Agenda

Model-Centric Smart Grid Workshop:
From Hard Dollar Justification to Real-Time Control and the Analytics That Make It Possible
September 26 - 27, 2013

The first day focuses on the unique characteristics of the ORU approach, including validation of investments, and should be of interest to both managers and technical personnel involved with smart grid activities. The second day takes a deeper dive into the details that make the ORU approach both technically unique and feasible. A number of demonstrations illustrating concepts will be provided. Discussion will be encouraged throughout the workshop.

Thursday, September 26

9:00 – 9:15 a.m.	Introductions
9:15 – 9:45 a.m.	Why does our intelligence and decisions need to depend upon simulation? Why does the ability to solve a problem depend upon the model?
9:45 – 10:30 a.m.	Questions and Discussion
10:30 – 10:45 a.m.	BREAK
10:45 – 11:30 a.m.	What is the model-centric approach? How is it different than current technology? Value of 24x7 model servers with cross support for planning and operations
11:30 – 12:00 noon	Brookhaven National Laboratory's model-centric approach
12:00 – 1:00 p.m.	LUNCH
1:00 – 2:30 p.m.	How is it possible to use a single model for all system analysis? • Why should "*algorithms be pushed to data* "instead of" *data being pushed to algorithms*"? Model-centric advantages: • Cost • Flexibility • Vendor independent How the model-centric approach is enabling creativity: *Changing "can't be done" to "can do"* The value of correlating independent measurement sets through a single model • Discovering bad SCADA measurements • Discovering failed controllers • Checking field crew operations

2:30 – 2:45 p.m. BREAK

2:45 – 4:30 p.m. Smart Grid "*hard-dollar*" value streams – *an incremental value approach*

- Efficiency improvements – preliminary validation results
- Deferral of capital investment using automation
- Reducing storm response costs and customer interruption hours
- Coordinated volt-var control – Conservation Voltage Reduction and Feeder Efficiency

ORU Smart Grid Lab hardware-in-the-loop testing approach, including demo of model-centric automated reconfiguration
Types of analysis used in hard dollar justification
Lessons learned from model-centric analysis to lab testing to field implementation: "*Taking charge of your smart grid investment*"

Friday, September 27

9:00 – 10:00 a.m. Questions and Discussion

10:30 - :10:45 a.m. BREAK

10:45 – 11:15 a.m. A major catastrophe is coming. Will you manage with "yellow stickies"?

- What are priorities (military term, system mission)?
- Moving the list of critical loads into the ISM
- Discovering the weak points

11:15 – 12:00 noon Generic programming and iterators of computer science,
or a peek under the hood
Integrated **S**ystem **M**odels

- Why do we rely upon abstract, simplified models maintained by a few?
- Why should poles and manholes be included?
- ***Building the ISM with determination***

Topology iterators: Extending generic programming to engineering analysis
Graph **T**race **A**nalysis basics: Edge-edge graphs, topology iterators, multi-reference models

- Operational algorithms
- Numerical algorithms
- Distributed computations via distributing the model with a Model Server
- Comparison of a matrix solutions with a GTA solution: Determining islands of generation

Moving from the complexity of matrix based analysis to the simplicity of **G**raph **T**race **A**nalysis: Power flow case study

- Why would you want to solve a power flow problem that includes both transmission and distribution?
- Why different power flow algorithms are used to solve different topologies (e.g., transmission versus radial distribution versus heavily meshed distribution)?

- How can a single GTA based power flow algorithm solve from transmission to radial/heavily meshed distribution, all in one ISM?

Advanced analysis made easy: Case studies

- Why Monte Carlo analysis?
- Distributed Energy Resource and/or electric vehicle penetration
- Storm modeling and reconfiguration for restoration
- Cascading failure analysis
- Control of flows with Distributed Series Reactance

Multi-domain ISMs and GTA algorithms

- Modeling electric, gas, communication, and other systems in the same model