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SS-31: Balancing Resources under Uncertainty – Weighing Safety, Security and Resilience Requirements

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Description

Decision-making in the protection of critical infrastructures often requires balancing limited resources while meeting safety, security, and resilience requirements. Such decisions must be made under multiple layers of uncertainty — uncertainties inherent in risk models, probabilistic estimations, and assumptions about threats, failures, and human behavior.

While *aleatory* uncertainties (e.g., random component failures) can often be modeled probabilistically, *epistemic* uncertainties — particularly those associated with deliberate attacks or cascading disruptions — are far harder to quantify. This complexity challenges risk-based prioritization and cross-domain comparability.

This Special Session invites contributions addressing methodological, technical, and organizational approaches to decision-making under uncertainty and resource constraints. Topics include risk-informed prioritization, uncertainty modeling, and strategies for balancing protection, safety, security, and resilience requirements to enhance robustness, transparency, and effectiveness in complex infrastructure systems.