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# Achieving resilience through the preservation of functions - safety and security working together

Advanced nuclear reactors, including Small Modular Reactors, promise enhanced safety and efficiency by harnessing complex digital technologies. However, these innovations also introduce risk management challenges regarding the computer security vulnerability of complex digital components to malicious action, faults and failure . Current nuclear industry approaches to safety and security operate with system-centric views, focusing on individual system robustness and redundancy. This approach overlooks functional interdependencies, resulting in a less efficient and resilient approach and potentially causing gaps in understanding and addressing threats and vulnerabilities.

This paper advocates a paradigm shift towards unified risk management where safety, security, and operational integrity are complementary aspects of achieving resilience through the preservation of functions. Although applying such a model poses analytical and complexity challenges, it provides a path towards more resilient nuclear infrastructure.

Recognising that safety and security fundamentally aim to uphold functional integrity facilitates collaboration between these domains. With the development of advanced nuclear reactors, the industry has a rare opportunity to develop new tools, techniques and working methods that foster cross-domain partnerships from the design phase onward. Ultimately, this integrated perspective on technological and organisational risk management will enable nuclear designers, regulators and operators to leverage the benefits of new and complex digital systems while ensuring robust safety and security.

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## Confirm that the work is original and has not been published anywhere else

Yes

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