RITT Report-Out

NASPI Work Group Meeting

5-6 June 2012

Denver, Colorado USA

Research Presentations

- (20 min) ***"Effects of Forced Oscillations on Power System Damping Estimation"***
  Dr. Luigi Vanfretti, KTH Royal Institute of Technology

- (20 min) ***"Synchrophasor-based Monitoring of Operational Impacts of Renewables on Inertia and Frequency Response (Initial Results)"***
  Mr. Jeff Dagle on behalf of Dr. Yuri Makarov, PNNL

RITT Discussion: Continuing Business

- NASPI Proceedings
- Monthly Research Presentation Conference Call/WebEx
- All Day IEEE Tutorial & Special Issue
  - Would be coordinated with 2013 IEEE PES General Meeting (Vancouver, BC)
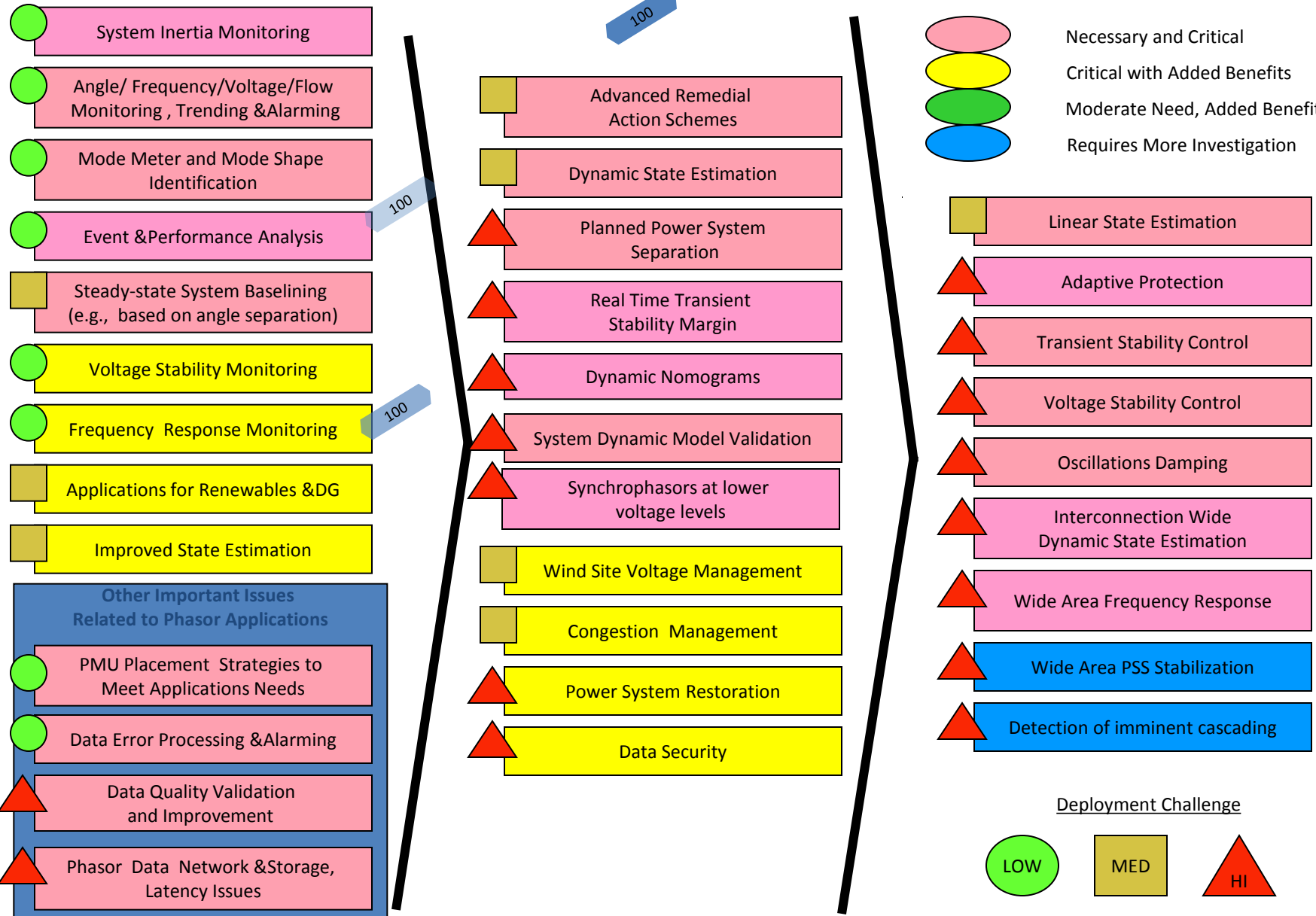 - Proposal would be due October 2012

RITT Discussion: New Business

- Research Roadmap – how can this evolve?
- Should the research roadmap be driven by a survey?
- Should this survey be repeated on set intervals?
- What are the broader impacts of a survey-driven roadmap?
- Other new business

2011 NASPI Roadmap for Synchrophasor Applications (DRAFT v6.0)

Percent Completed

Box Colors:
(reflect the value of phasor measurements for the tasks)

Necessary and Critical
Critical with Added Benefits
Moderate Need, Added Benefits
Requires More Investigation

1 to 3 Years

- System Inertia Monitoring
- Angle/ Frequency/Voltage/Flow Monitoring , Trending &Alarming
- Mode Meter and Mode Shape Identification
- Event &Performance Analysis — 100
- Steady-state System Baselining (e.g., based on angle separation)
- Voltage Stability Monitoring
- Frequency Response Monitoring — 100
- Applications for Renewables &DG
- Improved State Estimation

Other Important Issues Related to Phasor Applications
- PMU Placement Strategies to Meet Applications Needs
- Data Error Processing &Alarming
- Data Quality Validation and Improvement
- Phasor Data Network &Storage, Latency Issues

3 to 5 Years

- 100
- Advanced Remedial Action Schemes
- Dynamic State Estimation
- Planned Power System Separation
- Real Time Transient Stability Margin
- Dynamic Nomograms
- System Dynamic Model Validation
- Synchrophasors at lower voltage levels
- Wind Site Voltage Management
- Congestion Management
- Power System Restoration
- Data Security

> 5 Years

- Linear State Estimation
- Adaptive Protection
- Transient Stability Control
- Voltage Stability Control
- Oscillations Damping
- Interconnection Wide Dynamic State Estimation
- Wide Area Frequency Response
- Wide Area PSS Stabilization
- Detection of imminent cascading

Deployment Challenge

LOW   MED   HI

Survey Beginnings…

Need	Priority	Timeline
Advanced algorithms for bad data detection	HIGH	1-2 yr
PMU data sets with SCADA snapshots	HIGH	1-2 yr
Relationship between angle and stability	HIGH	3-5 yr
Forced Oscillations	HIGH/MED	1-2 yr
Data mining applications	HIGH/MED	3-5 yr
Data Compression	MEDIUM	1-2 yr
Better understanding of bad data definition	MEDIUM	1-2 yr
Archived data exchange	MEDIUM	1-2 yr
Interoperability	MEDIUM	3-5 yr
Communications security	MEDIUM	3-5 yr
Load modeling algorithms	MEDIUM	>5 yr
Wide-area real-time control systems	MEDIUM	>5 yr
Open source software tools	MED/LOW	>5 yr
Renewable generation model validation	LOW	3-5 yr