IAEA

Enhancing Capabilities for Nuclear Verification

Resource Mobilization Priorities

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Foreword

The International Atomic Energy Agency (IAEA) plays a central role in global security by independently verifying that nuclear materials and technologies are used solely for peaceful purposes. Through science-based safeguards, the IAEA provides credible, independent assurances to the international community that nuclear materials remain in peaceful use, helping to uphold the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and other global non-proliferation norms.

Despite growing challenges – including rapid technological advancements, expanding nuclear power programmes, a rising safeguards workload, and ongoing budget constraints – the Department has maintained operational effectiveness. Continuing to do so will require greater investments in our future capabilities – the infrastructure, systems, processes, methodologies, instrumentation, and human competencies that enable our work.

While core verification activities such as inspections are funded through the IAEA's regular budget, strategic enhancements to our capabilities are evermore dependent on extrabudgetary contributions and in-kind support from Member States and other partners. These partnerships are key to building institutional resilience and ensuring that the Department remains agile and prepared for future safeguards challenges.

This document sets out the Department's strategic priorities for strengthening its verification capabilities in an increasingly complex global nuclear landscape. It reflects the latest updates to the Department's strategy, including a set of new strategic initiatives. The Enhancing Capabilities for Nuclear Verification – Resource Mobilization Priorities (RMP) informs and complements the Development and Implementation Support Programme (D&IS), which outlines the Department's plans for concrete, implementable activities in

support of the capabilities outlined in the RMP. Together, the RMP and D&IS Programme help the Department advance its strategic priorities in collaboration with partners.

Sustained, predictable external support is not optional – it is imperative to protect existing investments, accelerate innovation, and ensure the safeguards system remains credible, future-ready, and fit for purpose. We thank our longstanding partners for their indispensable support and invite new partners to join in this effort, bringing to bear their expertise and resources to co-develop capabilities aligned with our shared global security goals.

In the years ahead, the strength of our collective effort will determine not only the effectiveness of nuclear verification but also demonstrate a global commitment to peace, security, and the peaceful use of nuclear science for all.

Massimo Aparo
Deputy Director General
Head of the Department of Safeguards

Introduction

The IAEA Department of Safeguards (hereafter "the Department") relies on partnerships with Member States and others to develop, maintain, and enhance capabilities needed for effective and efficient nuclear safeguards. While the IAEA's regular budget covers core operational work (e.g., inspections), the development and enhancement of those capabilities depends heavily on extrabudgetary and in-kind support provided through Member State Support Programmes (MSSPs) and other partners.

Purpose and scope

This document identifies and communicates the set of needed capabilities that are of highest priority to the Department and especially reliant on external support. It is intended to help stakeholders understand the context (the 'why') for pursuing particular departmental strategic initiatives and biennial development and implementation support plans[1] and how they relate to the bigger picture of strengthening the effectiveness and efficiency of IAEA safeguards.

In so doing, the RMP serves as a strategic framework for guiding the Department's collaborations with traditional and non-traditional partners and mobilizing resources and other support for activities not funded through the IAEA's regular budget.

Audience

The main audience for the RMP is the Department's current and future traditional and non-traditional partners. This includes Coordinators of the MSSPs, permanent missions to the IAEA, State and regional safeguards authorities, and research and development (R&D) organizations. Also, given the IAEA's strengthened focus on non-traditional partnerships, academia, foundations, non-governmental organizations (NGOs) and private sector entities are also invited to collaborate with the IAEA in advancing its capabilities.

Member State Support Programmes

- Argentina
- Australia
- Belgium
- Brazil
- Canada
- China
- Czech Republic
- European Commission
- Finland
- France
- Germany
- Hungary
- Japan
- Netherlands
- Norway
- Republic of Korea
- Republic of South Africa
- Russian Federation
- Spain
- Sweden
- United Arab Emirates
- Switzerland
- United Kingdom
- United States of America

Observers

- Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC)
- European Atomic Energy Community (Euratom)

[1] As identified in the biennial *Development and Implementation Support Programme for nuclear verification* (D&IS Programme).

Top priority capabilities

While all the capabilities reflected in this document are important to the Department of Safeguards, the following table highlights 17 capabilities that are of the highest priority[2] in needing external support.[3]

Priority objective		ID	Capability
V.6	Ensure effective safeguards approaches for all facilities and activities	V.6.C2	Ability to implement effective and efficient safeguards approaches for advanced reactors including SMRs and microreactors
		V.6.C5	Ability to more effectively and efficiently implement safeguards for enrichment plants
		V.6.C8	Ability to implement effective and efficient safeguards approaches for naval and maritime propulsion and floating reactors
T.1	Strengthen in-field instrumentation capabilities	T.1.C1	Ability to maintain continuity of knowledge over transport casks through secure tracking and monitoring of their terrestrial location without the need of inspector presence
		T.1.C4	Ability to efficiently perform and evaluate partial defect verification of spent fuel with the next generation device
T.2	Enhance sensitivity, reliability and timeliness in sample analysis	T.2.C2	Ability to determine age of U and Pu in environmental samples through techniques and evaluation methods
		T.2.C5	Ability to assure the quality of the NWAL, including SAL, in sample analysis (specifically particle analysis) using fit-for-purpose quality control and quality assurance methods and certified reference materials
		T.2.C8	Ability to maintain existing NWAL capabilities and increase capacity for the analysis of environmental samples through timely replacement of critical instrumentation, additional capacity from existing NWAL, and qualification of new laboratories
T.3	Maintain secure, resilient, and adaptable safeguards IT enterprise	T.3.C2	Ability for States to efficiently submit and review their nuclear material accounting reports, submit additional protocol declarations, and correspond with the Department
		T.3.C5	Ability to provide tools capable of advanced analytics to support verification activities, including AI/ML
		T.3.C6	Ability to provide data services based on a modern data architecture for effective, secure sharing and integration of data
T.6	Expand the use of remote monitoring	T.6.C2	Ability to deploy next generation capabilities to the cameras used in future surveillance systems (e.g. non-optical surveillance, climate insensitivity)
T.7	Leverage advancements in remote sensing	T.7.C1	Ability to leverage new types of space-borne sensor data from open sources, including the processing of synthetic aperture radar data and analysis of multispectral, hyperspectral, and thermal infrared data
M.4	Increase organizational resilience	M.4.C2	Ability to ensure business recovery and continuity to carry out mission-critical functions – needed for continued delivery of safeguards conclusions – in case of disasters (e.g. disruptive, massive cyber-attack or physical loss of critical infrastructure, supply chain and transport disruptions)
M.5	Enhance data governance	M.5.C3	Ability to better leverage methods and tools for automation and advanced analytics in support of data-centric approaches
S.2	Enhance States' safeguards capacity	S.2.C1	Ability to strengthen the capacity of SSACs/SRAs and monitor and measure progress
W.3	Build and retain organizational knowledge	W.3.C6	Ability to enhance staff literacy in information technology, including AI/ML and data integration advancements

[2] These top priorities are marked with an asterisk in the comprehensive list of capabilities.

[3] The order in which these are presented does not imply any order in their importance

Safeguards' strategy framework

Mission

To deter the proliferation of nuclear weapons through the risk of early detection, provide credible assurances, and assist with other verification tasks upon request.

Strategic objectives

The Department of Safeguards' strategic objectives are:

- To continually improve the Department's capabilities and performance and prepare for future safeguarding challenges
- To capture and leverage the benefits of emerging technologies, while managing the challenges and risks they pose
- To fully leverage the information assets gathered through safeguards implementation by deploying a data-centric approach
- To ensure the availability of adequate financial resources and needed human competencies for the safeguards mission

Key documents

Along with the IAEA's Medium Term Strategy, the Department's strategic planning and resource mobilization framework consists of (1) the Department's Strategic Plan, (2) this document (RMP)[4], and (3) the *Development and Implementation Support Programme for Nuclear Verification* (D&IS Programme). Together, these documents connect high-level strategy with required capabilities and associated external support needs and associated implementation plans. In so doing, they help ensure that the Department focuses its development efforts and resources where they are most needed, contributing to effective stewardship of limited resources and maximizing the impact of stakeholders' support.

[4] Prior to 2022 called the R&D Plan.

The Department's Strategic Plan-on-a-Page

IAEA Safeguards

MISSION

To deter the proliferation of nuclear weapons through the risk of early detection, provide credible assurances, and assist with other verification tasks upon request

STRATEGIC OBJECTIVES

- To continually improve the Department's capabilities and performance and prepare for future safeguarding challenges
- To capture and leverage the benefits of emerging technologies, while managing the challenges and risks they pose
- To fully leverage the information assets gathered through safeguards implementation by deploying a data-centric approach
- To ensure the availability of adequate financial resources and needed human competencies for the safeguards mission

STRATEGIC INITIATIVES

- Artificial Intelligence for Nuclear Verification – "SGAi"
- Safeguards Data Management Platform – "SGLake"
- Process Review for Efficiency – "SGLean"
- Workplace Enhancement –"SGTeam"
- Safeguards for Nuclear on the Move – "SGMove"
- Sustaining Partners – "SGPartnerships"

Delivering on the Mission — Departmental Priority Objectives

Core Activities

V.1 Strengthen information collection, integration and analysis
V.2 Maintain a robust State evaluation process
V.3 Implement State level safeguards
V.4 Enhance SG implementation monitoring and evaluation
V.6 Ensure effective safeguards for all facilities and activities

Technical Capabilities

T.1 Strengthen in-field instrumentation capabilities
T.2 Enhance sensitivity, reliability and timeliness in sample analysis
T.3 Maintain secure, resilient, and adaptable safeguards IT enterprise
T.6 Expand the use of remote data transmission
T.7 Leverage advancements in remote sensing

Management

M.1 Secure and optimally manage financial resources
M.2 Manage safeguards technology assets strategically
M.3 Streamline processes and ensure consistency
M.4 Increase organizational resilience
M.5 Enhance data governance

Stakeholders and Partnerships

S.1 Communicate proactively and transparently
S.2 Enhance States' safeguards capacity
S.3 Promote safeguards-by-design
S.4 Expand and leverage partnerships

People and Knowledge

W.2 Foster a high performance culture
W.3 Build and retain organizational knowledge
W.4 Maintain balanced workforce representation
W.5 Improve staff health, safety and security

Figure 1: The Department of Safeguards Plan-on-a-Page

Strategic Plan

The Department's Strategic Plan is an internal management and communication tool that describes departmental strategic objectives and priorities across five focus areas: (1) core activities, (2) technical capabilities, (3) management, (4) stakeholders and partnerships, and (5) people and knowledge. Within each focus area, the Department has defined priority objectives (see the Strategic Plan-on-a-Page on page 6). The Plan also outlines a set of strategic initiatives aimed at advancing those objectives and departmental capabilities.

Enhancing Capabilities for Nuclear Verification - Resource Mobilization Priorities (RMP) – this document

The RMP communicates to partners and other stakeholders a prioritized set of capabilities which the Department must strengthen or develop and for which it is seeking external support. In so doing, the RMP is a bridge between the Department's strategic priority objectives and the concrete support sought from partners.

Development and Implementation Support Programme for Nuclear Verification (D&IS Programme)

The D&IS Programme comprises of the Department's technical plans in specific domain areas. Updated every two years, the D&IS Programme is intended to help direct partners' extrabudgetary and in-kind support to concrete, implementable activities. These plans define the development, testing, and implementation activities needed to strengthen departmental capabilities and sustain essential tools and methodologies to meet operational needs. D&IS plans link to the relevant focus areas and priority objectives in the Strategic Plan, and capabilities in the RMP.

Figure 2: Departmental strategic priorities flow through Safeguards resource mobilization documents

Identification of RMP capabilities

To identify, review and prioritize capabilities that need to be either developed or further enhanced, the Department consulted all of its Divisions, from working level staff to Section Heads and Directors. The Department used a thorough process for identifying the capabilities for which it is seeking support, involving:

- Consideration of current and emerging safeguards implementation challenges and opportunities;
- Assessment of current capabilities, progress made in developing them, and of further development needs;
- Prioritization of desired capabilities, using five criteria; and
- Analysis of emerging technologies and the changing nuclear landscape at large.

Inputs to the process

Updated Strategic Plan

The Department's Strategic Plan was reviewed and updated by senior management in fall 2025. The updates reflect changes in the Department's operating environment. The changes made put greater emphasis on e.g., preparing for new nuclear technologies (e.g., SMRs) and processes (e.g., naval/ maritime propulsion) while also coping with organizational challenges of a growing workload and strained budgets, and of ensuring safety and security of staff. Moreover, the strategy updates reflect an increasing posture to leverage emerging technologies such as AI for greater efficiency while also needing to better integrate, govern and leverage the Department's data assets.

The updates in strategy also led to the identification and adoption of a new set of strategic initiatives. These are typically large-scale projects designed to advance multiple safeguards objectives and capabilities simultaneously. These initiatives require cross-divisional coordination, significant financial and human resources, and sustained institutional commitment to deliver transformative outcomes. These are described below:

- *Artificial Intelligence for Nuclear Verification – "SGAi"* – An initiative to identify use cases and deploy AI as a means of improve the efficiency of safeguards and, in so doing, also strengthen the effectiveness of safeguards implementation, and to enhance departmental capabilities and performance, while ensuring responsible AI use through policies, procedures and governance.
- *Safeguards Data Management Platform – "SGLake"* – A project to better integrate, manage and fully utilize data as a strategic asset, strengthen data governance, and enable leveraging modern tools in support of verification activities. The project involves the establishment of a data governance framework and architecture, deployment of a secure, integrated platform consolidating data from diverse sources ('data lake'), as well as the incorporation of innovative technologies (e.g., AI/ ML) to support analytical capabilities and greater automation.
- *Process Review for Efficiency – "SGLean"* – An internal efficiency improvement initiative designed to assist the Department to cope with its growing workload. It involves e.g., streamlining and optimizing safeguards processes, simplifying workflows, and automating repetitive tasks with the aim of improving quality and enhancing organizational performance.
- *Workplace Enhancement – "SGTeam"*– An initiative aimed at enhancing the working environment towards an organizational culture of greater collaboration, communication and collegiality in the Department. Building on staff surveys and workplace culture assessments, the initiative seeks to address the areas identified for improvement in order to boost individual and organizational performance.

- *Safeguards for Nuclear on the Move – "SGMove"* – An initiative to enhance preparedness to apply safeguards to verify the movement and storage of nuclear materials in transit, such as mobile nuclear reactors or reactors deployed at sea. The initiative involves the development innovative safeguards approaches and advanced technologies to provide real-time information on the location and status of nuclear materials on the move, while maintaining a high level of confidence in the integrity of the nuclear material, from the point of origin to the point of destination.
- *Sustaining Partners – "SGPartnerships"* – An initiative aimed at increasing predictability of extrabudgetary funding by soliciting donors (i.e., MSSPs) to provide sustained funding for specific areas (e.g., training, labs) as sustaining donors/partners, and by diversifying the donor base for safeguards to include financial and in-kind contributions from new partners the Department has traditionally not cooperated with. The initiative entails exploring the establishment of a 'fund' (or another mechanism) for drawing and receiving voluntary contributions (funds, services, equipment) from e.g., private sector entities, as part of their corporate social responsibility practices, to support innovation projects.

Consultations with all Safeguards Divisions

To update the RMP capabilities, the Department consulted staff throughout the Department using both a bottom-up and top-down approach. Divisions were requested to review, validate and/or identify any new capabilities needed to advance each of the Department's priority objectives, under the five strategic focus areas.

Emerging Technologies Workshops

As part of its strategic analysis and planning activities for nuclear verification, the Safeguards Department looks to identify new opportunities, explore challenges and deepen its understanding of emerging technologies through the Emerging Technologies Workshops (ETW). The capability priorities described in this document were also informed by the most recent ETW held in 2025, focused on Artificial Intelligence for Nuclear Verification.

Prioritization of needed capabilities

The list of capabilities was prioritized by consulting Section Heads and Directors, using five criteria:

1. *Effectiveness* – i.e., the extent to which the capability enables the Department to meet safeguards technical objectives; to detect indicators of safeguards/proliferation concern; and to strengthen confidence in safeguards findings.
2. *Efficiency* – i.e., the extent to which the capability helps the Department to optimize safeguards activities in the field and at HQ; to optimize processes and eliminate redundancies; to reduce costs; and to save time and effort.
3. *Effort vs. Impact* – i.e., the extent to which the anticipated effort/cost of creating or enhancing the capability is in line with its expected benefits (return-on-investment); and how often and how broadly the Department would benefit from the capability.
4. *Challenge/Risk* – i.e., how significant of a safeguards challenge the capability helps solve; and how significant is the risk if the Department does not achieve this capability.
5. *Urgency* – i.e., how soon the Department needs this capability.

The resulting prioritized set of capabilities was reviewed and validated by the Department's senior leadership team (DDG-SG and Directors). Only those capabilities expected to need external support have been included in this document.

Capabilities and associated support needs

The identified capabilities do not anticipate a particular solution or approach, but describe the outcome (i.e., the end state/result) that is being sought, and for which external support is required – giving partners more contextual information (the 'why') and leaving room to consider various ways in which to reach that outcome (the 'how'). In so doing, the document seeks to pave the way for more results-oriented monitoring and reporting, as the level to which a capability is achieved is more meaningful to track and report than the sole fulfilment of needs.

The document also identifies which type of support is expected, so partners can channel their support accordingly (see 'type of support' below).

Capability key words

Recognizing that partners may wish to support specific capabilities and areas of interest, the table below tags the capabilities with key words for ease of reference:

Information Technology (IT)

Capability relates to development/ enhancement of IT infrastructure, tools or expertise as enablers to safeguards implementation

Spent fuel verification

Capability relates to more efficiently measuring and verifying spent fuel transfers and inventories in both wet and dry storage

In-field instrumentation

Capability relates to verifying nuclear material and activities in the field through use of equipment (resident/portable), including radiation-based instruments, containment and surveillance systems, etc.

Information analysis

Capability relates to collection, processing and analysis of safeguards-relevant information and associated processes, methodologies and tools

Sample analysis

Capability relates to equipment, methodologies and techniques for analysing nuclear material and environmental samples and associated quality control

Safeguards approaches

Capability relates to development of concepts and approaches to meet current and future safeguards challenges, and to implement effective and efficient State-level safeguards

Training (and capacity building)

Capability relates to development of core and functional competencies of IAEA staff, and enhancement of effectiveness of SSACs and SRAs

Organizational performance

Capability relates to processes and systems to enhance the Department's performance, preparedness and resilience, and to manage its critical assets

Communication and reporting

Capability relates to assessing and reporting safeguards findings, performance and trends to stakeholders, and communicating on IAEA safeguards broadly

Detection of undeclared

Capability relates to detection of undeclared nuclear material and activities

Type of support

Financial resources

Contribution through direct fund provision

Collaboration

Consultations and correspondence with experts through, for example, conferences, workshops, and trainings as well as provision of access to facilities for testing and training

Expertise

Provision of a cost-free expert (CFE), junior professional officer (JPO) or temporary consultant

R&D

Research and development activities of exploratory or developmental nature, including studies and testing of ideas, methodologies, techniques and tools and other innovations with potential for safeguards application

Equipment & Materials

Provision or transfer of equipment, reference materials, working standards and other tangible assets

Full list of capabilities

ID	Capability	Key words	Support Type
Focus Area: Core Activities (V)			
V.1 **Strengthen information collection, integration, and analysis in all aspects (e.g., processes, methodologies, competences, tools) targeted at identifying early and evolving indications of safeguards concern.**			
V.1.C3	Ability to efficiently process and interpret multilingual safeguards relevant information, including within the Agency's secure airgapped network	Information analysis IT Detection of undeclared	
V.1.C4	Ability to enhance change detection, comparisons, and consistency analysis in large volumes of safeguards-relevant data	Information analysis Detection of undeclared IT	
V.1.C5	Ability to enhance the integration, sharing, visualization and analysis of geo-based information (e.g., verification data, satellite imagery)	Information analysis IT Detection of undeclared	
V.1.C6	Ability to efficiently process documents of diverse formats through enhanced document processing and optical character recognition to enable high-quality information integration into digital systems	Information analysis IT	
V.1.C7	Ability to effectively maintain situational awareness of safeguards relevant nuclear trade activities and developments	Information analysis Detection of undeclared	
V.2 **Ensure the State evaluation process remains collaborative and analytically robust, and increase efficiency and consistency in the way State evaluation groups (SEGs) carry out evaluation in order to draw and maintain confidence in soundly-based safeguards conclusions.**			
V.2.C1	Ability to increase the efficiency of the State evaluation process through additional support tools	Information analysis IT Detection of undeclared	
V.2.C2	Ability to comprehensively evaluate, record, and document implementation issues and follow-up activities to support resolution of anomalies	Information analysis IT	
V.3 **Further develop and align technical policies, procedures and methodologies for safeguards implementation at the State level, and develop and update State level safeguards approaches (SLAs) for additional States.**			
V.3.C2	Ability for safeguards information systems to assist analysts in identifying significant changes in a State's nuclear fuel cycle, which may trigger a need to update the APA, SLA, and AIP	Safeguards approaches Information analysis IT	
V.3.C3	Ability to enhance acquisition path analysis and development of State-level safeguards approaches	Safeguards approaches IT	
V.3.C4	Ability to develop and implement tools for random inspection planning and random sampling of items.	Safeguards approaches IT	

ID	Capability	Key words	Support Type
V.4 **Enhance the monitoring and evaluation of safeguards implementation for continued effectiveness, efficiency and improved consistency, with emphasis on State level.**			
V.4.C1	Ability to leverage statistical methodologies to evaluate verification data, to assess verification performance (detection probability, timeliness and deterrence) and the associated level of confidence	Safeguards approaches IT	
V.6 **Optimize safeguards approaches and ensure effective and efficient safeguards approaches for all new types of nuclear facilities at all stages of their lifecycle, including modification and decommissioning, and prepare for other technologies and activities of safeguards relevance such as nuclear naval and maritime propulsion, and novel sources of neutrons such as accelerator driven systems and fusion systems.**			
V.6.C1	Ability to implement effective and efficient safeguards approaches for geological repositories	Safeguards approaches	
V.6.C2 *	Ability to implement effective and efficient safeguards approaches for advanced reactors including SMRs and microreactors	Safeguards approaches	
V.6.C3	Ability to implement effective and efficient safeguards approaches at J-MOX	Safeguards approaches	
V.6.C4	Ability to perform process monitoring and associated data analysis, particularly for advanced reactors with liquid or pebble fuel	Safeguards approaches Information Analysis IT	
V.6.C5 *	Ability to more effectively and efficiently implement safeguards for enrichment plants	Safeguards approaches Training	
V.6.C6	Ability to implement effective and efficient safeguards during decommissioning or refurbishment, including on waste that is to be terminated/ transferred to retained waste	Safeguards approaches	
V.6.C7	Ability to meet facility-type specific evaluation challenges and assess verification performance in new types of nuclear facilities through tailoring standard evaluation methodologies (e.g., material balance evaluations)	Safeguards approaches	
V.6.C8 *	Ability to implement effective and efficient safeguards approaches for naval and maritime propulsion and floating reactors	Safeguards approaches	
V.6.C9	Ability to develop and apply safeguards to fusion systems	Safeguards approaches	

ID	Capability	Key words	Support Type
Focus Area: Technical Capabilities (T)			
T.1 **Strengthen in-field instrumentation capabilities for verification with emphasis on reliability, security, portability, sustainability and user-friendliness.**			
T.1.C1 *	Ability to maintain continuity of knowledge over transport casks through secure tracking and monitoring of their terrestrial location without the need of inspector presence	Safeguards approaches Spent fuel verification	
T.1.C2	Ability to verify quantitatively nuclear material in closed containers in spent fuel ponds	Safeguards approaches Spent fuel verification In-field instrumentation	
T.1.C4 *	Ability to efficiently perform and evaluate partial defect verification of spent fuel with the next generation device	In-field instrumentation Spent fuel verification	
T.1.C6	Ability to verify nuclear material in containers with heterogenous matrices	In-field instrumentation	
T.1.C7	Ability to unintrusively monitor the flow rate of UF6 in cascades and at conversion plants	In-field instrumentation	
T.1.C8	Ability to detect HEU production in real time at declared LEU enrichment facilities	In-field instrumentation	
T.1.C9	Ability to detect and remove contamination in equipment returned from the field with heterogenous matrices and shapes	In-field instrumentation	
T.1.C10	Ability to rely upon an integrated system of instrumentation data (e.g., spectra) processing and review, with high level of automation and with unified user interface	In-field instrumentation Information analysis IT	
T.1.C12	Ability to expand the use of robotic technology for verification activities	In-field instrumentation	
T.1.C13	Ability to perform near-real time review, verification and accounting for complex facilities, including with difficult access, with enhanced analysis and monitoring technologies	In-field instrumentation	
T.1.C14	Ability to develop instrumentation for new safeguards approaches for Small Modular Reactors and Advanced Modular Reactors	In-field instrumentation Information analysis	
T.2 **Improve capabilities for nuclear material and environmental sample analysis by expanding the Network of Analytical Laboratories (NWAL), as well as by pursuing higher levels of sensitivity, reliability and timeliness at the Safeguards Analytical Laboratory (SAL), and expand the set of forensic indicators.**			
T.2.C1	Ability to reliably and quickly deliver sample analysis results for special and high priority demands	Sample analysis Detection of undeclared	
T.2.C2 *	Ability to determine age of U and Pu in environmental samples through techniques and evaluation methods	Sample analysis Detection of undeclared	
T.2.C3	Ability to detect NFC materials and determine nuclear activities based on elemental and morphological analysis of particles in environmental samples, with emphasis on the recognition of anthropogenic particles using scanning electron microscopy techniques	Sample analysis Detection of undeclared	
T.2.C4	Ability to perform mixed U-Pu particle analysis, including screening, isotopic and elemental composition analysis	Sample analysis Detection of undeclared	

ID	Capability	Key words	Support Type
T.2.C5 *	Ability to assure the quality of the NWAL, including SAL, in sample analysis (specifically particle analysis) using fit-for-purpose quality control and quality assurance methods and certified reference materials	Sample analysis	
T.2.C6	Ability to maintain and further enhance the environmental sampling database and the process models, databases, and tools that support trace elements analysis (material characterisation)	Sample analysis IT	
T.2.C7	Ability to reliably manage and deliver safeguards analytical results, e.g., through SAL laboratory information management system (LIMS)	Sample analysis IT	
T.2.C8 *	Ability to maintain existing NWAL capabilities and increase capacity for the analysis of environmental samples through timely replacement of critical instrumentation, additional capacity from existing NWAL, and qualification of new laboratories	Sample analysis Detection of undeclared	
T.3 **Maintain a strategically aligned IT enterprise that leverages innovations and supports safeguards implementation through an evolving portfolio of applications and services, with robust security, and resilient, adaptable architecture.**			
T.3.C1	Ability to secure information and quickly detect and respond to security events in the Department's information systems using the latest advances in technology such as AI	IT Org. performance	
T.3.C2 *	Ability for States to efficiently submit and review their nuclear material accounting reports, submit additional protocol declarations, and correspond with the Department	IT Capacity building	
T.3.C3	Ability to manage the Enterprise Architecture, orchestrating interconnected systems to align with evolving organisational goals, and ensuring resilience, interoperability, and seamless scalability in SG IT environment.	IT Training Org. performance	
T.3.C5 *	Ability to provide tools capable of advanced analytics to support verification activities, including AI/ML	IT Information analysis Training Org. performance	
T.3.C6 *	Ability to provide data services based on a modern data architecture for effective, secure sharing and integration of data	IT Training Org. performance	
T.3.C7	Ability to streamline the maintenance effort of the portfolio and IT service provision, providing AI-enhanced applications and AI/ML automations	IT Training Org. performance	
T.6 **Expand infrastructure for unattended monitoring systems and remote data transmission in support of efficiency and safeguards resilience.**			
T.6.C2 *	Ability to deploy next generation capabilities to the cameras used in future surveillance systems (e.g., non-optical surveillance, climate insensitivity)	In-field instrumentation IT	
T.6.C4	Ability to further develop, deploy and maintain new containment system technologies with improved security and efficiency	In-field instrumentation IT	
T.6.C5	Ability to further develop, deploy and maintain remote data transmission and processing systems to collect, transmit and review data from safeguards equipment installed in facilities	In-field instrumentation IT	

ID	Capability	Key words	Support Type
T.6.C6	Ability to rapidly detect, characterize and address breaches to unattended systems, and evaluate their vulnerabilities more broadly, particularly from threats arising from technology advancements (e.g., conduit integrity verification)	In-field instrumentation IT Org. performance	
T.7 **Explore and leverage advancements in space-based and other remote sensing technologies (e.g., lidar, radar, thermal) in support of enhanced detection capabilities and safeguards resilience.**			
T.7.C1 *	Ability to leverage new types of space-borne sensor data from open sources, including the processing of synthetic aperture radar data and analysis of multispectral, hyperspectral, and thermal infrared data	Information analysis	

Focus Area: Management (M)

M.1 **Secure adequate and predictable resources by better projecting and communicating to Member States financial needs and growing workloads, seeking to increase extrabudgetary funds and by widening the donor base.**			
M.1.C1	Ability to fully implement data-driven programmatic and budgetary planning, monitoring and evaluation to support managerial decision making	Org. performance IT	
M.1.C2	Ability to effectively project, analyse and manage safeguards workloads and resource constraints	Org. performance	
M.1.C3	Ability to identify and attract more donors and sources for extrabudgetary funds.	Org. performance Communication & reporting	
M.2 **Manage safeguards assets (infrastructure, technology etc.) strategically, with long-term vision and planning that ensures timely availability of resources to sustain the assets.**			
M.2.C1	Ability to strategically plan, monitor, maintain, account for and improve safeguards technology assets and associated infrastructure.	Org. performance IT	
M.2.C2	Ability to enhance equipment reliability through improvements to the Safeguards Equipment Management System and monitoring of equipment performance	Org. performance IT	
M.3 **Streamline processes for greater efficiency, and ensure consistency and compliance in their implementation.**			
M.3.C3	Ability to integrate improvements to the Departments' process and quality management frameworks and quality culture	Org. performance IT	
M.3.C4	Ability to deploy project management approaches to ensure effective execution of strategic priorities and initiatives using standardized practices and tools	Org. performance IT	
M.4 **Increase organizational resilience and preparedness to face major disruptions to the Agency's work and identify and mitigate risks arising from disruptive, proliferation enabling technologies (e.g., additive manufacturing, AI).**			
M.4.C2 *	Ability to ensure business recovery and continuity to carry out mission-critical functions – needed for continued delivery of safeguards conclusions – in case of disasters (e.g., disruptive, massive cyber-attack or physical loss of critical infrastructure, supply chain and transport disruptions)	Org. performance IT	

ID	Capability	Key words	Support Type
M.4.C3	Ability to maintain awareness and prepare for changes in the nuclear landscape and associated impact on safeguards implementation, including the impact of emerging technologies and non-State actors	Org. performance Detection of undeclared	
M.4.C4	Ability to better measure and analyse safeguards performance of the Department through use of analytical and IT tools, including data visualization and statistical methodologies	Org. performance IT	
M.5 **Enhance the governance and management of safeguards data to better utilize data-centric approaches, and facilitate and govern (e.g., through policies, procedures) the responsible introduction of innovative technologies (e.g., AI) and tools in order to fully leverage safeguards data and information assets.**			
M.5.C1	Ability to, integrate and evaluate disparate, varied sets of verification data from multiple information sources to better support verification activities	IT Org. performance	
M.5.C2	Ability to govern safeguards data with clear policies, procedures, standardized practices with role-based access controls	IT Org. performance	
M.5.C3 *	Ability to better leverage methods and tools for automation and advanced analytics in support of data-centric approaches	IT Org. performance	

Focus Area: Stakeholders and Partnerships (S)

S.1 **Communicate and engage with States on safeguards matters proactively, consistently and transparently, and enhance stakeholders' understanding of Agency safeguards, including industry sectors new to nuclear (e.g., maritime).**			
S.1.C2	Ability to more clearly and effectively communicate the value and importance of IAEA safeguards, and to reach a broader audience	Communication & reporting	
S.2 **Build capacity of State authorities responsible for safeguards implementation and States' systems of accounting for and control of nuclear material (SSACs) and assess progress in their effectiveness.**			
S.2.C1 *	Ability to strengthen the capacity of SSACs/SRAs and monitor and measure progress	Capacity building IT	
S.3 **Promote safeguards-by-design through close collaboration with States and regulators and proactive outreach to industry to ensure that nuclear facilities and processes are designed, modified and constructed taking into account safeguards requirements.**			
S.3.C1	Ability to engage with designers and operators on safeguards needs to be incorporated in modified or new facilities for the early preparation for efficient implementation of safeguards	Safeguards approaches	
S.4 **Expand existing and explore new collaborations (e.g., research projects) and partnerships with traditional and non-traditional actors (e.g., academia, professional associations, non-governmental organizations, research institutions) in support of the Agency's verification mission, expertise and capabilities.**			
S.4.C1	Ability to include new partners and build expanded networks of experts and collaborators in support of generating innovations and solutions for safeguards	Org. performance Communication & reporting	

ID	Capability	Key words	Support Type
Focus Area: People and Knowledge (W)			
W.2 **Create conditions for an organizational culture that improves staff engagement and performance in line with Agency values.**			
W.2.C1	Ability to maintain an effective departmental communication framework and processes	Org. performance	
W.2.C2	Ability to enhance managerial decision-making processes, capabilities and competencies	Org. performance	
W.2.C3	Ability to integrate, analyze and report on performance to support data driven decisions	Org. performance	
W.2.C4	Ability to identify and implement enhancements and actions required to strengthen organizational culture, including quality culture, and thereby performance	Org. performance	
W.3 **Build staff skills and expertise through effective training to meet evolving needs and improve corporate knowledge management (e.g., capture, documentation, sharing, retention, and utilization) using modern methods and tools.**			
W.3.C1	Ability to train inspectors on spent fuel measurement techniques inside facilities	Training Spent fuel verification	
W.3.C2	Ability to further develop the expertise of the Safeguards Department's workforce and train the next generation of safeguards experts	Training	
W.3.C4	Ability to effectively utilize knowledge and expertise already existing with the Department	Training Org. performance	
W.3.C5	Ability to preserve and disseminate critical institutional knowledge to overcome staff turn-over and other associated challenges	Training Org. performance	
W.3.C6 *	Ability to enhance staff literacy in information technology, including AI/ML and data integration advancements	Training	
W.3.C7	Ability to enhance staff expertise and competencies on safeguarding gas centrifuge plants	Training	
W.4 **Continue to attract new talent of the highest competency and integrity while maintaining the principle of equal opportunity and balanced representation within the workforce.**			
W.4.C1	Ability to attract and retain a technically qualified, diverse and balanced workforce	Org. performance	
W.4.C2	Ability to attract, hire and train junior staff members to develop the future generation of safeguards technical experts	Org. performance	
W.4.C3	Ability to attract qualified recruits from sectors (e.g., technology) not traditionally related to safeguards	Org. performance	
W.5 **Strengthen the framework and measures to ensure the occupational health and safety of staff, and prepare and equip them to operate in challenging security conditionss.**			
W.5.C1	Ability to improve safety culture by enhancing staff skills and expertise related to radiological and industrial safety	Org. performance Training	
W.5.C2	Ability to create a policy and framework for occupational health and safety	Org. performance	

Annex

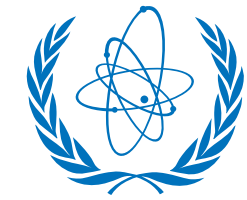
Definitions

Term	Definition
D&IS Plans	Technical plans in specific domain areas that define development, testing, and implementation activities needed to strengthen departmental capabilities and sustain essential tools and methodologies to meet the Department's operational needs. Together, these plans comprise the biennial D&IS Programme document.
Outcome	Benefits or changes that are expected, if the objectives and associated initiatives, actions and tasks are accomplished.
Output	A measurable product or service delivered or acquired as a direct result of the implementation of a task.
Priority Objectives	Objectives to be pursued by the Department to advance its vision and strategic objectives under five focus areas in its Strategic Plan.
Projects	Departmental projects to advance the strategic and priority objectives in the Department's Strategic Plan.
R&D	Research and development activities of exploratory or developmental nature, including studies and testing of ideas, methodologies, techniques and tools and other innovations with potential for safeguards application.
Strategic Initiatives	A set of highest priority action items (e.g., projects) that in the Department's Strategic Plan that address multiple objectives and capabilities that require support and coordination across the Department, and may require large amounts of resources and/or effort.
Strategic Objectives	A set of four overarching strategic objectives in the Department's Strategic Plan.
Task	A task is a specific activity under the D&IS Programme designed to deliver an output that will contribute to the achievement of an expected outcome. Resources, including external support, are required for the implementation of tasks.

Acronyms and abbreviations

Acronym/ abbreviation	Definition
AI	Artificial intelligence
AIP	Annual implementation plan
APA	Acquisition path analysis
CFE	Cost-free expert
COMPASS	Comprehensive Capacity-Building Initiative for SSACs and SRAs
D&IS	Development and Implementation Support Programme for Nuclear Verification
ETW	Emerging Technologies Workshop
HEU	Highly enriched uranium
HQ	Headquarters
IAEA	International Atomic Energy Agency
IT	Information technology
J-MOX	Japan Nuclear Fuel, ltd., mixed oxide fuel fabrication plant
JPO	Junior professional officer
LEU	Low enriched uranium
LIMS	Laboratory information management system
ML	Machine learning
MOX	Mixed oxide

Acronym/ abbreviation	Definition
MSSP	Member State Support Programme
NFC	Nuclear fuel cycle
NGO	Non-governmental organization
NWAL	Network of analytical laboratories
Pu	Plutonium
R&D	Research and development
RMP	Resource mobilization priorities
SAL	Safeguards analytical laboratory
SGAS	Office of Safeguards Analytical Services
SLA	State level safeguards approach
SMR	Small and modular reactors
SRA	State or regional authority responsible for safeguards
SSAC	State system of accounting for and control of nuclear material
U	Uranium
UF_6	Uranium hexafluoride
XCVD	Next generation of Cerenkov viewing device



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