



P161B - Information and Communication Technology (ICT) for Transmission 2015 Rollout Webcast

Paul Myrda
Technical Executive

October 7, 2014

Today's Presentation



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Agenda



- Welcome & Introductions
- Opening Remarks
- 2015 Program Plan
- Supplemental Projects
- Review & Wrap up



Opening Remarks

Tiffany Gibby
Program Manager, Grid Modernization
Tennessee Valley Authority



Information and Communication Technology (ICT) Program



The ICT Program conducts research, development and demonstrations that cut across operating domains and the IT and OT departments.

Research Areas:

- Interoperability
- Communications
- Data Management & Analysis
- Systems Integration
- Advanced Metering



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EPRI Power Delivery and Utilization Information, Communication and Technology (ICT) for Transmission: Program 161B



Information and Communication Technology for Transmission (161B)

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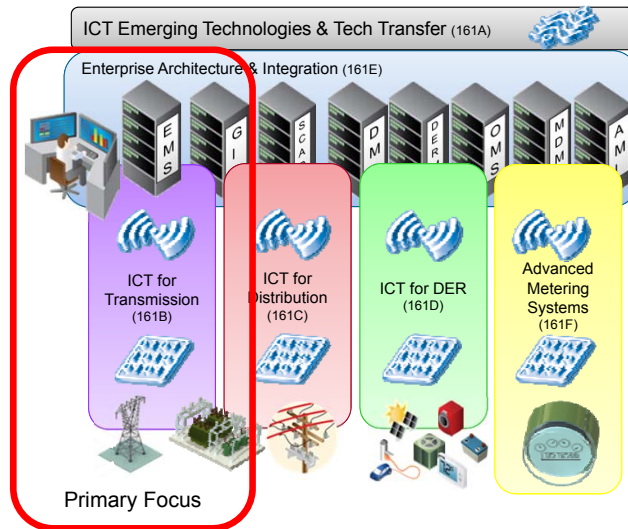
Questions? Email: ICTHotline@epri.com

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2015 Information & Communication Technology (ICT) Program



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161B - Information and Communications Technology for Transmission



- Enables Improved Grid Management through:
 - Real time information
 - Increased use of synchrophasors
 - Standards based health assessment
 - Continued reliance on legacy sensory devices
 - Improved network model management



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2015 Schedule



- Planning Webcast
 - Friday January 23, 2015
- Program Advisors Meeting
 - March 2-4, 2015
 - Sheraton Phoenix, AZ
- Mid-Year Update Webcast
 - Monday, May 11, 2015
- Program Advisors Meeting
 - October 5-7, 2015
 - Baltimore Marriott Waterfront Hotel



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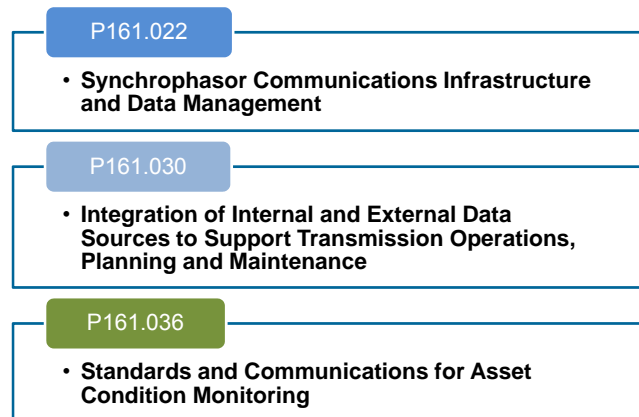
2015 Program Plan

P161B Project Set Summary

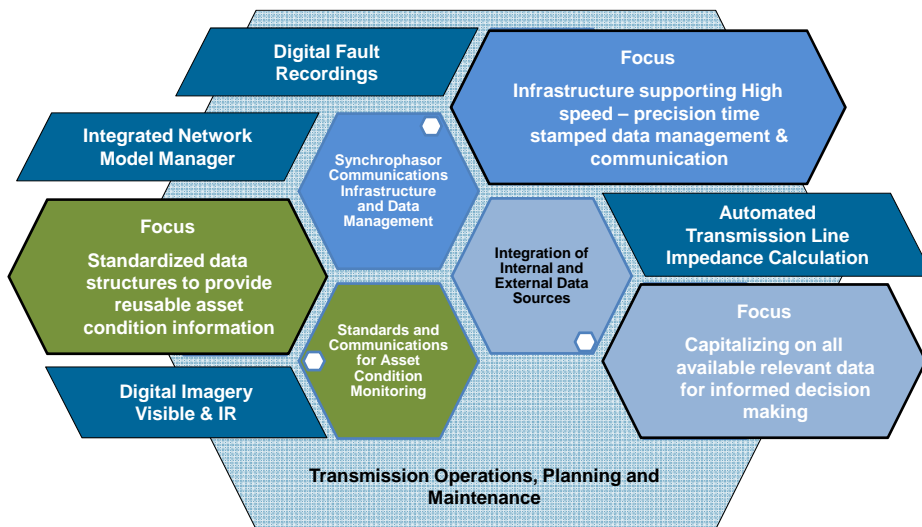


- Objective
 - Enhance the situational awareness and asset management of the transmission system by identifying requirements and industry best practices for a robust communications infrastructure
 - Develop effective approaches for integrating, managing and analyzing internal and external data sources;
 - Create a standards-based approach for integrating sensors.
- Results
 - Help utilities reduce long-term O&M expenditures
 - Improve system reliability and resiliency

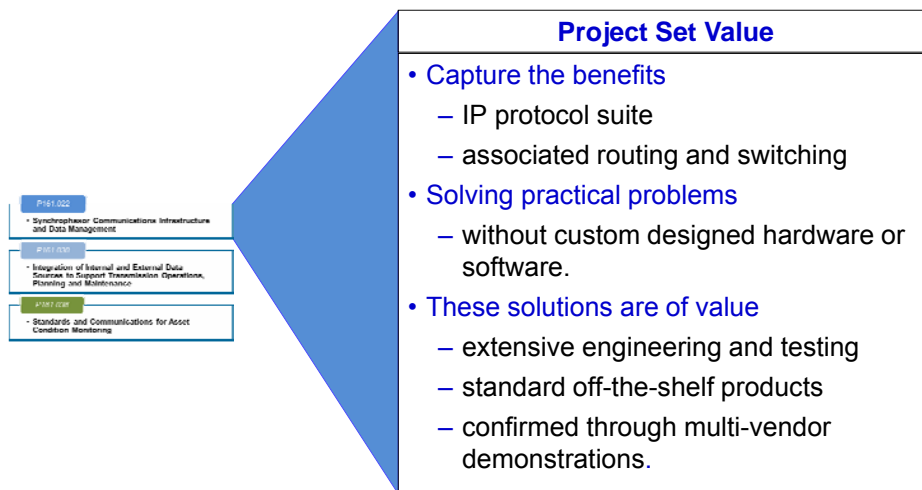
P161B Project Set Overview



Research Alignment



Synchrophasor Communications Infrastructure and Data Management



Project Set Value

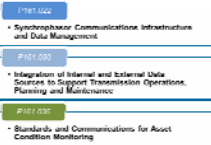
- Capture the benefits
 - IP protocol suite
 - associated routing and switching
- Solving practical problems
 - without custom designed hardware or software.
- These solutions are of value
 - extensive engineering and testing
 - standard off-the-shelf products
 - confirmed through multi-vendor demonstrations.

Integration of Internal and External Data Sources to Support Transmission Operations, Planning and Maintenance



Project Set Value

- Leveraging a variety of data sources
 - combining them into useful relationships
 - supporting business functions
- Geospatial centric information uncover location-specific impacts using:
 - related location-specific information
 - other real-time data
- Value oriented business enhancement opportunities such as
 - comprehensive asset condition evaluation
 - crew and supply deployment

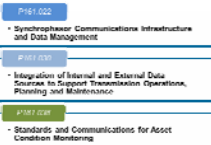


Standards and Communications for Asset Condition Monitoring



Project Set Value

- Demonstrated data exchanges using:
 - Common Information Model
 - IEC 61850 Object Models
 - and other relevant standards
- Fundamental to future proofing applications
- Broadens the reusability of software thereby lowering overall costs.
- Expeditious way to intelligently utilize data more efficiently.





Synchrophasor Communications Infrastructure and Data Management

Synchrophasor Communications Infrastructure and Data Management

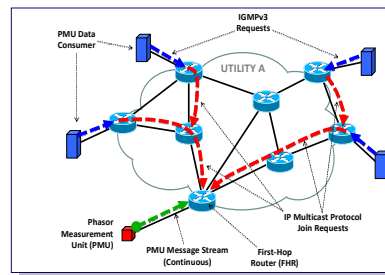


Issue

- Synchrophasor network and data operational concerns plague many utilities

Approach

- Improve overall PMU operational efficiencies through modeling and testing using the EPRI Smart Grid Substation Lab and other resources.



P161.022

Increase asset and system reliability

Synchrophasor Communication Infrastructure



- Deliverable – Electric Utility Guidebook on Synchrophasor Communications
- Value To – Technical staff involved in network communications for synchrophasors

The guide book will focus on the quality and other performance issues associated with synchrophasor communications.



Synchrophasor Data Management



- Deliverable – Electric Utility Guidebook on Synchrophasor Data Management
- Value To – Technical staff involved in storing, archiving and using this data

The guide book will focus on the data management issues associated with synchrophasor data.



161.022 - Synchrophasor Communications Infrastructure and Data Management



2015 Deliverables

Product Title & Description **Planned**	Completion Date	Product Type
Synchrophasor Communications Infrastructure <ul style="list-style-type: none"> Electric Utility Guidebook on Synchrophasor Communications 	12/18/15	Technical Update
Synchrophasor Communications Data Management <ul style="list-style-type: none"> Electric Utility Guidebook on Synchrophasor Data Management 	12/18/15	Technical Update



Integration of Internal and External Data Sources to Support:

Transmission Operations, Planning and Maintenance

Integration of Internal & External Data Sources to Support: Transmission Operations, Planning & Maintenance



Issue

- A wide array of transmission related data sources can be integrated to provide measurable performance improvement in planning, operations and maintenance.

Approach

- Utilities have demonstrated measurable improvements in field operations from standardized field data integration



P161.030

Optimize use of existing and future monitoring equipment.

Integration of Internal and External Data Sources to Support: Transmission Operations, Planning and Maintenance



- Deliverable - Electric Utility Guidebook on Integration of Internal and External Data Sources:
- Value To – Technical staff involved in Transmission Operations, Planning and Maintenance

The guide book will focus on the value and technical concerns associated with integrating internal and external data sources within the utility enterprise



P161.030 Integration of Internal and External Data Sources to Support Transmission Operations, Planning and Maintenance



2015 Deliverable

Product Title & Description Planned	Completion Date	Product Type
Electric Utility Guidebook on Integration of Internal and External Data Sources: The guide book will focus on the value and technical concerns associated with integrating internal and external data sources within the utility enterprise	12/18/15	Technical Update



Standards and Communications for Asset Condition Monitoring

Standards and Communications for Asset Condition Monitoring



Issue

- A wide array of data sources including internal and external are available but integration is limited

Approach

- Review the requirements for asset condition monitoring from the perspective of standards and identify relevant gaps to be addressed by project research



P161.036

Decrease maintenance and operating costs

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Standards and Communications for Asset Condition Monitoring



- Deliverable – Electric Utility Guidebook on Using Standards for Asset Condition Monitoring
- Value To – Asset management personnel employing analytics and IT support staff involved in asset data management

The guide book will focus on the applicability of existing standards in using asset condition data for health monitoring of utility assets.



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161.036 Standards and Communications for Asset Condition Monitoring



2015 Deliverable

Product Title & Description Planned	Completion Date	Product Type
Electric Utility Guidebook on Using Standards and Communications for Asset Condition Monitoring: The guide book will focus on the applicability of existing standards in using asset condition data for health monitoring of utility assets.	12/18/15	Technical Update



ICT for Transmission Success

Improving Transmission Network Model Management

Improving Transmission Network Model Management



Industry Issue

- Network models independently maintained in network analysis systems across the utility
- No overarching data management strategy
- Existing approach inefficient and error-prone

Applicable Standard

- Common Information Model (CIM)
 - Maturity
 - Few industry implementations for internal network model management

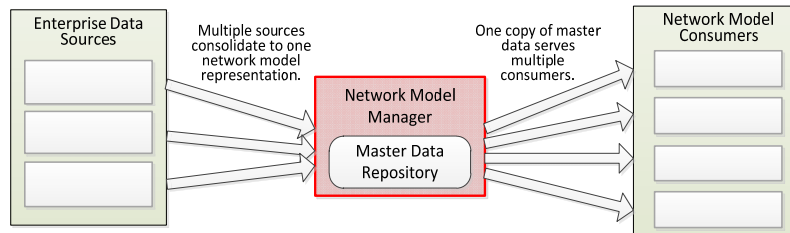


Industry need and standards readiness converge in opportunity for applied research

Improving Transmission Network Model Management



Consolidated network model management vision



- Network Model Manager (NMM) tool
 - Provides master repository
 - Supports model and case assembly

“EPRI’s Network Model Management concept offers an effective way to ensure model consistency and process efficiency.”

– Durgésh P. Manjuré, Senior Manager, System Modeling at MISO

Improving Transmission Network Model Management



Projects and Products



2015+

“Transmission Modernization Demo” Supplemental Network Model Management Improvement at AEP

“CIM Primer Companion Guide for Network Analysis Data Management”
(Product ID 3002002587)

2014

“Network Model Manager Requirements Overview” Supplemental
(Product ID 3002003053)

“Network Model Manager and Repository:
A Guide to Exploring the Potential of Centralized Network Model Management”
(Product ID 300200609)

(Product ID 300500000)

2013

“Integrated Network Model Management” Supplemental

Making steady progress toward improved network model management across the industry

(Product ID 1054530)

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Improving Transmission Network Model Management



“So, what’s next?”

Network Model Management Guidance Team

- Cross-cutting group
 - Utilities, vendors, consultants
 - ICCS, GO&P, Distribution
 - US and Europe
- Develop a shared understanding of “state of the NMM world”
- Define strategies for industry education
- Identify areas for action (research, standards development, etc.)
- Help EPRI target its NMM efforts
- Interested?

Contact Pat Brown pbrown@epri.com



“Integrated Network Model Management is no longer a ‘nice to have’ idea, but is *CRITICAL* for utilities who plan to thrive in today’s regulatory and competitive environment!”

– Eric Hatter, EMS Applications Support at AEP

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Supplemental Projects

Application Guides, Software Tools and Migration Strategies for the Implementation of the IEC 61850 Standard



Objectives and Scope

- Address the barriers in planning, implementing, operating and maintaining the IEC 61850 standard and associated technologies by:
 - capturing lessons learned from utility implementations
 - developing education and training material
 - developing guidebook and software tools
 - addressing security challenges



Value

- Reduce costs and minimize risk when deploying the IEC 61850 standard

Details and Contact

- Price: TBD
- Qualifies for TC and SDF
- Project will start in 2014

Don Von Dollen

- dvondoll@epri.com (650) 855-2210
- **SPN Number: 105304**

Address the barriers in implementing and maintaining IEC 61850

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Automated Transmission Line Impedance Calculation Using GIS



Objective - Determine the feasibility of automating the line impedance calculation using existing data sources such as GIS

Phased Approach:

1. **Validate Simple Line Impedance Calculation Process:** Determine the feasibility of automating the line impedance calculation process
2. **Complex Line Impedance Calculation Process:** Transmission line which has multiple mutually coupled lines and other complexities.
3. **Improved Line Impedance Calculation Process:** Impact of refining the calculation process by including terrain variations, conductor sag and other parameters

In Progress

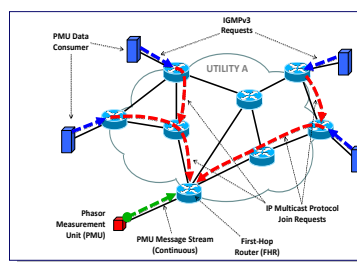
Seeking Other Members

Assessment of Synchrophasor Network Performance



Issue:

- Utilities have been experiencing performance issues with their PMU data networks
 - Data loss
 - Erratic behavior
 - Poor data transfer rates (latency)



Approach:

- Perform systematic assessments of PMU data networks
- Develop Best Practices recommendations and possibly a PMU Data Network Guidebook

Integrated Network Model Manager

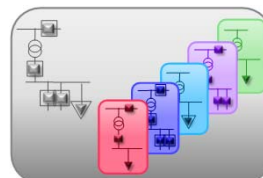


Project Description:

Deep-dive into existing model management practices and exploration of opportunities for improvement via coordinated model management architecture.

- Candidates
 - Transmission owners/operators or ISOs serious about improving internal network model management
- Participation
 - \$100K (TC/SDF eligible)
 - Active participation required
 - 2 utilities participated in 2013, both are moving ahead with plans to implement model management solutions
- Benefits
 - Develop cross-department understanding of feasibility and benefit of coordinated Transmission model management within utilities
 - Explore solid standards-based approach for solution implementation

Still Open in 2015



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Emerging Technologies and Technology Transfer: 161A



Approach:

- Analysis of emerging standards, technologies and practices for smart grid implementations
 - Smart Grid Standards Tracking, Analysis and Contribution
 - Communications Technology Tracking and Analysis
- Technology transfer support for **ALL** Integrated Communication and Technology (ICT) R & D projects.
- Email: ICTHotline@epri.com



Project Set Lead: Don Von Dollen
dvondoll@epri.com (650) 855-2210

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Interoperability Standards & Communications Technology Tracking and Analysis



161A

Issue

- Rapidly evolving standards and communications technologies can have a major impact on utility deployments
- Tracking development can be overwhelming and costly

Approach

- EPRI staff is deeply involved in standards development and industry activities
- EPRI staff reports on developments and activities and provides analysis on the impacts to utilities



Saving utility staff time *tracking* standards activities, while gaining a better understanding of the *impact* of standards

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ICT Technology Transfer Activities



161A

Issue

- To receive value from our research, our member stakeholders must be aware of what we are doing and implement the results

Approach

- Communicate research results in a variety of ways:
 - Technical reports
 - Webcasts
 - Newsletters



Receive the results of our work in the format that works best for YOU!

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Questions?

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