NERC SMWG – NASPI Joint Task Force on Role-Based Synchrophasor Training

NASPI Working Group Meeting

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Southern Company

Research & Development

Role-Based Training Concept

Let’s do a training session on cars!
Who will we train and on what?

- Engineering and Service
- Marketing and Sales
- Production and Assembly
- Logistics and Distribution
- Customer Service and Support
- Finance and Accounting
- Research and Development
- Executive Leadership and Management

Need for Role-Based Synchrophasor Training

- When Synchrophasor Training is mentioned, often Transmission Operators come to mind. This is often the target audience for developed training.
- While Transmission Operators comprise an important stakeholder group, other critical stakeholders often go ignored. Single technology champion.
- Greater overall organizational success can be achieved with integrating and leveraging synchrophasor technology for business value if we take a wholistic/comprehensive approach – identify and target all stakeholders of the ecosystem and perform appropriately scoped training. Encourages multiple technology champions.

From Single Target

To Multiple Targets

Role-Based Training on Synchrophasor Technology

Who are the stakeholders? | What are their respective interests and needs?

- Executive Leadership and Management
- Transmission Planning
- Transmission Operations
- Protection and Control
- Distribution Operations
- Information Technology
- Research and Development
- Compliance

Non-exhaustive List

Outline for Role-Based Synchrophasor Training

NERC SMWG **Outline for Role-Based Synchrophasor Training (RBST)**

1. Introduction to Synchrophasor Technology
- **Overview of Synchrophasors**
  - Definition and basic principles
  - Historical development and evolution
- **Importance in Modern Power Systems**
  - Benefits and applications
  - Case studies and success stories

2. General Training for All Departments
- **Basic Concepts**
  - Phasor Measurement Units (PMUs)
  - Data acquisition and synchronization
- **System Integration**
  - Communication networks
  - Data management and storage
- **Regulatory and Compliance Requirements**
  - Standards and protocols (e.g., IEEE C37.118)
  - Compliance with NERC and other regulatory bodies

3. Department-Specific Training Modules

A. Transmission Planning
- **Synchrophasor Applications in Planning**
  - Grid stability analysis
  - Load forecasting and capacity planning
- **Case Studies**
  - Real-world examples of synchrophasor use in planning

B. Transmission Operations
- **Tailored Advanced Fundamental Concepts**
  - Synchrophasor Theory
  - Distribution Devices
  - Data Quality
- **Real-Time Monitoring and Control**
  - Situational awareness
  - Voltage stability and oscillation detection
- **Event Analysis**
  - Post-event analysis and reporting
  - Tools and software for operational use

C. Protection and Control
- **Tailored Advanced Fundamental Concepts**
- **Enhanced Protection Schemes**
  - Wide-area protection
  - Adaptive relaying
- **Fault Detection and Isolation**
  - Faster and more accurate fault location
  - Coordination with traditional protection systems

D. Distribution Operations
- **Tailored Advanced Fundamental Concepts**
  - Synchrophasor Theory
  - Distribution Devices
  - Data Quality
- **Distribution System Monitoring**
  - Integration of PMUs in distribution networks
  - Voltage and frequency monitoring
- **Outage Management**
  - Improved fault detection and restoration
  - Coordination with AMI (Advanced Metering Infrastructure)

E. Information Technology (Data Management)
- **Tailored Advanced Fundamental Concepts (Deep Dive)**
  - Networking
  - Data Concentration
  - Protocols (C37.118, IEEE 2664-2024 (STTP)
  - Data Quality
  - PMU Devices
- **Data Handling and Storage**
  - Big data challenges and solutions
  - Data security and privacy
- **Integration with IT Systems**
  - SCADA and EMS integration
  - Data analytics and visualization tools

F. Research and Development
- **Advanced Fundamental Concepts (Deep Dive)**
  - Synchrophasor Theory
  - Networking
  - Data Concentration (Software)
  - Protocols (C37.118, IEEE 2664-2024 (STTP)
  - Data Quality
  - Hardware Devices
- **Innovative Applications**
  - New algorithms and methodologies
  - Pilot projects and experimental setups
- **Collaboration with Academia and Industry**
  - Joint research initiatives
  - Funding opportunities and grants

G. Compliance
- **Regulatory Framework**
  - Understanding compliance requirements
  - Regular audits and reporting
- **Best Practices**
  - Ensuring continuous compliance
  - Training and certification programs

H. Executive Leadership
- **Strategic Importance of Synchrophasors**
  - Long-term benefits and ROI
  - Integration into corporate strategy
- **Decision-Making and Policy**
  - Policy development and implementation
  - Risk management and mitigation

I. Maintenance and Field Services
- **Advanced Fundamental Concepts (Deep Dive)**
  - Synchrophasor Theory
  - Hardware devices
  - Commissioning/Configuration/Testing
  - Data Quality
- **Installation and Maintenance of PMUs**
  - Best practices for installation
  - Routine maintenance and troubleshooting
- **Field Data Collection**
  - Techniques for accurate data collection
  - Safety protocols and procedures

J. Customer Service and Support
- **Understanding Synchrophasor Data**
  - Basic interpretation of data for customer inquiries
  - Communicating benefits to customers
- **Support and Troubleshooting**
  - Common issues and solutions
  - Escalation procedures

4. Practical Workshops and Hands-On Training
- **Simulation Exercises**
  - Real-time scenarios and problem-solving
- **Field Training**
  - Installation and maintenance of PMUs
  - On-site troubleshooting

5. Assessment and Certification
- **Training Format**
  - Instructor-led
  - Online courses
- **Knowledge Checks**
  - Quizzes and tests for each module
- **Certification**
  - Role-based certification upon completion
  - Continuous education and re-certification

6. Continuous Improvement and Feedback
- **Feedback Mechanism**
  - Regular feedback from participants
  - Iterative improvement of training content
- **Updates and Refresher Courses**
  - Keeping up with technological advancements | Periodic refresher courses

Help Wanted

Would you like to join the ~~Mission~~ Task Force?


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