PSERC Power Systems Engineering Research Center

Thematic Grouping of Systems Stem Projects

January 2017

A) Parameter and State Estimation

S-1: Identification and Tracking of Parameters for a Large Synchronous
S-10: Power System State Estimation and Optimal Measurement Placement for Distributed Multi-Utility Operation
S-15: Estimation of Synchronous Generator Parameters from On-line Measurements
S-17: Techniques for the Evaluation of Parametric Variation in Time-Step Simulations
S-22: Enhanced State Estimators
S-23G: Optimal Placement of Phasor Measurement Units for State Estimation
S-33: Implementation Issues for Hierarchical State Estimators
S-39: The Smart Grid Needs: Model and Data Interoperability, and Unified Generalized State Estimator

B) Analysis Tools for Power System Reliability and Security

S-2: CPFLOW for Power Tracer and Voltage Monitoring
S-3: Avoiding and Suppressing Oscillations
S-4: Computer Simulation of Cascading Disturbances in Electric Power Systems
S-5: Automated Operating Procedures for Transfer Limits
S-6: Congestion Management in Restructured Power Systems Using an Optimal Power Flow Framework
S-7: Integrated Security Analysis
S-8: Coordination of Transmission Line Transfer Capabilities
S-11: Voltage Security Margin Assessment
S-13: Comprehensive Power System Reliability Assessment
S-19: Detection, Prevention and Mitigation of Cascading Events: Part III
S-19: Detection, Prevention and Mitigation of Cascading Events: Part II
S-19: Detection, Prevention and Mitigation of Cascading Events: Part I
S-21: On-Line Transient Stability Assessment Scoping Study
S-24: Optimal Allocation of Static and Dynamic VAR Resources
S-26: Risk of Cascading Outages
S-28: Preventing Voltage Collapse with Protection Systems that Incorporate Optimal Reactive Power Control
S-29: Detection, Prevention and Mitigation of Cascading Events: Prototype Implementations
S-30: Development and Evaluation of System Restoration Strategies from a Blackout
S-32: Fast Simulation, Monitoring and Mitigation of Cascading Failure
S-38: Next Generation On-Line Dynamic Security Assessment

S-38: Next Generation On-Line Dynamic Security Assessment - Parts III and IV
S-43G: Validation and Accreditation of Transient Stability Results
S-46G: Seamless Power System Analytics
S-51: The Application of Robust Optimization in Power Systems
S-60: Load Model Complexity Analysis and Real-Time Load Tracking
S-66: Representation, Modeling, Data Development and Maintenance of Appropriate Protective Relaying Functions in Large Scale Transient Stability Simulations
S-68G: Non-Minimum-Phase Dynamics in the Electric Power Transmission Network: Identification, Analysis, and Preserving Model Reduction
S-76: Modeling, Control, and Protection of Multi-Terminal Direct-Current Transmission for Improving Power Grid's Performance

C) Power System Control

S-6: New System Control Methodologies: Adapting AGC and Other Generator Controls to the Restructured Environment
S-12: Robust Control of Large Scale Power Systems
S-16: Security Enhancement through Direct Non-Disruptive Load Control: Part I
S-16: Security Enhancement through Direct Non-Disruptive Load Control: Part II
S-35: System Protection Schemes: Limitations, Risks, and Management
S-48G: Setting-less Protection Methods

D) Phasor Measurement Units and Applications

S-27G: Tool for On-line Stability Determination and Control for Coordinated Operations between Regional Entities Using PMUs: Expanded Testing (Decision Tree Based Online Voltage Security Assessment Using PMU Measurements)
S-27: A Tool for On-line Stability Determination and Control for Coordinated Operations between Regional Entities Using PMUs
S-31: Real-Time Security Assessment of Angle Stability and Voltage Stability Using Synchrophasors
S-36: Using PMU Data to Increase Situational Awareness
S-37: Toward a Systematic Framework for Deploying Synchrophasors and their Utilization for Improving Performance of Future Electric Energy Systems
S-44: Data Mining to Characterize Signatures of Impending System Events or Performance from PMU Measurements
S-45: Testing and Validation of Phasor Measurement Based Devices and Algorithms
S-49: Exploiting Emerging Data for Enhanced Load Modeling
S-50: Real Time PMU-Based Stability Monitoring
S-57: Adaptive and Intelligent PMUs for Smarter Applications
S-59: Sparse Sensing Methods for Model-Free Sensitivity Estimation and Topology Change Detection using Synchro-Phasor Measurements
S-60: Load Model Complexity Analysis and Real-Time Load Tracking
S-64: Monitoring and Maintaining Limits of Area Transfers with PMUs
S-65: Real Time Synchrophasor Measurements Based Voltage Stability Monitoring and Control
S-71: Real-time Synchrophasor Data Quality Analysis and Improvement
S-73G: Fuctional assessment of DFIG and PMSG-based wind turbines for grid support applications

S-74: Synchrophasor-Data Analytics for a More Resilient Electric Power System
S-77G: Improving Voltage Stability Margin Estimation through the use of HEM and PMU Data

E) Renewable Resource Integration

S-20: New Implications of Power System Fault Current Limits
S-34: Impact of Increased DFIG Wind Penetration on Power Systems and Markets
S-40: Integration of Storage Devices into Power Systems with Renewable Energy Sources
S-41: Tools and Techniques for Considering Transmission Corridor Options to Accommodate Large Scale Renewable Energy Resources
S-42: Low Frequency Transmission
S-55: Toward Standards for Dynamics in Electric Energy Systems
S-56: Stability, Protection and Control of Systems with High Penetration of Converter-Interfaced Generation
S-61G: Day-Ahead and Real-Time Models for Large-Scale Energy Storage
S-69G: Mitigating Adverse Impacts of Negative Damping Induced by Wind Generators on Power Grid Dynamics
S-73G: Functional assessment of DFIG and PMSG-based wind turbines for grid support applications
S-75: Reliability Evaluation of Renewable Generation Integrated Power Grid including Adequacy and Dynamic Security Assessment

F) Power System Visualization, Energy and Data Management

S-9: Visualization of Power Systems
S-18: Visualization of Power Systems and Components
S-25: Effective Power System Control Center Visualization
S-47G: Integrated EMS for Seamless Power System Analytics
S-53G: Seamless Energy Management Systems Part I: Assessment of Energy Management Systems and Key Technological Requirements
S-53G: Seamless Energy Management Systems Part II: Development of Prototype Core Elements
S-54: Towards a Privacy-Aware Information-Sharing Framework for Advanced Metering Infrastructures
S-62G: Seamless Bulk Electric Grid Management
S-62G: Seamless Grid Management: 2014 Plan
S-63G: Advanced Cyber-Physical Analysis for Smart Grid Distributed ICT and IED Resources at RTE France
S-67G: Cloud Data Sharing Platform
S-72: Attack-Resilient and Secure EMS: Design, Algorithms, Operational Protocols, and Evaluation

G) Co-simulation Tools for Integrated Transmission and Distribution Systems

S-52: Coordinated Aggregation of Distributed Demand-Side Resources
S-58: Hybrid Time Domain Simulation: Application to Fault Induced Delayed Voltage Recovery
S-70: Leveraging Conservation Voltage Reduction for Energy Efficiency, Demand Side Control and Voltage Stability Enhancement in Integrated Transmission and Distribution Systems