



ANNUAL INDUSTRY WORKSHOP
NOVEMBER 6-7, 2013

CLUSTER: TRUST ASSESSMENT

NOVEMBER 2013

ZBIGNIEW KALBARCZYK

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

DEFINING CLUSTER THEMES

- Create methods and tools that use simulation, modeling, and experimentation to support quantitative trust assessment of
 - power grid devices, hardware/software architectures, protocols, and applications
 - measurement data representing power system state
 - monitoring and protection mechanisms/algorithms used to provide power grid resiliency

SMART GRID CHALLENGES ADDRESSED

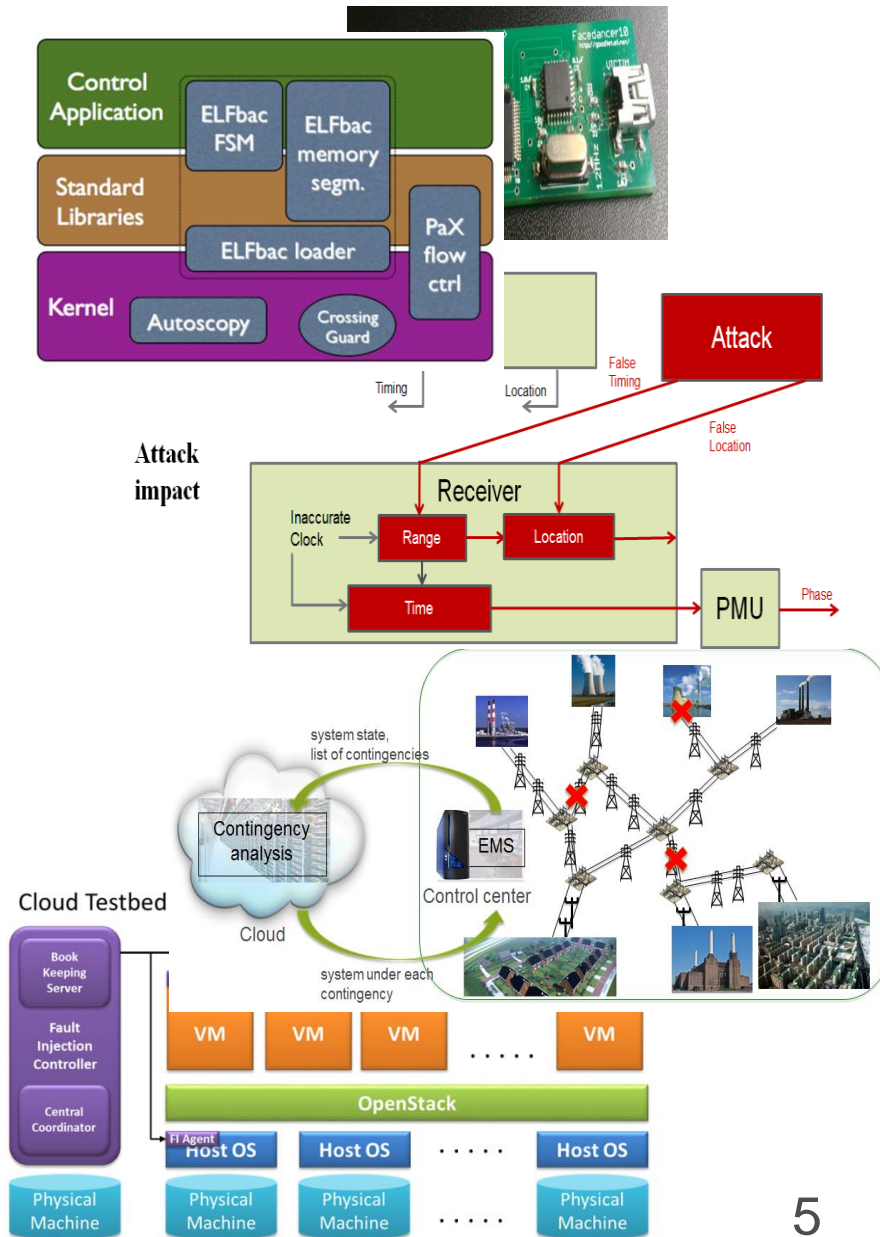
- ***Model-based assessment***
 - Create scalable modeling and simulation infrastructure for evaluation of power grid architectures and applications
 - Create stochastic models for power system to study reliability impact of uncertainties introduced by cyber and physical components
 - Create tools for automated analysis of integrity of security policies
- ***Experiment-based assessment***
 - Create experimental environment to test and evaluate security of power grid devices, protocols, and applications under realistic use cases
 - Create tools for assessing quality of measurement data reflecting system state
 - Use of cloud computing for power grid, including applications, grid management, and tools for security assessment

EXPERTISE AND COMPETENCE OF THE RESEARCH TEAM

- High fidelity simulation of networked systems (including cyber and physical aspects)
- Stochastic modeling and simulation of power systems and applications
- Analysis and identification of security vulnerabilities
- Experimental assessment of cyber physical systems
- Design and evaluation of secure and reliable computing systems and specifically resilient power systems
- Assured cloud computing

CLUSTER ACTIVITIES

1. Modeling Methodologies for Power Grid Control System Evaluation
2. Quantifying the Impacts on Reliability of Coupling between Power System Cyber and Physical Components
3. Security and Robustness Evaluation and Enhancement of Power System Apps
4. Synchrophasor Data Quality
5. Testbed-Driven Assessment: Experimental Validation of System Security and Reliability
6. Tools for Assessment and Self-assessment of ZigBee Networks
 - transfer to River Loop Security
7. Trustworthiness Enhancement Tools for SCADA Software and Platforms
8. Understanding and Mitigating the Impacts of GPS/GNSS Vulnerabilities



MAPPING ACTIVITIES TO THEMES

	Simulation tools	Modeling	Devices, HW & SW architectures	Applications	Measurement data quality (e.g., PMUs)	Experimental assessment methods & tools
Modeling Methodologies for Power Grid Control System Evaluation	✓	✓		✓		
Quantifying the Impacts on Reliability of Coupling between Power System Cyber and Physical Components	✓	✓	✓			✓
Security and Robustness Evaluation and Enhancement of Power System Apps		✓		✓	✓	✓
Synchrophasor Data Quality				✓	✓	✓
Testbed-Driven Assessment: Experimental Validation of System Security and Reliability			✓	✓	✓	✓
Tools for Assessment and Self-assessment of ZigBee Network			✓	✓		✓
Trustworthiness Enhancement Tools for SCADA Software and Platforms			✓	✓		✓
Understanding and Mitigating the Impacts of GPS/GNSS Vulnerabilities	✓			✓	✓	✓

DISCUSSION TOPICS

- Validation of solutions with smart grid applications
- Cloud support for smart power grid applications and resilient SCADA-based management
- Technology transfer and pilot deployment opportunities