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Development of a Framework for Analyzing Impact of Emerging Technologies on Nuclear and Radiological Security

Rapid advancement in technological development has a profound effect on the world around us. In this context, the influences that these advances could have on the nuclear and radiological security are changing rapidly and dramatically. Nuclear operators and security stakeholders are already investing significant resources to address some of these new emerging threats and to also integrate new technological solutions into security systems. However, systematic understanding of this massive technology evolution is of vital importance to follow the trends and identify both potential vulnerabilities and opportunities to increase effectiveness, and prioritize investment areas.
This study was designed to enable decision makers to evaluate the potential impact of emerging technologies and the way those technologies are implemented on nuclear and radiological security, now and into the future. The main objective was to develop an understanding of: How might emerging technologies both create and address future risks to securing nuclear and radiological materials around the world?

To achieve the goals of the study a robust analysis framework was needed. Some of the requirement and constrains applied to this framework were:
- It should be capable of analyzing and comparing a large number (hundreds) of technologies and applications
- It should effectively define and address criteria relevant to nuclear and radiological security
- It should be scalable: be capable of adding and removing technologies as they emerge, or no longer of interest
- It should be flexible: be capable of focusing on more specific areas within a broad area of nuclear and radiological security

This paper describes the analysis framework that was developed by Sandia to perform a systematic analysis of a large number of emerging technologies and prioritizing them with regards to their impact on the field of nuclear and radiological security. Several examples of analysis and outcomes are also presented.

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