

INFORMATION, COMMUNICATION & CYBER SECURITY NEWSLETTER

Merry Christmas and Best Wishes for a Happy New Year!



Dear EPRI ICCS Members and Stakeholders,

It's hard to believe that the end of the year is here! It's been an exciting, fast-paced year with a lot of great activities and results. I did a quick reflection on 2015 by reviewing the 10 previous newsletters this year – all available online here:

<http://smartgrid.epri.com/Newsletters.aspx>. We kicked off the year in 2015 highlighting 2014 results with over 60 utility members and highlighting over 30 deliverables (stay tuned for a similar report in January 2016). As the year progressed we continued to get input on the [ICCS roadmap](#) that was published in October. Part of that process resulted in three new supplemental projects 1) [Integrated Threat Analysis Framework](#) (ITAF), 2) [Assessing Augmented Reality for the Electric Industry](#), and 3) [Telecommunications Initiative](#).

We celebrated the success of Technology Transfer award winners and it was great to have such a strong international representation – applying EPRI research results. The ICCS related technology transfer award winners included Electricité de France, Tokyo Electric Power Company, Ameren, Duke Energy, Ergon Energy, Hawaiian Electric Company, Hydro-Quebec, Salt River Project, PECO, SCE, Southern Company and Baltimore Gas and Electric.

We also made significant progress on our multi-year data analytics initiatives in Distribution and Transmission. Early in the year we highlighted accomplishments in the [2-year update](#) and as we look into 2016, it is exciting to begin getting a rich set of results from the demonstrations at utilities.

There are numerous examples, making it clear that electric utilities around the world are collaborating and *Together....We are shaping the future of electricity!*

Keep reading to see what's been accomplished this past month and see what's coming up in the new year. Merry Christmas and best wishes for a Happy New Year!

Sincerely,



Matt Wakefield
Director, Information, Communication and Cyber Security Research

December 2015

In this Newsletter

[ICT Program \(161\)](#)

[Cyber Security Program \(183\)](#)

[Data Analytics \(DMD & TMD\)](#)

[Smart Grid Demo](#)

[Upcoming Events](#)



ICT Team Industry Contributions and Collaborations

A Look Inside EPRI's New Center for Utility AMI data

Christine Hertzog, Brian Seal, and Don Von Dollen contributed a commentary to **Intelligent Utility** about EPRI's new center for AMI (Advanced Metering Infrastructure) data, a repository of information about utility AMI applications, operations, and management practices for the systems themselves and the data they collect.

A Smarter Power Grid – Enabled by Data and Virtualization to Minimize Silos and Enhance Value CIO Review

By Doug Dorr, Program Manager and Matt Wakefield, Director

The distinguishing characteristic of a smarter electric power grid is actionable information at the right time or, more specifically, at the exact time when that information is needed to make an optimal decision. The main barrier to having right-time information in today's electric system is data interoperability, and the power industry suffers from the same challenges with data silos that face not other industries. [Read full article](#)

Recent ICT / IntelliGrid (161) & Related Demonstration Deliverables

Title	Date
<p><u>Demand Response-Ready Domestic Water Heater Test Plan: Preliminary Test Procedure for CEA-2045 Field Demonstration</u></p> <p><i>This document defines a process for testing domestic electric water heaters developed under the Electric Power Research Institute's (EPRI's) ANSI/CEA-2045 Field Demonstrations Project. The report includes procedures to test water heaters designed specifically to meet requirements set forth in Demand Response-Ready Water Heater Specification: Preliminary Requirements for CEA-2045 Field Demonstration (EPRI report 3002002710). The procedures defined herein are intended to test and verify that the water heater supports the ANSI/CEA-2045 standard in the manner defined in the aforementioned requirements document. Tests to quantify the energy efficiency or demand response performance of the water heater itself are beyond the scope of this test plan.</i></p>	17-Dec-2015
<p><u>2015 Third Quarter CEA-2045 Field Demonstration Project Update</u></p> <p><i>In February 2013, the Consumer Electronics Association (CEA) released standard CEA-2045, which defines a modular communication interface, or port, into which communication modules of any kind can be plugged. This standard is intended for application on any appliance to enable demand response (DR), automation, and remote management. Electric Power Research Institute (EPRI) Report 3002004020, Introduction to the CEA-2045 Standard,</i></p>	16- Dec-2015

describes this new standard in detail. EPRI's Field Demonstration Project, described in CEA-2045 Field Demonstration Project Description (EPRI report 3002004009), is a three-year collaborative research activity designed to assess this new standard. This report provides an update on project activities through the third quarter of 2015.

Information Technology (IT)/Operational Technology (OT) Convergence Strategies

12-Dec-2015

This study attempted to delve into these high-level strategies:

- *Reorganization – taking a wholesale approach and moving large segments of the organization under a single CIO/CTO*
- *Realignment – taking a piecemeal approach and selectively choosing segments of the organization to move based on similar skill sets*
- *Re-engage – where leadership did not move anyone organizationally, but for large efforts to ensure that all of the stakeholders had a seat at the table when developing requirements*

and determine what changes to convergence have occurred since the original study, the factors that determine success or the lack of it, whether a correlation between size of the utility and level of convergence could be made, and if some clarity could be brought to the definition of OT.

Guidebook for Advanced Distribution Automation Communications—2015 Edition: An EPRI Information and Communications Technology Report

04-Dec-2015

This guidebook provides a comprehensive reference and resource for utility personnel engaged in the evaluation, design, and deployment of communications systems to support a variety of applications and operational requirements.

Information and Communication Technology (ICT) Interoperability Newsletter, November 2015

30-Nov-2015

The Interoperability Newsletter provides members with information and insight on developments in interoperability standards. The November 2015 issue contains articles on the Information and Communication Program's R&D Roadmap for interoperability, creating a CIM testing community, transactive energy, the IEEE 802-15.4g standard and the Wi-SUN Alliance; and status reports on the Smart Grid Interoperability Panel, Grid 3.0, and the Outage Data Initiative project.

Guidebook on Synchrophasor Communications

28-Nov-2015

This effort follows four previous EPRI reports and two previous surveys addressing communications for synchrophasor measurement. This report is a consolidated guidebook on synchrophasor communications best practices that builds on the previous reports to provide improved knowledge for transporting synchrophasor data. The updated survey captured recent experiences of utilities including some details on their implemented systems, the results versus expected performance, and lessons learned. The report goes on provide

a discussion on outstanding issues in the industry related to phasor data communications, a summary of performance requirements, the current thinking on the North American Synchro-Phasor Initiative (NASPInet), and a list of current areas for future research as indicated by the survey participants.

Common Functions for DER Group Management, Second Edition

25-Nov-2015

This report presents the work-in-process of the second phase of developments by this work group. It addresses DER management in aggregate groups, including group setup, status monitoring, and dispatch of real and reactive power. At the time of publication, the Phase 2 work is in process and expected to be completed in 2016. When completed, this body of work will provide the energy industry with a reference library of functions that can be used for integrating multiple levels of aggregation of DER, including integration with other utility applications.

Communications Challenges and Opportunities Associated With the Integration of DER

20-Nov-2015

This paper looks at the advantages and requirements of a communications structure, and ways to abstract the complexity of DER types. This can simplify the development of DER services and business applications to maximize the utilization of DER investments, and create a vision of how to move forward with DER integration communication systems.

Meeting/Webcast Materials Available

DNP3 Certification for Smart Inverters

Cyber Security and Privacy Program (183)



Cyber Security Team Industry Contributions and Collaborations

Monday, December 7, **Annabelle Lee**, Sr. Technical Executive, presented on EPRI cybersecurity work before 20+ Congressional energy staffers. She was part of a 5-person panel organized by the electricity trades (EEI, APPA, and NRECA) and joined by Mike Bardee of FERC as well as Janet Sena of NERC.

Thursday, December 3, **Jason Christopher**, Sr. Technical Leader, briefed 25 House Staff from the *Congressional Cyber Caucus* on cyber security R&D, joined by speakers from the national electricity and telecommunications trade associations. The panel provided an insider's view of cybersecurity issues facing our electrical sector. They discussed major technological innovations that are currently

available to protect the grid, and identified what we can't do with existing technology now, where we need to go in the future, and what we need to do to get there.

Jason Christopher was interviewed by the **Wall Street Journal** about the cyber integrity of the industry's SCADA system.

Annabelle Lee was interviewed by **Nature Magazine** about whether SCADA systems are susceptible to being hacked.

Annabelle Lee and Jason Christopher were quoted in an **E&E News** article about the recent GridEx III exercise and how the industry seeks to protect the cyber integrity of utilities' control systems. Christopher helped develop the exercise, which included utilities and other entities from Canada, Mexico and the United States.

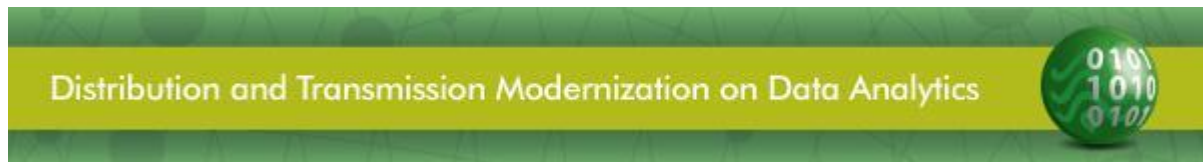
Recent Cyber Security (183) Program Demonstration Deliverables

Title	Date
<p><u>Network and System Management: Advanced Application of the IEC 62351-7 Standard and Utility Pilot Project</u></p> <p><i>To support utilization of the IEC 62351-7 SNMP MIBs, further research has been conducted. This research provides a review of manufacturer's implementations, and includes a technical guide for exposing relevant IEC 62351-7 Network and System Management (NSM) objects via SNMP. Equipment manufacturers can use this guidance to incorporate the SNMP MIBS into their products. Utilities using products supporting the 62351-7 MIBs can develop a more comprehensive, cohesive, and focused view of security and situational awareness for the monitored systems.</i></p>	17-Dec-2015
<p><u>Distributed Network Protocol (DNP3) Security Interoperability Activities 2015</u></p> <p><i>This report describes the latest progress in promoting the adoption of the Secure Authentication features of the Distributed Network Protocol (DNP3-SA) within the power industry. It describes the development and review of the new DNP3 Key Management Protocol (DKMP) specification for managing DNP3-SA security credentials. It also describes the evaluation of the DNP3-SA Test Procedures document that was performed during a multi-vendor workshop hosted at the EPRI Cyber-Security Lab in Knoxville, Tennessee.</i></p>	17-Dec-2015
<p><u>Security, Cyber, Risk Assessment Methodology (SRMD) v1</u></p> <p><i>This web application provides an interface to a cross reference database of cyber security risk management guidelines for the electric sector.</i></p>	8-Dec-2015
<p><u>Security Testing Tool for End-User Devices (PT2) Version 2.0</u></p>	27-Nov-2015

The Penetration Testing Toolkit is a software tool to aid end users in the security assessment of power systems sector specific embedded devices. The PT2 provides the end user with a centralized interface for managing and executing penetration test activities. The PT2 gives the end user the ability to execute the full range of penetration test activities such as: script execution, data collection, data analysis, traffic injection, and fuzzing. Additionally, the PT2 provides access to a variety of freely available open source security penetration testing tools in an easy to use interface. The benefit of this approach is that it minimizes the amount of setup required in order to execute a penetration test. In this initial release of the software, support for the OpenADR 2.0a protocol has been provided. The OpenADR 2.0a protocol is an XML based HTTP protocol, therefore, the toolkit may also be utilized to test protocols which are similar in structure to the OpenADR protocol.

Meeting/Webcast Materials Available

P183D Technology Transfer Workshop



Recent DMD/TMD and Related Demonstration Deliverables

Title	Date
<u>Application Readiness Guide for DSCADA Analytics</u> <i>Use of AMI beyond meter reading and remote connect/disconnect is a relatively new field, and applications are not well understood. Moreover, utilities are looking to implement one or more of the many identified applications early on in the AMI process. DSCADA also offers utilities opportunity for new and improved applications. The objective of this technical update is to provide detailed information regarding the adoption and implementation of high-value applications for AMI data and DSCADA.</i>	9-Dec-2015
<u>Application Readiness Guide for AMI Data Analytics</u> <i>Use of AMI beyond meter reading and remote connect/disconnect is a relatively new field, and applications are not well understood. Moreover, utilities are looking to implement one or more of the many identified applications early on in the AMI process. DSCADA also offers utilities opportunity for new and improved applications. The objective of this technical update is to provide detailed information regarding the adoption and implementation of high-value applications for AMI data and DSCADA.</i>	9-Dec-2015



Karen George contributed a commentary to **Electric Energy Online** about how the electricity grid has become increasingly dependent on information and communication technologies, and how EPRI's Open Enabling Platform can facilitate the enabling of a more integrated grid.

Recent Smart Grid and Related Demonstration Deliverables

Title	Date
<p><u>Photovoltaic Smoothing Using Coordinated Control of a Battery and Gas Generator: Public Service Company of New Mexico Smart Grid Demonstration</u></p> <p><i>This case study covers a test of the coordinated control of PV smoothing for the PNM system, using the PNM batteries and the NEDO gas-engine generator (GE) and fuel cell.</i></p>	18-Dec-2015
<p><u>Field Assessment of Large-Scale Smart Grid Applications in Distribution Systems</u></p> <p><i>In a series of report sections, the project reviews a detailed Cost/Benefit Analysis (CBA) framework, and the development of that framework for the following Smart Grid business cases: cost of voltage control, distribution management system, and conservation voltage reduction. Since this report builds on EPRI report 3002006694, Guidebook for Cost/Benefit Analysis of Smart Grid Demonstration Projects, it expands technology-specific CBA protocols, develops specifications for evaluation in an analytics platform, and utilizes an analytical platform, where possible, to illustrate how a business case evaluation for Smart Grid technologies can be accomplished.</i></p>	15-Dec-2015

Upcoming Events

Dates

EPRI Company Holiday Shutdown

Dec. 24, 2015 - Jan. 3, 2016



GridEd 2016:

Applications of Smart Inverters, CPS Energy, San Antonio, TX,
12 PDUs

Jan 13-14, 2016

Unbalanced Power Systems Analysis, JW Marriott Austin,
Austin, TX, 12 PDUs

Feb. 25-26, 2016

EPRI Power Delivery and Utilization Sector Council and Advisory Meetings, Austin, TX

Feb. 22-25, 2016

DISTRIBUTECH[®]
CONFERENCE & EXHIBITION
FOCUSED ON THE FUTURE

Orlando, FL
Look for EPRI in booth #2061

Feb. 9-11, 2016

EPRI European ICCS Engagement Summit, Dublin, Ireland

April 19-20, 2016

**EPRI Distribution Modernization Demonstration and Transmission
Modernization Demonstration Spring Advisory Meeting 2016**,
Chattanooga, TN

May 11-12, 2016

**EPRI Smart Distribution and Power 2016 Quality Conference and
Exhibition**, Atlanta, GA

June 28-30, 2016

**Save the Date: EPRI Power Delivery and Utilization Advisory
Meetings**, Hollywood, FL

Sept. 19-22, 2016

Together...Shaping the Future of Electricity

You are receiving this email due to your expressed interest in receiving news from EPRI. If you do not wish to receive electronic news from EPRI in the future, please respond to this message with your request. If you wish to update your contact information or manage your TIP program selections, visit www.epri.com. If you do not have a username and password or are not sure, you may also [request an account](#).



EPRI | 3420 HILLVIEW AVENUE | PALO ALTO, CA 94304 | WWW.EPRI.COM