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Building a Simulated Environment for the Study of Multilateral Approaches to Nuclear Materials Verification

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Verification research can be resource-intensive, particularly when it relies on practical or field exercises. These exercises can also involve substantial logistical preparations and are difficult to run in an iterative manner to produce data sets that can be later utilised in verification research. This paper presents the conceptual framework, methodology and preliminary findings from part of a multi-year research project, led by VERTIC. The multi-component simulated environment that we have generated, using existing computer models for nuclear reactors and other components of fuel cycles, can be used to investigate options for future multilateral nuclear verification, at a variety of locations and time points in a nuclear complex. We have constructed detailed fuel cycle simulations for two fictional, and very different, states. In addition to these mass-flow models, a 3-dimensional, avatar-based simulation of a nuclear facility is under development. We have also developed accompanying scenarios - that provide legal and procedural assumptions that will control the process of our fictional verification solutions. These tools have all been produced using open source information and software. While these tools are valuable for research purposes, they can also play an important role in support of training and education in the field of nuclear materials verification, in a variety of settings and circumstances.

Country or International Organization

VERTIC - the Verification Research, Training and Information Centre

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