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3D technologies for Nuclear Safeguards applications: current and future developments

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“3D technologies have been used in nuclear safeguards verification for several years: applications include design information verification where laser scanners acquire 3D models of nuclear facilities with millimeter accuracy to verify the design information provided by the operators. Another example is container identification and authentication where high-precision 3D scanners are used to acquire the container geometry with micrometer accuracy.

Several technological developments are currently changing the 3D landscape: 3D imaging systems are getting smaller, faster and cheaper; automated processing algorithms - including machine learning - significantly accelerate the processing pipeline; and related technologies such as augmented and virtual reality are getting mature and can be used with large amounts of 3D data. These developments will enable a wider use of 3D technologies in current applications and also open the way for new use cases in nuclear safeguards. Examples include: accurate 3D scanning can be applied at dry storage facilities to verify that the containers have been immobilized between inspections; continuous 3D imaging can complement or replace standard video surveillance, reducing the work load for video review and automatize the verification of material flow for example in encapsulation plants; automated 3D data acquisition and processing –potentially using autonomous platforms and drones –will increase the efficiency for design information and verification; mobile 3D mapping and localization enables location-based services and augmented-reality applications during on-site inspections; the acquisition of as-built 3D data and high-resolution imagery allows the use of virtual reality technologies for training and the preparation of on-site visits.

The presentation will provide an overview of current advances in 3D and related technologies and illustrate how they might be applied to nuclear safeguards in the short and medium term.

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Which “Key Question” does your Abstract address?

TEC5.5

Topics

TEC5

Which alternative “Key Question” does your Abstract address? (if any)

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