



## TIP 361: Open and Extensible Control and Analytics Platform for Phasor Data (openECA)

### Context

In the United States, there has been rapid growth of synchrophasor data systems and infrastructure over the last three years with most of this expansion being designed and implemented based on traditional information technology (IT) best practices.

For any synchrophasor data system on the scale of a mid-sized transmission operator or larger, it is becoming apparent that along with the valuable phasor data analytic systems that have been developed, next-generation synchrophasor data systems are needed. Such systems ought to provide easy-to-implement, end-to-end configuration and change management; identification and management of bad data; easy points of integration with analytics both for new cutting-edge and legacy systems; and storage designed for the volume and speed of phasor data, among other features.

Many of these information issues have been known to the Grid Protection Alliance (GPA) project team for some time, and work has been underway on many of them. Therefore, creation of the next-generation phasor data system is not a grand redesign, but rather the integration of existing commercial and new pre-commercial components with help from utility experts to ground the Open and Extensible Control and Analytics Platform for Phasor Data (openECA) project in a generalized set of critical business, technical, and regulatory requirements.

### Description

The openECA project advances the production deployment of robust and high-availability applications by:

1. creating the information architecture that can effectively handle the most demanding of synchrophasor data system requirements;
2. implementing eight, high-value analytics (plus a linear state estimator) that span the application domains of real-time decision support, automated control, and periodic (off-line) assessments; and
3. establishing a community of support for the extensible, open source openECA platform to assure that the results of this project can be easily adopted by vendors, utilities and researchers who are not participating directly on the project.

### Benefits

The openECA project seeks to accelerate significantly the production use and ongoing development of real-time decision support tools, automated control systems, and off-line planning systems. These tools and systems will incorporate synchrophasor data and enhance system reliability while enabling more effective execution of North American Reliability Corporation (NERC) operating functions for reliability coordinators, transmission operators, and/or balancing authorities.

### Achievements

The openECA Project Team, lead by GPA, developed an open source highly scalable framework that provides a secure platform to distribute data and produce analytic results for collections of information received from critical grid infrastructure.

The Team designed a platform to support analytics that includes a generalized publish/subscribe interface that can form a standard for integration of analytics with phasor data sources. This project developed a prototype of the architecture to assess its performance in support of grid operations using multiple-included analytics which include oscillation detection, wide-area volt-ampere-reactive (VAR) control, and phasor measurement unit (PMU) transducer calibration, among others.

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**Project Start Date:** November 17, 2015

**Project End Date:** September 30, 2017

*(NOTE: While BPA's investment in this project ended on this date, GPA secured a no-cost time extension until February 28, 2018, with the U.S. Department of Energy to finalize deliverables)*

## Funding

Total Project Cost: \$4,958,000

BPA Cost: \$224,874

## For More Information Contact:

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## Deliverables

- Software platform and applications (version 1.0) installed at the BPA Synchrophasor Laboratory
- Documentation provided to the BPA Synchrophasor Laboratory

## Links

[www.gridprotectionalliance.org](http://www.gridprotectionalliance.org)

## Related Projects

## Participating Organizations

Grid Protection Alliance  
U.S. Department of Energy  
Virginia Polytechnic Institute and State University  
T&D Consulting  
Dominion Virginia Power  
Oklahoma Gas & Electric  
NorthWest Energy  
Southwest Power Pool

## Conclusions

The openECA Project Team transferred the resulting technology through the posting of open source code and promoted the technology through North American Synchrophasor Initiative (NASPI) meetings, the GPA User's Forum, papers, presentations, and the Grid Open Source Software Alliance (GOSSA).

