributed to the development of the IAEA’s Tool for Radiation Alarm and Commodity Evaluation (TRACE) mobile application, a tool that supports customs officers’ work in alarm assessment.

“Utilizing fixed radiation portal monitors, the port records approximately 1970 radiation alarms monthly, with many stemming from commodities with natural radioactivity (known as naturally occurring radioactive material (NORM)). Sri Lankan customs officers currently rely on the TRACE mobile application for radiation alarm evaluation and find its user-friendly interface particularly beneficial for training new personnel,” she says.

Behind the scenes at major public events

Nuclear security measures

By Emma Midgley, Monika Shifotoka

As the Greek flag was raised over the stadium for the 2004 Olympic Games, marking a return to their ancient home after more than a century, most spectators and athletes were unaware of an extensive behind-the-scenes effort to protect them from potential nuclear security threats. For the first time, the IAEA was involved in providing training and equipment for such an event, enabling Greece to enhance nuclear security measures during the Olympic Games.

A major public event (MPE) is a planned national or international event classified by the host country as ‘major’ and requiring the implementation of complex security measures, including those related to nuclear security. In an era when the global community frequently gathers for MPEs such as sporting events, high level political or religious forums and international conferences, as well as planning and training, are necessary to enhance nuclear security.

Nuclear security for MPEs encompasses measures designed to prevent, detect and respond to criminal or intentional unauthorized acts involving nuclear or other radioactive material or directed at nuclear and associated facilities.

The IAEA has been at the forefront of this effort to integrate nuclear security protocols into traditional security arrangements for MPEs — an effort crucial to safeguarding global peace and securing the lives of millions.

“The IAEA’s support and assistance in this area includes equipment loans, training workshops, tabletop and field exercises, and on-site technical assistance from international experts,” says Itimad Soufi, Head of the Nuclear Security of Materials outside of Regulatory Control Section in the IAEA’s Division of Nuclear Security. “Behind the scenes, our unwavering dedication to nuclear security ensures that events remain untarnished by threats”.

Additionally, the IAEA helps countries hosting MPEs in a unique way, through information exchange. Before an event, the IAEA can provide a tailored Incident and Trafficking Database analysis report on nuclear security threats, trends and patterns, which is focused on the host country and region.

An increased role

The IAEA’s role has greatly increased since its inaugural venture in 2004, when it supported the Athens Olympic Games. Over the past 20 years, the IAEA has extended its support to numerous high profile international events, providing assistance for security measures that protect against nuclear security threats.

The IAEA has provided expertise and resources for 75 MPEs in 46 countries, from World Youth Days to the Women’s and Men’s football World Cups. Most recently, the IAEA has supported MPEs such as the Africa Cup of Nations in Côte d’Ivoire by providing local experts with hands-on training in required measures, including prevent analyses of threats and of the possible consequences of the deliberate misuse of nuclear or other radioactive material.

“Events of such magnitude require an overall security plan that includes nuclear security measures. Through collaboration with and support from the IAEA, nuclear security was assured at the event,” says Oka N’guessan Guy Léopold, Nuclear Physicist and Deputy Directory of Nuclear Safety and Security at Côte d’Ivoire’s Radiation Protection, Nuclear Safety and Security Authority.

Other events, such as the 27th and 28th sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27 and COP28) hosted in 2022 and 2023 by Egypt and the United Arab Emirates (UAE)

respectively, were also supported through the implementation of nuclear security measures.

“It is important that MPEs that host delegates, professionals, and members of the general public are conducted in accordance with the highest standards of safety and security, including nuclear security. The UAE worked closely with the IAEA to ensure that international standards of nuclear security were upheld during COP28,” says Fahed Mohamed Al Blooshi, Director of the Nuclear Security Department at the UAE’s Federal Authority for Nuclear Regulation.

Innovation through technology and training

As technology has evolved over the past 20 years, the IAEA has kept pace, enabling the development of apps and software supporting nuclear security operations and decision making. In 2023, the IAEA launched the Mobile-Integrated Nuclear Security Network (M-INSN), which provides real time radiation data on operations in high traffic areas such as airports, land borders and seaports that require nuclear security measures to be in place.

M-INSN can vastly strengthen the implementation of nuclear security measures at MPEs. The first ever use of M-INSN at

an MPE was at the Women’s U-20 football World Cup, held in Costa Rica in August 2022. The tool was also used to support the nuclear security measures at COP27.

In parallel, the IAEA continues to enhance its training and support programmes, ensuring that countries hosting significant events are well prepared to tackle nuclear security challenges. The recently inaugurated IAEA Nuclear Security Training and Demonstration Centre offers workshops and simulation exercises for a range of scenarios — from the detection of unauthorized radioactive material to the implementation of response measures — to officials and experts responsible for implementing nuclear security.

In the past six years alone, the IAEA has lent over 3500 pieces of radiation detection equipment to countries around the world. Training, tabletop and field exercises led by the IAEA and international nuclear security experts have enabled countries to stay up to date in the face of complex nuclear security challenges.

Effectively addressing nuclear security concerns at global gatherings is critical to international relations and public safety, and an important practical example of the IAEA’s continuous commitment to global peace and security.

Organizing a major public event presents unique security challenges, including nuclear security. The IAEA supported Côte d’Ivoire’s nuclear security at African Cup of Nations (AFCON), by providing local experts with hands-on training on required measures.

(Photo: B. Kaboro/IAEA)



A day at the Nuclear Security Training and Demonstration Centre

Advanced training in a unique IAEA facility

By Emma Midgley

A new IAEA training centre dedicated to helping countries strengthen their nuclear security regimes offers practical hands-on training in areas ranging from the physical protection of nuclear facilities and material to nuclear forensics and computer security. The IAEA's Nuclear Security Training and Demonstration Centre (NSTDC) — the first international training centre dedicated to nuclear security — builds on the IAEA's mandate and long-standing expertise, experience and knowledge in this area and has been created in response to countries' requests for more practical nuclear security training.

While the IAEA has for decades supported countries in strengthening their nuclear security regimes by conducting missions, trainings and exercises, the establishment of the NSTDC further enhances the assistance provided to countries to help them address unique challenges and implement complex projects in nuclear security which require specialized technical infrastructure and equipment. The NSTDC trainings complement existing national and international mechanisms for capacity building in nuclear security and specifically tackle areas not previously addressed by the IAEA.

The facility currently offers 23 training courses and workshops in the areas of physical protection of nuclear or other radioactive material and associated facilities, as well as detection and response to criminal or intentional unauthorized acts involving or directed at nuclear or other radioactive material, associated facilities, or associated activities.

“The NSTDC is a modern, specialized training facility supported by state-of-the-art technical infrastructure. Its training programme is designed to address identified needs and gaps, offering thousands of experts access to hands-on training, advanced technology and equipment,” says Marina Labyntseva, Head of the Education and

Training Development Unit in the IAEA's Division of Nuclear Security.

An example of the Centre's unique infrastructure is the Demonstration Control Centre (DCC), which is a simulation of the central alarm station (CAS) found at nuclear facilities or facilities that use radioactive material. It is equipped with multiple workstations that can be configured for alarm monitoring, access control, video monitoring, and training in computer security. Demonstration and virtual reality environments simulate the security systems used at nuclear power plants (NPPs), research reactors and border crossings.

“It is a technical training facility that does not commonly exist in countries, providing unique experience in hands-on CAS operations. The DCC provides monitoring and control of all installed security systems so that trainees are able to monitor, assess and communicate alarms from different systems and workstations,” adds Labyntseva.

The NSTDC also has a physical protection demonstration room, allowing trainees to configure, use and test different physical protection components, such as access controls and surveillance cameras. Security is also a key consideration when transporting radioactive sources, whether from a research facility or hospital to a secure storage site or to a port for repatriation to their country of origin. The NSTDC offers hands-on training to assist countries in enhancing nuclear security relating to these activities.

“Since before its opening, it was clear to us that the NSTDC would play a critical role in training nuclear security professionals. It is important to underscore that we are immensely proud of the work we have done in supporting this Centre, which has already attracted a large number of participants in such a short space of time, demonstrating the essential and constructive role it will play in the fields of nuclear security,” says Abdullah

Khalid Tawlah, Ambassador and Permanent Representative of Saudi Arabia, who co-chairs the Friends of the NSTDC group.

In response to countries' needs for assistance in the implementation of nuclear security measures at major public events, the NSTDC conducts workshops and simulation exercises to prepare local and national security forces. These drills encompass a wide range of scenarios, from the detection of unauthorized radioactive material to the implementation of response measures.

The NSTDC offers advantages in the area of radiological crime scene management and nuclear forensics training. The specialized equipment available at the Centre offers trainees the opportunity to gain experience of dealing with a radiological crime scene, learn about safety precautions in such a scenario, and understand how evidence of radioactive material is collected, packed and transported to a laboratory and how it can be analysed to support crime investigations.

“The NSTDC and the comprehensive training it offers exemplify the IAEA’s enduring commitment to nuclear security. Its location, nestled between the safeguards laboratories and the original nuclear applications laboratories, serves as an important reminder of the pivotal role nuclear security plays alongside safeguards and nuclear applications in fulfilling the IAEA’s ‘Atoms for Peace

and Development’ agenda. In concert, these activities build public trust in, and safe and secure access to, nuclear technology, enabling the IAEA to address the most pressing challenges of our time,” says Ambassador and Resident Representative of the United States of America Laura S. H. Holgate, who co-chairs the Friends of the NSTDC group.

The increasing use of digital technologies globally, including in NPPs, means that extra vigilance is needed to protect against blended attacks and cyberattacks, underscoring the urgent need for robust computer and information security measures. The NSTDC training courses include the computer and information security modules as a cross-cutting area. Computer security and cyber capabilities have been integrated into the NSTDC courses to address aspects such as sabotage of NPPs, the detection of lost radioactive sources, nuclear security for sources used in hospitals, and nuclear security at major public events and at border controls.

The NSTDC, located at the IAEA’s Seibersdorf laboratories outside Vienna, has been operational since October 2023. By the end of April 2024, in its first six months of operation, it will have hosted 29 events attended by about 700 participants. The NSTDC is supported by donors’ financial and in-kind contributions and welcomes partners interested in supporting its work.

The NSTDC is equipped with classrooms and demonstration capabilities, including a nuclear forensics demonstration laboratory containing microscopes, a glove box, and other relevant equipment.

(Photo: F. Biquet/IAEA)

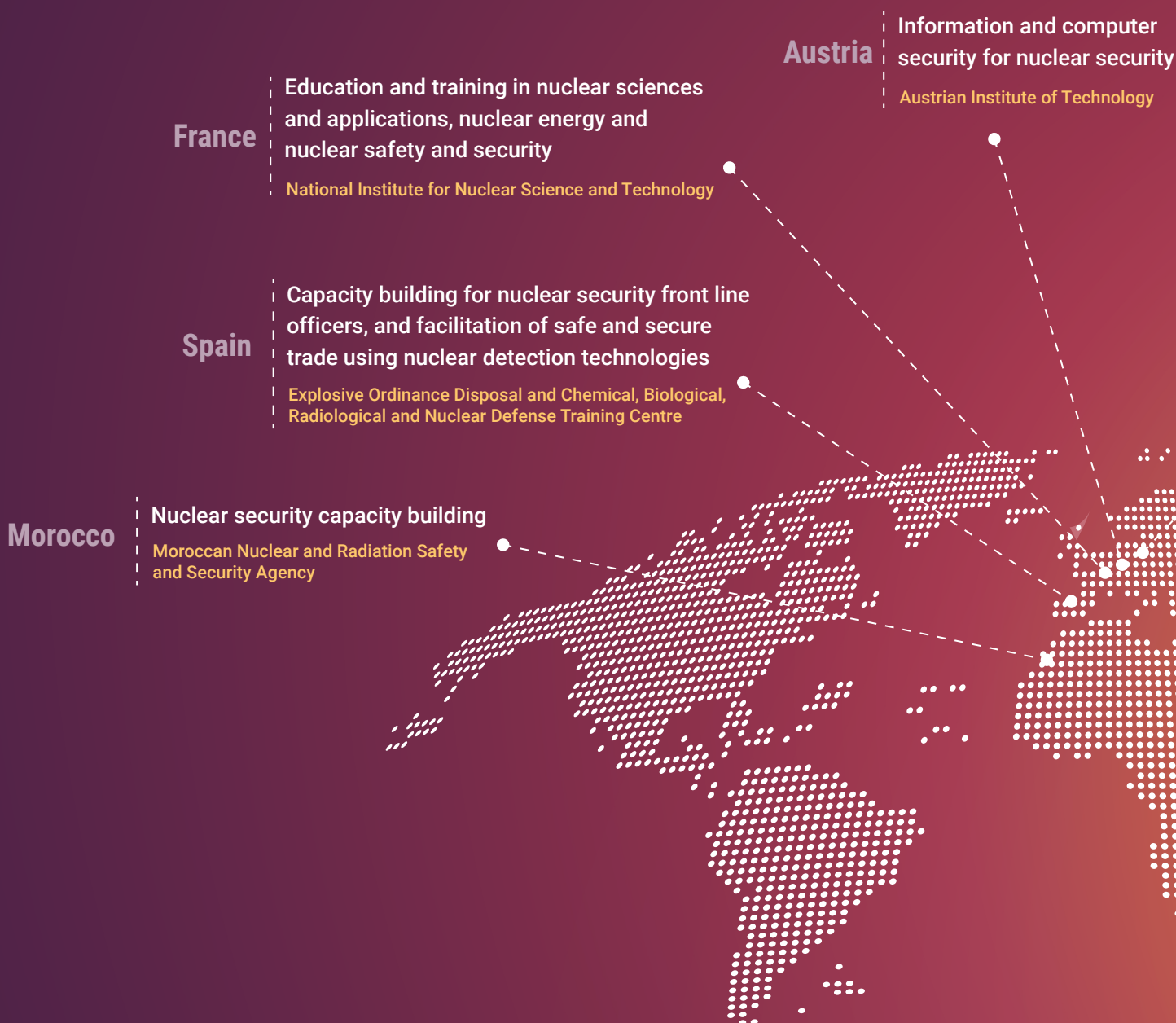


IAEA Collaborating Centres

Strengthening global nuclear security

The IAEA's Collaborating Centres in nuclear security are institutions, departments or laboratories which support the IAEA's work by providing technical expertise, theoretical and practical training as well as specific research and development activities.

Working in partnership with the IAEA, these centres assist to further enhance capacity building efforts for nuclear security at national, regional and international levels by assessing and implementing an agreed work plan.



As of April 2024, there are nine Collaborating Centres for nuclear security in eight countries across the world.

Each of these centres is recognized for their excellence and expertise in specialized subject areas, among others in computer security, nuclear forensics or physical protection. Their designation as IAEA Collaborating Centres offers them the opportunity to share knowledge and good practices, and facilitate enhanced international cooperation.



Missing or stolen?

The Incident and Trafficking Database has the info!

By Erika Kancsar, Anna Gredinger

Have you ever wondered what happens to nuclear or other radioactive material around the world if it is lost or stolen? The IAEA hosts a database that compiles information on incidents such as trafficking and other related unauthorized activities involving nuclear and other radioactive material. The Incident and Trafficking Database (ITDB) was established in 1995 and includes updates from 145 participating countries that maintain the database and keep it up to date. Information is exchanged on a voluntary basis.

“The ITDB encompasses a range of activities, from the smuggling and sale of nuclear material to unauthorized disposal and the discovery of lost radioactive sources,” says Scott Purvis, Head of the Information Management Section in the IAEA’s Division of Nuclear Security.

Since the database was launched three decades ago, over 4000 incidents have been reported, approximately eight per cent of which are confirmed as acts related to trafficking or malicious use. Most reported incidents are not related to any malicious intent or threat to sealed radioactive sources. These incidents primarily involve various types of material recovery, such as the discovery of uncontrolled sources, the detection of material disposed of in an unauthorized way and the detection of inadvertent unauthorized possession or shipment of nuclear or other radioactive material, including radioactively contaminated material.

On average, over 100 incidents within the scope of the ITDB are reported annually, including thefts, losses and missing items. The majority of such incidents involved radioactive sources used in industrial or medical applications. In general, devices containing radioactive sources may attract

the attention of potential thieves, as they may be perceived to have a high resale or scrap metal value. During the period 1993–2023, only four per cent of the reported thefts were subsequently confirmed to have been related to the trafficking of nuclear and other radioactive material.

Incidents reported to the ITDB involve various radioactive materials, including uranium, plutonium and thorium, as well as naturally occurring and artificially produced radioisotopes and radioactively contaminated material.

“Knowledge about such incidents enables countries, and even regions, to learn from them. It also enables authorities responsible for nuclear security to establish and enhance systems and measures to protect against theft and better detect and respond to illicit trafficking of nuclear and other radioactive material,” adds Purvis. “We encourage all countries to report incidents to ITDB systematically”.

The Netherlands has participated in the ITDB since 1995 and regularly shares information regarding incidents detected through its nuclear detection infrastructure. “As a basis for regular reporting of incidents we have a solid detection infrastructure, and clear lines are in place for reporting after detection,” says Emina Salihovic, alternate ITDB point of contact (PoC), of the Netherlands’ Authority for Nuclear Safety and Radiation Protection.

The ITDB has amassed a huge volume of information to learn from and help further strengthen the global nuclear security regime. “Through regular reporting to the ITDB, we are able to gain insights into regional and global trafficking of nuclear and other radioactive material, which is relevant for national and global nuclear security,” says Salihovic.



Although the number of incidents involving the most concerning types of nuclear material from a nuclear security perspective has decreased significantly over the last two decades, attempts to illegally trade various nuclear and other radioactive materials are still recorded. In addition, transport-related incidents account for more than 50 per cent of all thefts, which highlights the importance of strengthening transport security measures.

Regular communication with the 145 participating countries through a network of national PoCs is critical to the ITDB. The IAEA reviews all reported incidents with a view to identifying common threats, trends and patterns; assisting countries in determining what actions may need to be taken with respect to particular events; helping formulate policy to combat the illicit trafficking of such materials; and supporting the IAEA's nuclear security activities.

Another fundamental function of the ITDB is to promote the exchange of information regarding pertinent nuclear security incidents among participating countries. Information about reported incidents is disseminated to national PoCs, as well as to a selected group of personnel at the IAEA and relevant international organizations. This shared information can aid authorities in identifying and recovering lost or stolen material, informs national capabilities for detection and response and, in some cases, facilitates the linking of related cases.

The IAEA plays a central role in helping countries strengthen nuclear security, and the sharing of information through the database contributes to this vital goal. The ITDB's detailed data is confidential and can only be accessed by participating countries and relevant international organizations, such as the International Criminal Police Organization – INTERPOL.

Incidents of illicit trafficking of nuclear and other radioactive material reported to ITDB include small portable sealed radioactive sources used in many industrial applications.

(Photo: Walter Truppa/ARN)

Let's talk about nuclear security

National perspectives on the importance of public communication

By Vasiliki Tafili

Communicating with non-experts, the public or the media about nuclear security requires a delicate balance between transparency and respect for the confidentiality and sensitivity of information. The complexity of the challenge becomes even more evident when considering the highly technical content and terminology used in relation to aspects of nuclear security work, from physical protection to computer security and nuclear forensics.

“Communicating on nuclear security can be as challenging as it is for nuclear safety and radiation protection: topics are technically complex; we need to take into account anxiety and fears related to nuclear energy, as well as misinformation and disinformation,” says Cédric van Caloen, Public and International Affairs Expert at Belgium’s Federal Agency for Nuclear Control (FANC), the national regulatory authority responsible for communication regarding nuclear safety, radiation protection and nuclear security.

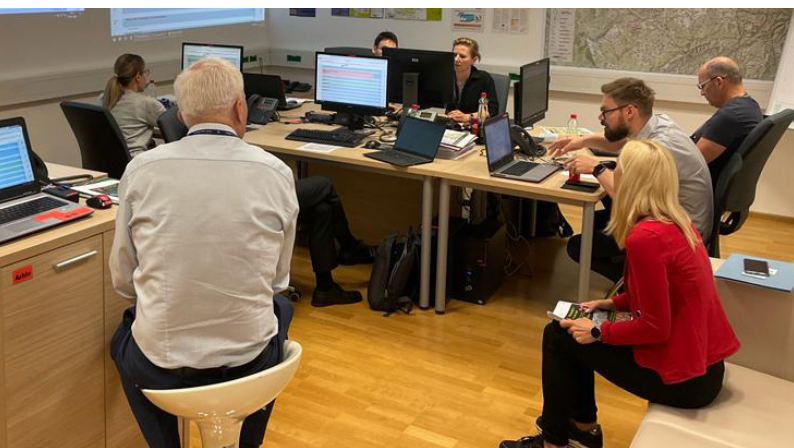
At the international level, FANC has been particularly vocal in the area of insider threat mitigation, after experiencing sabotage at the Doel nuclear power plant in 2014. “This is a good example of a topic we communicate on regularly,” highlights van Caloen, making a clear reference to the balance between transparency and confidentiality. “Our role is to inform the public in a transparent way of potential risks and security measures, while also maintaining the confidentiality necessary to protect sensitive information”.

Indonesia’s Nuclear Energy Regulatory Agency (BAPETEN) identifies two primary audiences for its communication activities: government agencies and the general public. “In practice, the technical divisions at BAPETEN engage directly with government agencies to emphasize messages pertaining to

potential nuclear security incidents, radiation detection equipment and the consequences of radiation, as well as the prevention and detection purposes of nuclear security measures,” says Retno Agustyah, Public Relations Specialist at BAPETEN. “The public communications division focuses more on improving public awareness of the benefits and risks of nuclear, which leads to public trust in what BAPETEN is doing to maintain nuclear security,” she adds.

Agustyah points out that the diversity of Indonesian society poses a huge challenge when communicating about nuclear security. Indonesia is an archipelagic country with 1340 ethnic groups, 38 provinces and a population of 276 million. “Given that 77 per cent of the population use the Internet to obtain life-improving information, BAPETEN employs its official website and social media to disseminate comprehensible information regarding nuclear security in Indonesia, in addition to conducting in-person meetings,” says Agustyah. “Our ultimate purpose is to determine the strategy, messages and channels that will be most effective in conveying nuclear security-related information, leading to public awareness, acceptance and required actions”.

Bilal Mushtaq, Emergency Response Officer at the Pakistan Atomic Energy Commission, describes his country’s communication approach for nuclear security events: “Keeping the public informed is essential for maintaining order and mitigating effects in case of a nuclear security event. Pakistan has an elaborate system for clear and continuous communication with the public”. He explains that the Nuclear and Radiological Emergency Support Centre (NURESC) at the Nuclear Emergency Management System is designed to connect with the operator, the regulator, the National Disaster Management



Authority and other stakeholders. “In case of an event, NURESC shall conduct public communications in simple and easily comprehensible language through the relevant media channels”.

Communication about nuclear security is important because it is directly linked with strengthening public confidence in nuclear science and technology applications for peaceful purposes. The IAEA’s role in communication about nuclear security is outlined in the Nuclear Security Plan 2022–2025 and in the nuclear security resolutions of the IAEA General Conference.

“Raising awareness about the IAEA’s Nuclear Security Programme and how it assists countries in achieving nuclear security

globally requires targeted promotion and outreach,” says Elena Buglova, Director of the IAEA’s Division of Nuclear Security. “Systematic communication can contribute to further improving nuclear security culture, and this is one of the main reasons why countries are encouraged to share good practices and participate in information exchange platforms”.

Effective public communication is crucial in order to demystify nuclear security. The IAEA’s future plans include the development of a specific training module on public communication in nuclear security. This module will be part of the suite of assistance offered by the IAEA at its Nuclear Security Training and Demonstration Centre to help countries enhance their capabilities.

“Raising awareness about the IAEA’s Nuclear Security Programme and how it assists countries in achieving nuclear security globally requires targeted promotion and outreach.”

– Elena Buglova, Director, Division of Nuclear Security, IAEA

Nuclear security includes all of us

By Monica Shifotoka

Diversity and inclusivity are crucial when addressing systemic inequalities and both play a crucial role in strengthening capabilities in nuclear security. Establishing work environments that are more diverse, equitable and inclusive not only enhances organizational effectiveness but also fosters innovation and resilience.

According to the Nuclear Energy Agency, women represented only 28.8 per cent of new hires in the nuclear sector workforce in 2023. At the IAEA, however, the number of women in professional and higher categories has increased from 30 per cent to almost 46 per cent since December 2019.

“In nuclear safety and security, gender equality is not just an ideal to aspire to — it is a cornerstone of our collective strength. Diverse perspectives enrich our understanding. Inclusion means ensuring and providing equal access to opportunities and resources, as such efforts will contribute to the success of the nuclear safety and security work,” says Lydie Evrard, IAEA Deputy Director General and Head of the Department of Nuclear Safety and Security.

Specifically in the field of nuclear security, there is a noticeable lack of diversity in terms of gender parity due to insufficient information, access and opportunities.

Women professionals are underrepresented in nuclear security, including in positions and leadership roles related to science, technology, engineering and mathematics (STEM).

To address this issue, the IAEA has set up the Women in Nuclear Security Initiative (WINSI), which actively promotes gender equality in nuclear security. Launched in March 2021, WINSI aims to support gender equality both in the IAEA and in the global nuclear security community.

“Nuclear security is indispensable for the peaceful uses of nuclear science and technology that the world needs — to meet urgent challenges such as climate change and a growing cancer burden. A diverse and qualified workforce can bring creativity and innovation to forge technological and scientific solutions, to further enhance the global nuclear security framework,” adds Evrard. In the IAEA’s Division of Nuclear Security, the number of women in the professional category increased from 35 per cent to almost 65 per cent between 2021 and 2024.

A growing nuclear security workforce

Among the IAEA’s efforts to address the under-representation of women in the nuclear field is the IAEA Marie Skłodowska-Curie



Fellowship Programme, which awards scholarships and internships to women Master's level students in the nuclear field, and the Lise Meitner Programme, which provides early and mid-career women professionals with opportunities to advance their technical and leadership skills.

As more countries adopt nuclear science and technology for clean energy, cancer care, industry and research, the role of nuclear security is growing. It is only through harnessing collective strengths that the challenge of creating the necessary nuclear security workforce can be addressed. The IAEA's programmes and initiatives work towards closing the gender gap in the nuclear field and enabling more women and young people to pursue careers, including in nuclear security.

Alex Barrow, Development Lead for Government, Security and Resilience at Nuclear Transport Solutions, says: "There is evidence that greater diversity improves decision making, and organizations with more diverse workforces tend to perform better. Nuclear is no different — if we want to build a secure future for peaceful nuclear technologies, we must include diverse perspectives to introduce new and innovative ideas and challenge established ways of doing things".

Nuclear technology is a viable way to drive socioeconomic development and ensure that young people are employed and employable.

Empowering youth in nuclear security

The IAEA also has outreach programmes aimed at students and early career professionals to encourage careers in the nuclear field and foster professional development. One of the most recent initiatives is the Nuclear Security Delegation for the Future, which was announced as part of the IAEA's efforts to increase youth representation at the 2024 International Conference on Nuclear Security: Shaping the Future (ICONS 2024) and invited young nuclear security specialists to gain real world experience in leadership, diplomacy and international nuclear security. The Nuclear Security Delegation for the Future gave younger participants the chance to learn about, collaborate on and contribute to advancing nuclear security on a global stage, while providing them with opportunities to make connections with peers, industry leaders and policymakers from around the world.

"Including young professionals in important discussions and initiatives can accelerate advancements in global nuclear security by introducing additional novel perspectives and vitality into the conversation," says Diana Mafie, a member of the Nuclear Security Delegation for the Future from Tanzania.

These initiatives and programmes exemplify the IAEA's commitment to inclusivity in nuclear security, underscoring that this critical issue transcends gender, borders, sectors and generations.

Rafael Mariano Grossi, IAEA Director-General, together with recipients of the IAEA Marie Skłodowska-Curie Fellowship Programme and Lise Meitner Programme, at the International Women's Day, "For More Women in Nuclear", event held at the IAEA headquarters in Vienna, Austria. 7 March 2024.

(Photo: D. Calma/IAEA)



Strengthening the role of parliaments in nuclear security

An interview with Dr. Tulia Ackson,
President of the Inter-Parliamentary Union



Parliaments are unfortunately often overlooked as key players in the universalisation of international treaties.

Q: Can you describe the role and work of the Inter-Parliamentary Union, especially with regard to the empowerment of parliaments in promoting peace and security and in promoting the SDGs?

A: The Inter-Parliamentary Union (IPU) was founded 135 years ago as the first political multilateral organization in the world and is dedicated to promoting peace through parliamentary diplomacy and dialogue. Its key objective is to encourage parliamentarians to meet and engage in mediation rather than resolve their differences through war.

As President of the IPU, I am proud that we now have 180 Member Parliaments (MPs), representing most of the 46 000 national members of parliaments worldwide. Both of the founders of the IPU, as well as a dozen other leading IPU figures, have been awarded the Nobel Peace Prize.

The IPU plays a special role in countries emerging from conflict or transitioning to democracy. It helps them to develop their parliaments as robust and democratic institutions that can heal national divisions, and it protects citizens so that they can enjoy freedom from fear and freedom from war.

Disarmament and non-proliferation are also crucial for peace. The IPU lobbies hard for a nuclear-weapon-free world and promotes the full implementation of United Nations Security Council resolution 1540 on preventing non-State actors from obtaining weapons of mass destruction. The IPU also works towards the eradication of illicit flows of small arms and light weapons, which are everyday tools of violence and killings. Because war often affects women and young people disproportionately, we focus on peace and security in relation to these groups, based on United Nations Security Council resolutions 1325 and 2250.

One of my priorities as IPU President is the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). Parliaments' legislative, oversight and budgetary responsibilities make them key players in reducing social and economic inequalities, improving the health of the people they represent and taking action to save the planet from the climate emergency, for example. Our self-assessment SDG toolkit, produced with the United Nations Development Programme and translated into a dozen languages, is also proving very successful. The toolkit helps parliamentarians identify good practices, opportunities and lessons learned in how to institutionalize and mainstream the SDGs into the legislative process.

Q: How is the IPU helping to advance the universalization of legal instruments for nuclear security?

A: I am proud to say that supporting the ratification of legal instruments on disarmament and nuclear security is one of the IPU's key areas of work. We raise awareness and provide assistance on the ratification and implementation of disarmament treaties and initiatives. There are numerous examples of dedicated members of parliament acting as champions of a cause and being 'game changers' in ensuring the signature and ratification of such international instruments.

Parliaments are unfortunately often overlooked as key players in the universalization of international treaties. Parliaments are the entities responsible for the ratification of any international text and its integration into national law for efficient implementation.

The IPU has been discussing the nuclear issue for many years — both in terms of peaceful use and from a non-proliferation

and disarmament perspective — as an essential part of its actions in favour of peace, international security and development, and with an emphasis on the impact and importance of the universalization of legal instruments for nuclear security.

One of the first IPU resolutions on the issue, adopted at the 91st Inter-Parliamentary Conference in 1994, is entitled *The Importance of Adhering to the Obligations Specified in the Treaty on the Non-Proliferation of Nuclear Weapons*.

1995 saw the adoption of a resolution that spearheaded calls for the early conclusion of a truly comprehensive and internationally verifiable test-ban treaty. This materialized in 1996, with the adoption of the *Comprehensive Nuclear-Test-Ban Treaty (CTBT)*.

Since then, nuclear non-proliferation and disarmament have remained high on the IPU's agenda, with regular resolutions and high level declarations on the issue culminating in a landmark resolution entitled *Towards a nuclear-weapon-free world: The contribution of parliaments* adopted in 2014. The resolution calls on parliaments to ensure full compliance with all provisions of the *Treaty on the Non-Proliferation of Nuclear Weapons* and to strengthen the safety of all nuclear materials.

The IPU has been working to raise awareness among its MPs of the need to fully implement these instruments, including through the organization of regional seminars under the umbrella of United Nations Security Council resolution 1540. Such events provide an opportunity to highlight the pressing need to develop and maintain appropriate and effective measures to account for and secure nuclear materials.

Targeted campaigns in relation to nuclear-related international instruments have also been successful. For instance, the IPU has contributed to most of the ratifications of the CTBT since 2019.

Q: Why is the role of parliamentarians important in further promoting adherence to international legal instruments such as the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment?

A: Parliamentary diplomacy can help to remove national obstacles that may be 'roadblocks' to the signature and ratification of international legal instruments. Parliaments are also important in overseeing the full implementation of these instruments. The IPU supports its 180 MPs by creating forums for sharing experiences, and by showcasing the benefits and successes of treaties on non-proliferation and nuclear security.

This is important, because no parliament wants to be the 'weak link' — especially as the international infrastructure of legal instruments on non-proliferation, nuclear safety and disarmament can only truly become effective when implemented globally.

In relation to the CPPNM and its Amendment, and with respect to the realities on the ground, countries must be aware of the real possibility that their territory may be used to transport illicit nuclear material, bearing in mind that their neighbours are equally vulnerable to this threat.

Under the framework established by the CPPNM, parliaments understand that they cannot tackle this issue alone, and that unless they succeed in cooperating, the safety of their constituents and those in neighbouring countries cannot be guaranteed.

Parliamentarians are well aware that global problems require global solutions, and opportunities to present a united front on issues of such importance are few and far between. I am convinced that the United Nations, specialized agencies like the IAEA, and the global parliamentary community represented by the IPU can be successful in addressing the multiple challenges the world is facing today.

Nuclear security through the lens

The eight images presented here were submitted to the IAEA's 'Nuclear Security Through the Lens' photography contest, announced as part of the International Conference on Nuclear Security: Shaping the Future (ICONS 2024).

The IAEA called for photographic submissions to help raise awareness of nuclear security work around the world. The selected photos showcase various roles that support nuclear security, the evolution of the infrastructure and technology used, and gender equality.



A promising future for the world: Women in nuclear security

This image, winner of the 'Nuclear Security Through the Lens' photography contest, captures men taking part in a lecture on nuclear security taught by a woman. At the Pakistan Centre of Excellence for Nuclear Security, women deliver national and international trainings on prevention, detection and response, and hold leading roles in the associated scientific commissions of the National Command Authority. These trailblazing women show how we continuously strive for a gender-inclusive global nuclear security architecture.

Anum A. Khan, Pakistan



The role of the Brazilian armed forces in planning and preparing the medical response to radiological and nuclear accidents

This photograph captures nuclear security measures undertaken during an emergency exercise at the Angra I nuclear power plant in Brazil. In emergencies, an effective medical response is crucial in saving lives, highlighting the importance of having precise equipment to protect the health of the public and professionals during radiological accidents. The constant evolution of radiation dose measurement equipment directly contributes to nuclear security.

Marciley Thadeu Cartaxo da Costa, Brazil



Portal

This portal was once used to facilitate secure entry into a now deconstructed facility that operated for half a century, between 1954 and 2008. When built, the plant was the largest building in the world, and thousands of people passed through its gates each day. The portal serves as a reminder of the importance of forethought and agility in designing, maintaining and upgrading infrastructure, facilities and security systems. Such relics reinforce the ideas of permanence and impermanence: the portal stands, the plant is gone.

Laurel Fetterer, United States of America



In the company of coconut trees

Built in the late 1970s, the Bataan nuclear power plant (NPP) in the Philippines never commenced operations. The continued maintenance of this quiet site underscores a commitment to the responsible stewardship of nuclear resources. The backdrop of a calm blue sky and coconut trees contrasts starkly with the imposing structure of the NPP. It serves as a visual representation of the balance required in managing nuclear facilities, where the pursuit of clean energy must be accompanied by rigorous security measures.

Zenobia Homan, Kingdom of the Netherlands



From 3G to AI: Shaping the future of nuclear security

Nuclear security has evolved away from the traditional methods of gates and armed guards towards technological methods, which now integrate artificial intelligence (AI). The three pillars of nuclear security – prevention, detection and response – can equally benefit from the applications of AI. AI capabilities can be used to obtain information easily, identify threats rapidly and respond quickly. However, human oversight remains of crucial importance. Shaping the future of nuclear security will involve balancing the benefits and risks of AI.

Imran Ali Khan, Pakistan



The atomic structure of nuclear security

Contained within the metaphorical nucleus of nuclear security is the atom — the key to security criticality. The stability and resilience of this atomic structure depends on a uniquely skilled profession, where gender diversity promotes cohesion between protons and neutrons. Just as electrons orbit the nucleus, a dynamic workforce revolves around the core mission of securing nuclear assets.

Geoffrey McCabe, Canada



Proud to protect nuclear material!

Nuclear material transport security is an important part of nuclear security. This picture shows law enforcement officers escorting a shipment of nuclear material during the COVID-19 pandemic. Despite health risks, they carry out their mission, recognizing the importance of maintaining nuclear programmes.

Cesar Romao, Brazil

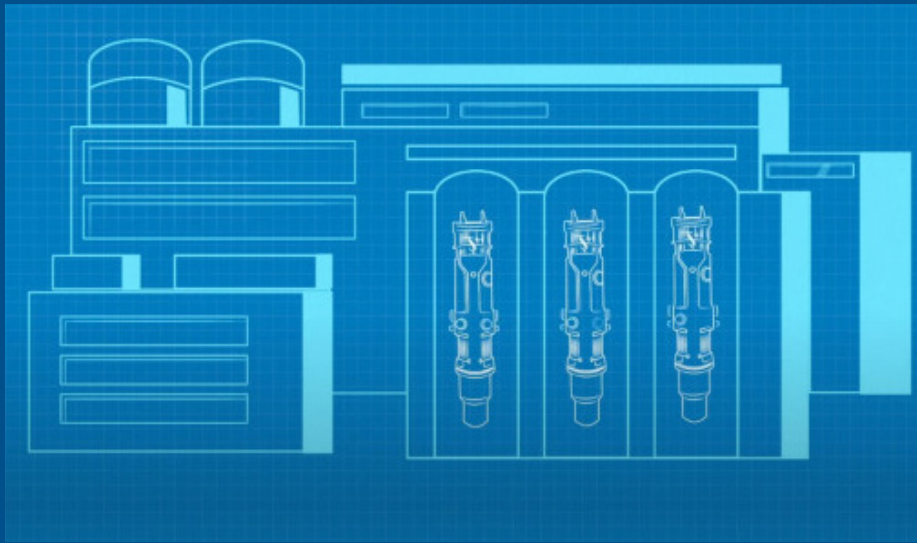


Continuing training for a sustainable nuclear security

The proper implementation of nuclear security measures at major public events requires the training of front line officers and the use of radioactive and nuclear material detection equipment. With the IAEA's support, Cameroon conducted two workshops on nuclear security measures in advance of the 2021 Africa Cup of Nations. Around 2100 individuals from security forces received training. Continuous training and the acquisition of detection equipment is necessary to ensure that nuclear security remains sustainable.

Cecile Mangwi Wandjie, Cameroon

New research project enhances computer security for small modular reactors and microreactors



Computer security measures need to be considered and maintained throughout the entire life cycle of SMRs, from design to operation to decommissioning.

human actions could be very beneficial, but it must go hand in hand with safety considerations, placing robust computer security measures at the centre”.

Overall Objective of the Coordinated Research Project

The primary objective of the CRP entitled Enhancing Computer Security of Small Modular Reactors and Microreactors is to advance computer security for SMRs, taking into account safety, security, operational modes, emergency preparedness, human factors, novel technologies and methodologies.

The specific research objectives of the CRP are:

- To research methodologies and techniques for assessing and implementing computer security for computer-based systems in order to support the deployment and operation of SMRs;
- To research defensive computer security architecture and best practices for SMRs based on concepts of operation, and to provide defence in depth against compromise using a graded approach;
- To research and evaluate computer security in respect of novel technologies and the application and adaptation of current digital technologies for SMRs;
- To research computer security measures and guidelines for SMRs;
- To research computer security tools for training, exercises and demonstrations.

— *By Vasiliki Tafli*

The IAEA is launching a research project to advance computer security for small modular reactors (SMRs), further expanding its support to protect the next generation of nuclear reactors against cyber-attacks.

As interest in SMRs grows, this new coordinated research project (CRP) will explore operational concepts such as autonomous, remote operations and fleet management, as well as digital technologies such as cloud computing, artificial intelligence (AI) and machine learning.

“The innovative digital technology of advanced reactors brings new challenges in terms of nuclear safety and security,” says Elena Buglova, Director of the IAEA’s Division of Nuclear Security. “Adequate computer security measures should be considered and maintained during the entire lifetime of SMRs,” she adds.

This three-year project will foster cooperation and technical exchange among experts around the world on activities that have the potential to

advance the nuclear safety and security of SMRs and microreactors. It will also provide an opportunity for a network of international research institutions to assess and develop approaches, methodologies, technologies and techniques related to computer security to increase the resilience of SMRs to cyber-attacks.

In line with the IAEA’s systematic approach to identifying and developing enabling technologies for SMRs, this project is coordinated by the IAEA’s Division of Nuclear Security of the Department of Nuclear Safety and Security, in collaboration with the Division of Nuclear Power of the Department of Nuclear Energy.

“AI and other digital tools have a lot of potential to support SMR deployment and operation, but it is important that we take a holistic view and carefully consider how exactly these technologies will work in concert with one another,” says Aline des Cloizeaux, Director of the Division of Nuclear Power. “Moving towards a model of autonomous operations with reduced

Supporting the next generation

An IAEA spotlight on women in nuclear sciences and applications



Susana Fiadey, an MSCFP recipient from Ghana and intern at the Food Safety and Control Laboratory, Food Safety and Control Section, Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture in Seibersdorf, Austria.

(Photo: S. Fiadey/IAEA)

The IAEA is supporting women to pursue careers in nuclear through its Marie Skłodowska-Curie Fellowship Programme (MSCFP), which provides highly motivated female masters-level students with scholarships and internship opportunities. There are diverse prospects in the nuclear field, encompassing everything from nuclear energy, nuclear safety and nuclear security to nuclear law and non-proliferation. Interestingly, nearly half of MSCFP recipients are actively pursuing or have completed their studies in the field of nuclear sciences and applications, covering a diverse range of subjects such as health, nutrition, agriculture and ocean protection — testimony to the interest of many young scientists harnessing the non-power benefits of nuclear technologies.

Furthermore, a third of the 105 fellows placed through the MSCFP's internship component have gained direct work experience in nuclear sciences and applications, either in one of the IAEA's state-of-the-art laboratories in Seibersdorf or Monaco, or in partner organizations.

The MSCFP, launched in 2020 by IAEA Director General Rafael Mariano Grossi, offers fellows the chance to contribute, during their internships, to cutting-edge research projects that address development needs around the world.

“The IAEA is a unique and exciting place for MSCFP recipients to intern, where they can support our activities and contribute to our mission of addressing global issues such as climate change and public health,” says Najat Mokhtar, IAEA Deputy Director General and Head of the Department of Nuclear Sciences and Applications.

Since the MSCFP's inception, 560 women have been awarded the fellowship, 28 of whom have been placed in internships relating to nuclear science and its applications at the IAEA. Currently, 11 interns from around the world are supporting IAEA activities in areas ranging from health, food and agriculture to environment, water and industry.

Brenda Trust, an MSCFP recipient from Uganda, is an intern at the Joint FAO/IAEA Centre of Nuclear Techniques

in Food and Agriculture. As part of the Soil and Water Management and Crop Nutrition Section, she explores how nuclear technologies can be used to enhance agricultural and water resources.

“I was able to collaborate with esteemed professionals, which has enriched my perspective and stimulated my determination to have a positive impact in this field,” remarks Trust.

Mary Joy Erojo, an MSCFP recipient from the Philippines, has been supporting the IAEA's Dosimetry Laboratory (DOL).

“As a medical physicist, I ensure the safety and effectiveness of the diagnosis and treatment of cancer patients. At DOL, I am training in various techniques for the measurement and optimization of radiation doses for radiotherapy, which are crucial for enhancing treatment outcomes and patients' quality of life,” says Erojo.

The internship has been instrumental in advancing MSCFP fellows' education in nuclear sciences and preparing them for high-end academic and professional opportunities.

“Throughout my internship, I gained valuable knowledge of the practical aspects of nuclear physics, including safety protocols and the operation of a neutron generator,” says MSCFP recipient Wafa Bennaceur from Algeria, who supports the IAEA's Nuclear Science and Instrumentation Laboratory.

The MSCFP provides young women in nuclear with opportunities and support, enabling them to unlock their full potential and drive progress and innovation in nuclear sciences to achieve gender equality in the nuclear field.

— *By Chiara Cogliati*

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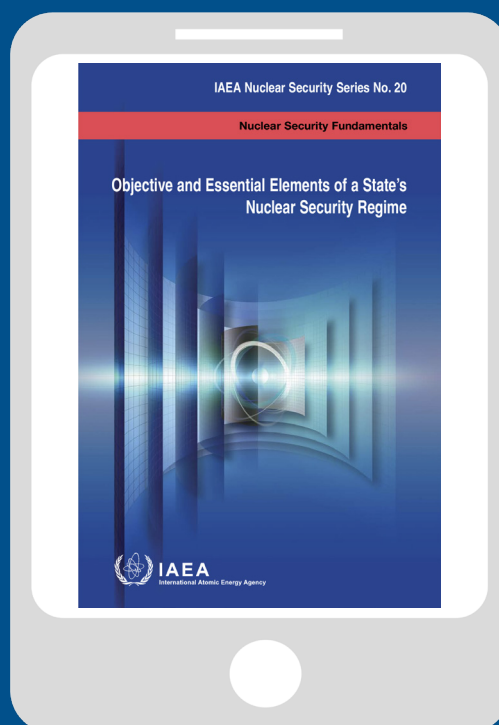


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