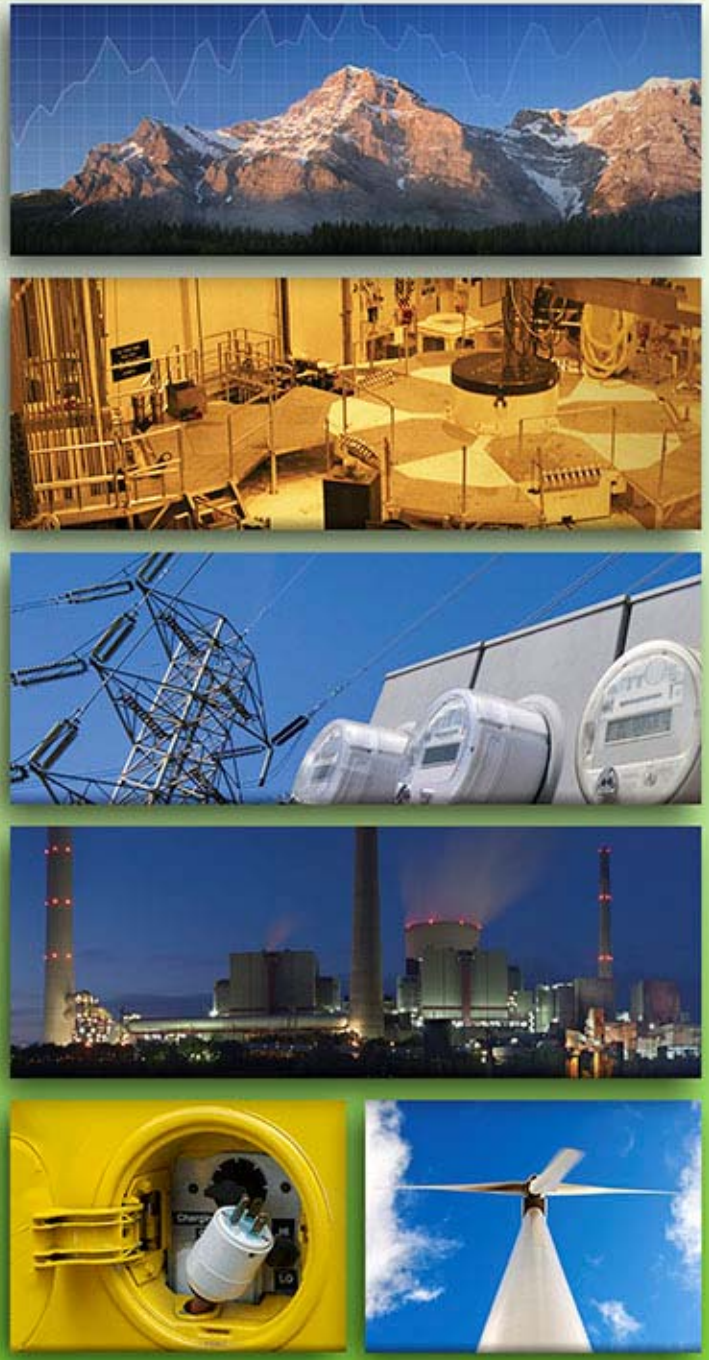


Project Set 161d Update

Webcast/Conference Call

May 13th 2010

Erfan Ibrahim – Project Set Lead

Brian Seal – PM 161.006

Joe Hughes – PM 161.007

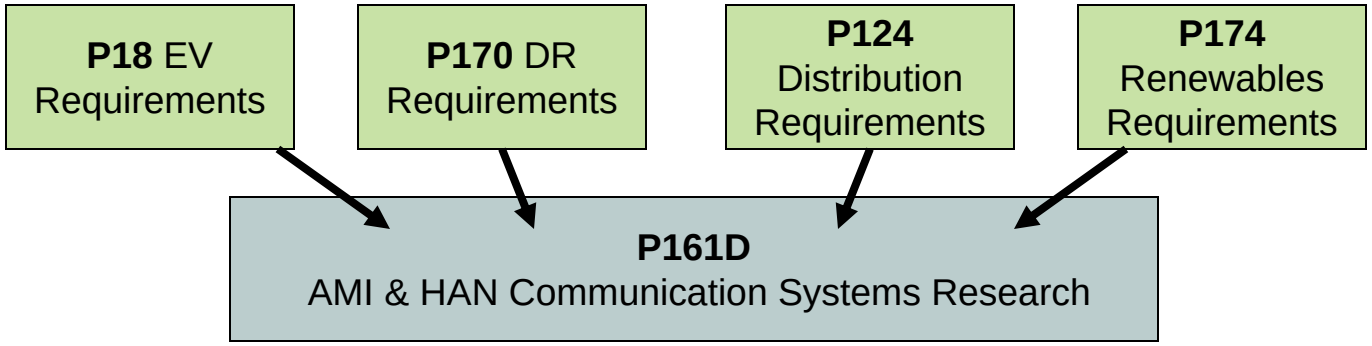
Craig Rodine – PM 161.008

EPRI ELECTRIC POWER RESEARCH INSTITUTE

P161D – Place in the Overall Portfolio

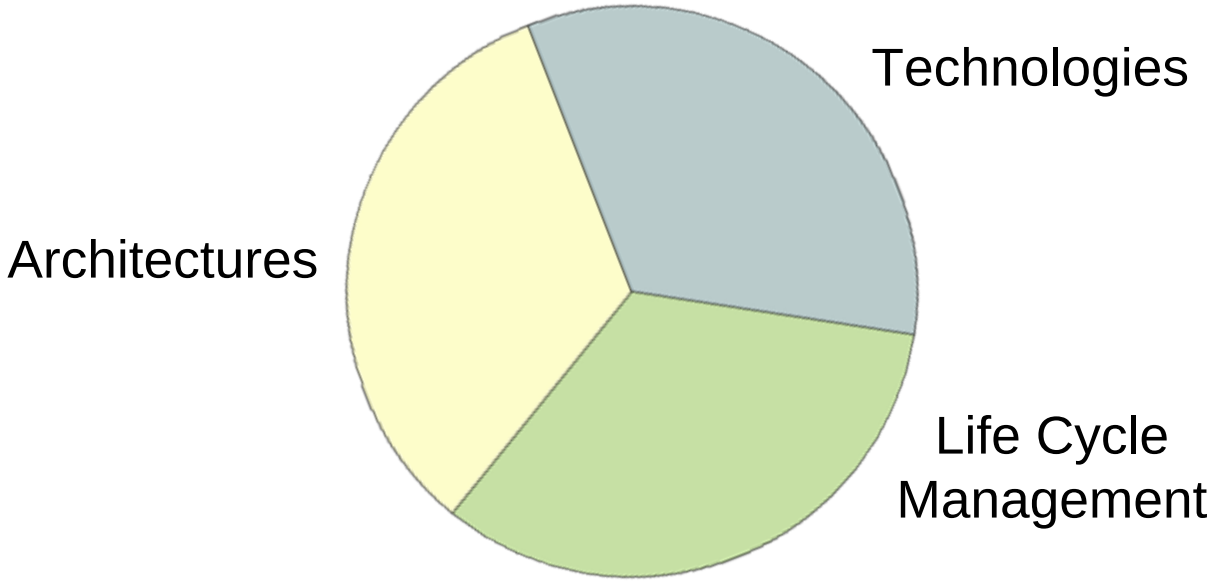
- Application requirements are identified in a range of programs, but P161D is the designated place for AMR/AMI communication system research and evaluation.

- P161D is the designated place for all research and evaluation in-premise communication systems.



P161D – Place in the Overall Portfolio

- Scope includes communication architectures, technologies, and protocols
- Covers in-premise residential and commercial networks, AMI networks, and headend software integration
- Ongoing focus areas:



P161D – 2010 Base Project Summary

- P161.006 Develop a forum to share AMI and HAN lab test results across member utilities
- P161.007 Characterize a range of common utility communication architectures, with standards and gaps identified at each interface and layer
- P161.008 Work with HAN communications chip manufacturers to ensure HAN communication reliability with well defined performance metrics

Value
P161.006 Utility Laboratory Testing Coordination

- What are we doing in 2010?
  - Provide an ongoing means by which results of testing being conducted in utility laboratories can be shared and aligned
    - Focused on AMI and HAN (communications and devices)
    - No red-tape: Easy to participate, No obligations

- Why is it valuable?
  - Participants will benefit from improved awareness of tests being conducted in utility labs and from the opportunity to share in the learnings from these tests

Utility Laboratory Testing Coordination
Project 161.006

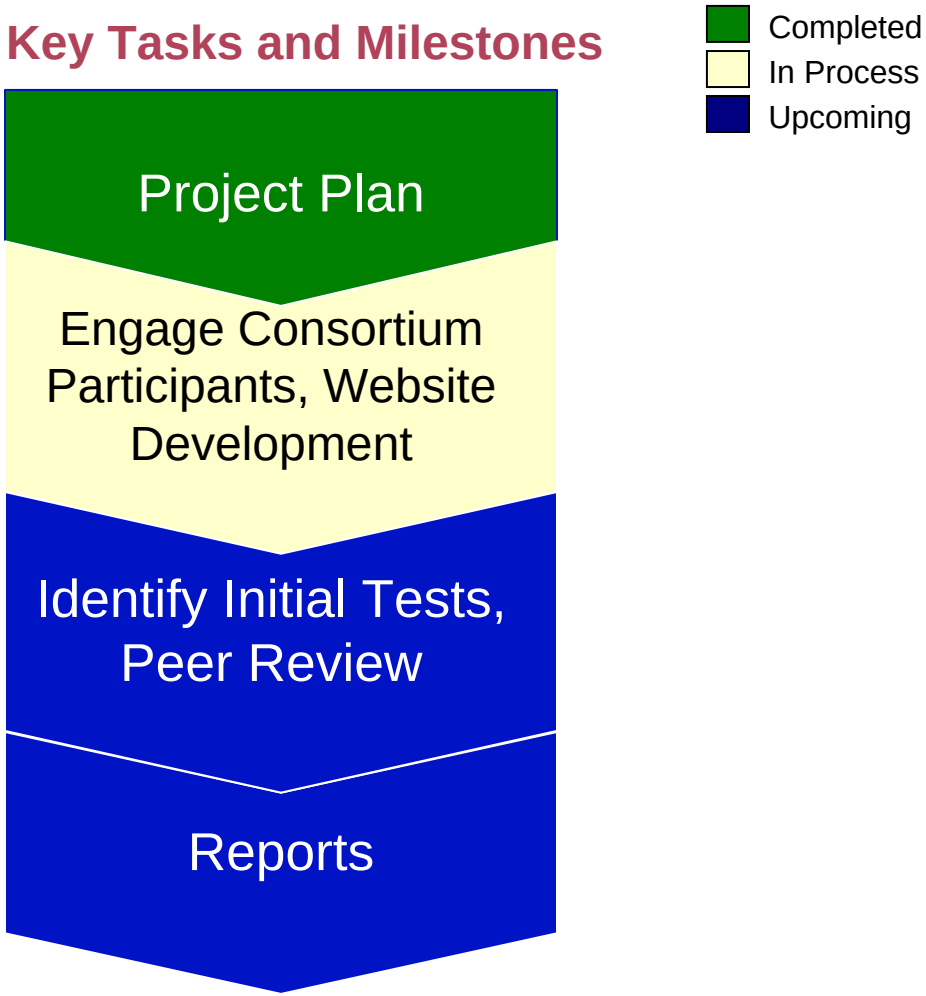
Objectives
- Maximize the industry benefit of ongoing laboratory tests of AMI and HAN technologies.

Deliverables
- Utility lab testing webcasts, test reports.

Completion Date
- Ongoing with 2010 deliverables TBD

The Big Picture
- *Utilities have developed laboratories with unique capabilities and are conducting technology evaluations that may be shared with other interested parties.*

Key Tasks and Milestones



Status
P161.006 Utility Laboratory Testing Coordination

- Temporary FTP site created – a starting place for data gathering.

  ftp://Utility:Testing@ftp.epri.com/

- Development of a SharePoint site is in-process

- Initial utilities agreeing to participate in the info sharing forum:

  AEP, Consumers Energy, PG&E

- Initial project information to be shared by AEP:
  - Dolan Labs test plan for the Texas HAN System Acceptance Test
  - Dolan Labs test plan for the South Bend Regression Tests
  - Possible additions: Texas IOP Info, Dolan registered test procedures, Thermostat accuracy test plan and analysis, scrubbed results

Value
P161.007 Customer Communications Architecture

- What are we doing in 2010?
  - Defining the Standards landscape for end to end integration of customer communications
    - Assemble structured dictionary of communications metrics for product and standards assessment
    - Analyze prominent product suites against the metrics
    - Identify gaps and overlaps with existing standards and associated implementations

- Why is it valuable?
  - Participants will benefit from improved awareness of the standards for customer communications and how they could be integrated and what the remaining issues are in developing a full customer communications system

Customer Communications Architecture

Project 161.007

Objectives

- Maximize the potential to integrate standards into a coherent and interoperable infrastructure

Deliverables

- Report on standards integration strategies and issues including graphics of interfaces

Completion Date

- 6/30/2010 Metrics
  8/30/2010 Assessment

The Big Picture

- *A standards based AMI & HAN comms. architecture will accelerate the development of vendor products and value derived from DR & EE.*

Key Tasks and Milestones

Value
P161.008 Standards and Software for HAN Evaluation

- What are we doing in 2010?
  - Driving standards and platforms for monitoring HAN performance and reliability
    - Including IEEE 802.15.4 (Zigbee), IEEE 802.11 (WiFi), HP-AV/GP and IEEE P1901 (PLC)
    - Involves close collaboration with SDOs, technology alliances, and HAN silicon and appliance vendors

- Why is it valuable?
  - Enables participants to validate HAN communications reliability in support of Retail Energy Services: PH/EV Charging, Demand Response
  - Provides critical infrastructure for utility in-home trials under Intelligrid HAN Supplemental

Standards and Software for HAN Evaluation
Project 161.008 Status

- Power Line Evaluation Tool (PET) A Home Plug AV (HPAV) test tool
  - Accomplishments
    - Evaluated files provided by Atheros for testing HPAV.
    - Generated Ethernet HomePlug type Packets.
    - Made network status request and received results from HPAV units. Node MAC addresses, and traffic statistics.
    - Made Tone_Map request and received results from HPAV unit
    - Made SNR request and received a response (in the process of analyzing the response).

Standards and Software for HAN Evaluation
Project 161.008 Status-continued

- Wireless Evaluation tool (IEEE802.15.4) ZigBee
- Accomplishments
  - Local version (no networking) has been tested by third party (Tim Godfrey). Received feedback on user interface, functionality and performance. Many of the feedback items have already been implemented and others are in the process of being implemented.
  - Established two way communication over the Internet between the local “home” and remote site “central” versions of the software.
  - Interfaced the Central WET GUI with the two way communication. In the process of testing it for reliability in a simulated remote deployment.

Standards and Software for HAN Evaluation
Project 161.008

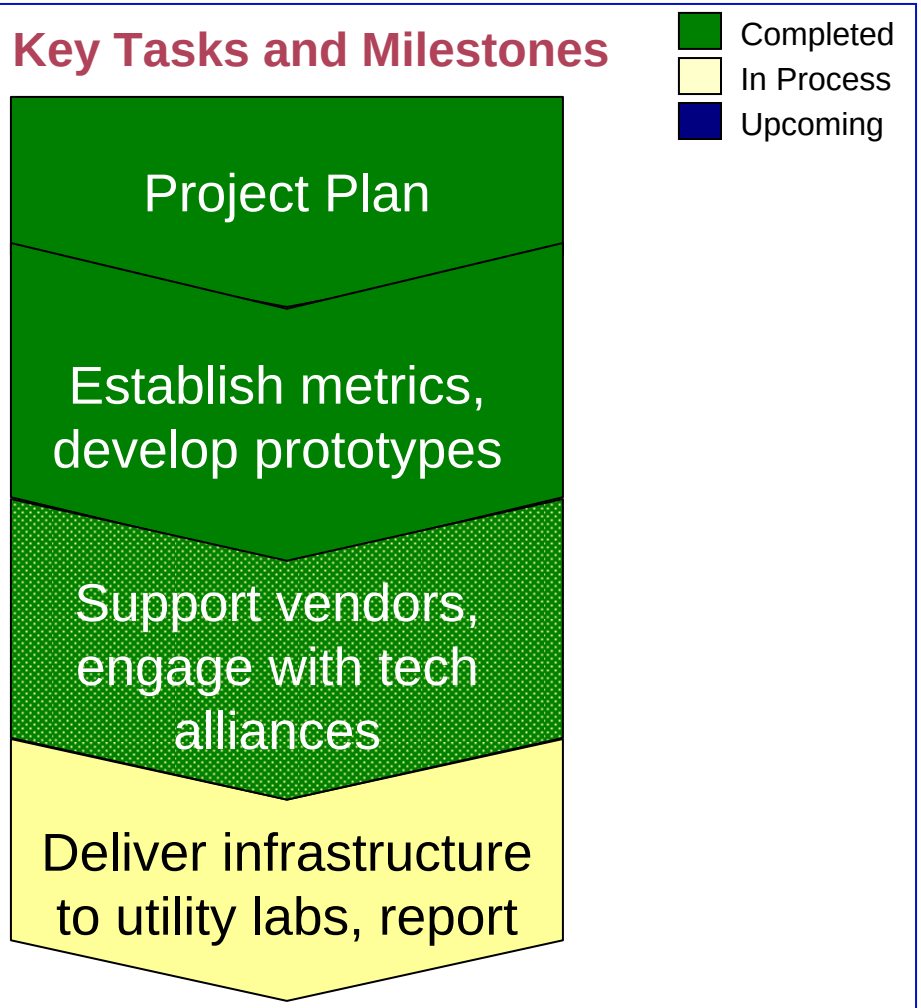
Objectives
- Establish standard metrics and methods for HAN performance and reliability monitoring.

Deliverables
- Standards, prototype software, vendor and utility support.

Completion Date
- 12/31/2010

The Big Picture
- *Utilities need to determine whether they can rely on HAN technologies for Retail Energy Services. We are delivering that capability with a set of SDO standards, network monitoring prototypes, and HAN technology/device vendor engagements and support.*

Key Tasks and Milestones



Home Area Network Supplemental Project

Problem Statement: Some technologies proposed for home area networks are new and it is unknown how well they will work in a diverse range of homes. These systems need to work reliably with no customer hassle, yet there are attenuation and interference concerns.

Project Plan: This project will leverage the standard metrics from P161.008, and will work with vendors and participating utilities to get a wide range of products installed in a wide range of scenarios and monitored continuously for connectivity.

Technologies to be evaluated are ERT, HomePlug, Wi-Fi, and ZigBee. EPRI-provided software on a local laptop computer will capture results.

Goal is 10-50 homes as test sites per utility. Target 5-6 utilities.

Home Area Network Supplemental Project Status

- Initiated Industrial remote system monitoring survey and study. This task is to help in defining the current state of Remote system monitoring technologies. It is also to help understand the available technologies that are already deployed in monitoring systems such as those similar to that of the HAN. Its Focus on Utility assets, cell phone towers and industrial related system monitoring.

- Help 161.008 Project in defining its architecture and requirements to insure its suitability to support this project.

- Current Funders (2-3 additional funders in sales funnel):
  - AEP
  - TVA
  - Consumers

P 161d Projects in 2011

- 161.006 Communications Infrastructure
  - 161.006 – 1: Evaluation of Communication Technologies (Continuation of Brian Seal's Lab Coordination Program)
  - 161.006 – 2: Architecture Issues (PEV, PV, Storage, and Internet Based Gateway Communications Architecture Specs)
  - 161.006 – 3: Lifecycle Management (Continuation of Craig and Jamal's project on HAN Performance metrics)

- 161.007 Data Integration for Home Area Networks
  - Evaluation of Smart Energy Profile 2.0 Specification and Interoperability Testing using SEP 2.0 Enabled HAN Devices

161D Outreach Efforts To Members & Industry at Large

- 4 Quarterly Webcasts (Feb 23rd , May 13th, July, November)
- 2 face to face meetings (March 2nd @ AEP & September)
- Direct E-mail Updates for Project Set Advisors, Site Visits and Conference calls to Project Set Advisors
- Utility & Vendor Collaboration
- Contact Info:
  - Erfan Ibrahim – eibrahim@epri.com
  - Joe Hughes – jhughes@epri.com
  - Craig Rodine – crodine@epri.com
  - Brian Seal – bseal@epri.com

Together…Shaping the Future of Electricity