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Supporting Secure Transport through Detector Calibration by Design: Regulatory and Technical Developments in Tunisia

In response to growing transnational threats such as terrorism and the illicit trafficking of radioactive materials, Tunisia has enhanced its national security measures by deploying radiation detection systems at critical border points. Despite these efforts, challenges remain, including the limited availability of Radiation Portal Monitors (RPMs) and the need for improved training of customs personnel. To address these issues and support national and international nuclear security objectives, the Nuclear Safety and Security Department of the National Center for Nuclear Sciences and Technologies (CNSTN) is aiming to establish a specialized radiation calibration laboratory. This facility supports the accurate calibration and validation of radiation detection equipment used in border security, nuclear forensics, and the prevention of smuggling.

A key innovation emerging from this initiative is a novel mobile calibration device centered around a pilot Cobalt-60 source. The device features a cylindrical design optimized via SolidWorks and Monte Carlo simulations (FLUKA and GEANT4), incorporating advanced dosimetry techniques such as ionization chambers, EPR in alanine, thermoluminescence, and Fricke dosimetry. Now officially registered under patent application, this portable system enhances the reliability of radiation detectors and represents a significant advancement in Tunisia's nuclear security infrastructure. The project received support from the International Atomic Energy Agency (IAEA) through a dedicated research contract CRP-JO2014.

These technical developments are complemented by a robust institutional and legal evolution. Since the establishment of the National Atomic Energy Commission (NAEC) in 1962 and the creation of the CNSTN under Law No. 93-115 in 1993, Tunisia has committed to the peaceful and secure use of nuclear technologies. CNSTN plays a central role in nuclear research, international cooperation, and acts as Tunisia's National Liaison Office with the IAEA. In parallel, the country is finalizing a comprehensive legal framework for nuclear safety and security, including a draft law on the peaceful uses of nuclear energy and the establishment of a National Nuclear Safety Authority. Ongoing collaboration with the U.S. National Nuclear Security Administration (NNSA) also supports the implementation of the Additional Protocol (AP) and further alignment with IAEA safety, security, and safeguards standards. Collectively, these efforts reflect Tunisia's strategic commitment to enhancing nuclear security through integrated technical innovation and regulatory development.

Country or International Organization

Instructions

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