Peak Reliability Synchrophasor Program (PRSP)

Presented by:

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NASPI

(North American Synchrophasor Initiative)
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assuring the wide area view

Acknowledgement and Disclaimer

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Agenda

- What we plan to do with the award
  - PRSP Financials
  - Timeline and Status
  - Data Management
  - Control Room Solutions
  - Mode and Oscillation Detection
  - Interconnection Baseline Correlation
  - Investigate Methods for Efficient Data Delivery
  - Voltage Stability, Grid Control and Monitoring
  - BPA Synchrophasor Project
- Anticipated Learnings or Advances at he end of the project
- Primary Researcher and Project Partners
- Questions

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What we plan to do with the award

PRSP Financial Summary

		Project to date August 2015		
		Actual	**Project Budget**	**Variance**
Personnel & Fringe	Total 1040	362,173	1,971,768	1,609,595
Travel & Other	Program 1040	18,071	58,010	39,939
Equipment	Program 1040	765	360,000	359,235
Contractors	Program 1040	1,127,177	3,581,059	2,453,882
	V&R Energy			
	Bridge Engineering	717,200		
	Utilicast	247,567		
	Everest	78,660		
	T&DCE	-		
	GPA	45,500		
	VZETC	38,250		
	Total	1,508,186	5,970,837	4,462,651
Overhead		70,399	296,163	225,764
	Peak expenditure	1,578,585	6,267,000	4,688,415
Cost Share:	BPA	3,389,883	5,367,000	1,977,117
	IPC	15,568	200,000	184,432
	SCE	13,485	200,000	186,515
	CAISO	10,781	200,000	189,219
	SDG&E	-	200,000	200,000
	PRSP total	5,008,303	12,434,000	7,425,697

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Project Timeline

WBS	PRSP Project Tasks	Start	Scheduled Finish	Actual Finish	Status
1.1	**Program Management Office**	Jul-14	Dec-16		
1.1.2	PMO Delivery	Oct-14	Sep-16		On Track
1.2	**Data Management**	Oct-14	Jul-16		
1.2.1	Phasor Data Accuracy & Availability	May-15	May-16		On Track
1.2.3	PMU Accuracy Tool	Oct-14	Mar-16		On Track
1.2.5	Registry Enhancement	Apr-15	May-16		On Track
1.2.7	Model Validation	Oct-15	Jul-16		Not Started
1.3	**Interconnection Baseline Correlation**	Jan-16	Aug-16		
1.3.1	Data Analysis Tool	Sep-15	Apr-16		On Track
1.3.3	Historical Archive	Dec-15	Aug-16		Not Started
1.4	**Control Room Solutions**	Oct-14	Sep-16		
1.4.1	Technology Options Study	Oct-14	Jan-15	Jan-15	Complete
1.4.2	Peak Visualization Platform	Jan-15	Sep-16		On Track
1.4.4	Phasor Point	Jun-15	Oct-15		On Track
1.4.5	Wide Area View (WAV)	Jul-15	Aug-15		On Track
1.4.6	Synchrophasors over ICCP	Nov-14	Dec-15		On Track
1.4.7	Buisness Transition and Rollout	Jun-15	Apr-16		Not Started
1.8	**T&DCE (Montana Tech) Mode and Oscillation D**	**Jun-15**	**May-16**		
1.7.1	Upgrade the MAS Algorithm & APIs	Jun-15	May-16		On Track
1.7	**Grid Protection Agency (GPA) Workstream**	**Mar-15**	**Aug-16**		
1.7.1	GPA PDQ Tracker	May-15	Mar-16		On Track
1.7.2	openPDC Upgrade	May-15	Aug-15	Aug-15	Complete
1.7.3	Phasor Gateway Project	Jan-16	Jul-16		Not Started
1.5	**Voltage Stability (V&R Energy)**	Jan-15	Sep-16		
1.5.1	V&R Energy Contract	Jan-15	Mar-15		Task Delay
1.5.2	Voltage Stability Delivery	Apr-15	Sep-16		Task Delay
1.6	**BPA Project**	Oct-14	Sep-16		On Track

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Data Management

- Data Management
  - Objectives:
    - Develop tools and reports to monitor data availability and accuracy
    - Develop improvements in the configuration management tools
    - Develop improvements in the synchrophasor data architecture
    - Develop tools, integrations, analytics and metrics to support improvements in simulation models, comparison to state estimation results and interconnection baseline correlation
  - Workstreams:
    - Develop Phasor Data Availability and Accuracy Tools
    - Upgrade the open PDC & synchrophasor data stream architecture
    - Deploy the PDQ Tracker from GPA
    - Develop and deploy the PMU Accuracy Tool
    - Upgrade the Registry

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Control Room Solutions

- Control Room Solutions
  - Objectives:
    - Perform a technology options study to assess the current suite of applications
    - Improve the integration and visualization platform
    - Support the integration of application results into operations
  - Workstreams:
    - Peak Visualization Platform
    - Deliver synchrophasor measurements to members via ICCP
    - Review the PI Based BPA MAS Solution
    - Review the Wide Area View

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Mode and Oscillation Detection

- Modal Analysis Software
  - Objective
    - Develop improvements to the MAS algorithms and APIs
  - Scope of work with T&DCE (MT Tech)
    - Enhance the MAS algorithms
    - Enhance the API for improved interoperability
    - Revisit spectral estimation
    - Develop a summary of improvements in accuracy, speed, and ease of use of the API to Modal Analysis Software including documentation to enable tool use by vendors and researchers

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Baseline Correlation and Model Validation

- Interconnection Baseline Correlation
  - Objective
    - Develop methods to deliver historical data to engineers for use in interconnection baseline studies
  - Scope of Work
    - Document policies for distributing archived synchrophasor data
    - Develop and deploy a data request front end for historical data
    - Investigate the automation of data extracts for events
- Model Validation
    - Develop methods to deliver historical data to engineers
    - Provide data to develop missing elements in generator models

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Investigate Methods for Efficient Data Delivery

- Investigate Methods for Efficient Data Delivery
  - Explore, test and pilot new techniques for delivery of real-time and archive data including multicast, pub/sub, DDS, etc. for both performance and cost

- Phasor Gateway
  - Test the SEIGate protocol across the Wide Area Network (WAN)
  - Compare Gateway Exchange Protocol (GEP) with existing C37.118
  - Summary of evaluation of the use of synchrophasor gateways for more efficient use of the Wide Area Network

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Voltage Stability, Grid Control and Monitoring

- Voltage Stability, Grid Control and Monitoring
  - Work with PRSP Participants to improve and extend the voltage stability applications for use in real-time and offline models

- V&R Energy will provide:
  - LSE prototype deliverables, inputs and outputs for each function (bad data detection, conditioning, and measurement based case development).
  - The LSE and Peak-ROSE will be integrated at Southern California Edison, San Diego Gas & Electric, Idaho Power Inc., and Peak Reliability

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BPA Synchrophasor Project

- PMU additions for linear state estimating
- Develop and test automated controls
- GPS clock availability and potential hardening
- Advanced synchrophasor applications
- Summary detailing completed test algorithms for production RAS system
- Summary detailing deployed automated controls to control voltage following monitoring period

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Anticipated Learnings or Advances at the end of the project

- Improved methods and processes for monitoring and reporting on synchrophasor data availability
- New procedures to perform root cause analysis on synchrophasor data quality issues
- How to present synchrophasor data in the control room
  - Visualization techniques and platforms (Geospatial vs. Schematic)
- Determine the value and use of synchrophasor measurements delivered over ICCP
- How improvements in the MAS impacts results
  - Oscillation and Mode Damping

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# *Anticipated Learnings or Advances at the end of the project*

- What will archived synchrophasor data be used for in addition to generator model validation
- How alternative synchrophasor communication protocols compare to C37.118 and 61850
- How utilities will use linear state estimation
- Techniques for hardening GPS Clocks
- New algorithms for RAS using synchrophasors
- Details for automated voltage control

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Primary Research and Project Partners

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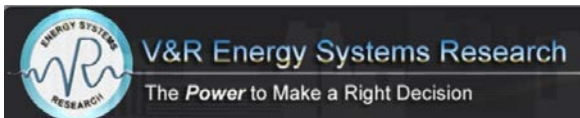
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