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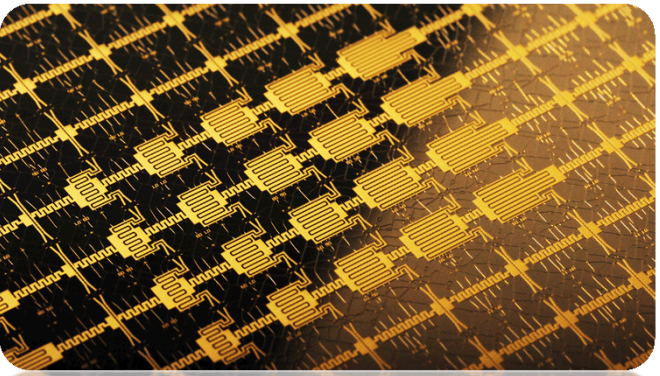
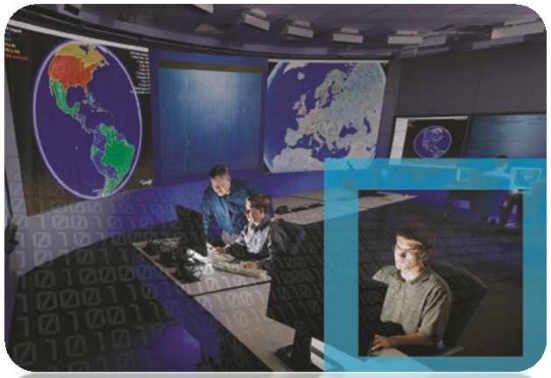


Cyber Technical Challenges in Nuclear Energy

May 2016

Phil Turner, Systems Research and Analysis

Managing Risks Associated with Global Nuclear Energy Expansion: Emerging Challenges and Cooperative Solutions

U.S. DEPARTMENT OF ENERGY

NNSA National Nuclear Security Administration

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The Evolving Cyber Domain Problem

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Plants are becoming more digital over time with new fully digital plants being built

- New attack vectors are introduced
  - Supply Chain
  - Greater Flexibility for Potential Insiders
- Malware has gotten to I&C systems
- Business networks have been targeted
- Other energy infrastructure has been targeted

Technical Challenges

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- Understanding Risks
  - Threats
  - Vulnerabilities
  - Consequences
- Mitigating Risk
  - Prioritizing Controls
  - Analyzing Effectiveness of Controls
- Supply Chain
- Training
  - How do operators perceive upsets?
  - How do they respond to upsets?
  - Can they keep the plant safe?
- Developing Secure Architectures

Research

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- Goals
  - Protect Plants From Cyber Domain Attacks
  - Help Reduce Costs
  - Ensure Long-Term Viability of Nuclear Energy
- Cyber Hazards Analysis Risk Methodology
- Development of Credible Cyber Attack Scenarios
- Development of Cyber Modelling and Simulation
- Coupling Cyber Models to Physics Models
- Coupling Cyber Models to Plant Simulators
- Researching Secure Architectures