



Prize Competitions

Automated Maintenance Protection Systems Challenge

Make power systems more reliable by automating maintenance testing of protective relays and associated potential and current transformers.

Overview

The Bureau of Reclamation (Reclamation) is looking for solutions to automate comprehensive testing of existing protection systems at hydropower facilities (AMPS Challenge). This \$270,000 Challenge seeks prototypes that automate maintenance protection systems testing without requiring plants to be off-line and that are not labor intensive.

While there can be a variety of approaches to solve this challenge including a single tool, a group of tools, a continuous monitoring system, or a surveillance system, all solutions must result in a decrease in the employee time required for testing, an elimination of plant downtime for testing, and an increase in plant safety and reliability.

Solving this challenge will increase hydropower plant generation reliability and avoid the opportunity cost of unit outages. The solutions are being requested by Reclamation for their hydropower facilities however, solutions will likely be applicable to many other protective relay systems.

Reclamation is partnering with the Western Area Power Administration, Bonneville Power Administration, U.S. Army Corps of Engineers, Department of Energy's Water Power Technologies Office and Oak Ridge National Laboratory, NASA Tournament Lab, Freelancer.com and Arrow Electronics.

Current Status

Reclamation selected seven teams to share \$80,000 in prize awards as Phase I winners in the Automated Maintenance of Protection Systems Challenge. In Phase I, solvers submitted a paper that demonstrated their knowledge of the problem, their approach to solve the problem, and described how they would implement a prototype. Over five months, seven teams developed their prototypes.

For Phase II, Reclamation selected the top five prototypes. They will be shipped to Reclamation for testing and evaluation in Reclamation's Hydropower Laboratory and at Western Area Power Administration's Electric Power Training Center in Colorado.

Website: Automated Maintenance of Protection Systems Challenge

Total Prize Purse: \$270,000



Minidoka PowerPlant (Idaho)

Phase II Finalists

MultiSequence Inc. (United States)

MultiSequence Inc. solution includes a modular real-time automation controller along with the custom developed Smart Server and Smart Terminal units in a fully integrated and flexible platform.

We have a great experience with clear project requirements and a dedicated team.
- MultiSequence Inc.

Andrés Quintanilla (Sweden)

CAMPS focuses on automating the maintenance tasks described by the AMPS challenge while using top-end technologies on hardware and software that is industrially tested and approved, while providing flexibility and full control on upgrades, scalability, and troubleshooting.

Exciting challenge that puts my ideas and solutions to the tests against world class competitors.
- Andrés Quintanilla

Brett Wilson and Professor Jian Guo Zhu (Australia)

Electricity is life, and we answer the question “what if we could do electrical maintenance on critical electrical infrastructure differently to make it safer, more reliable, and more efficient using the latest available technology?” We believe we have achieved this using bleeding edge artificial intelligence and deep learning, combined with thinking out of the box to develop a revolutionary prototype device for automating mandatory routine electrical maintenance of protection and metering equipment.

The AMPS Phase 2 Competition has been an exciting, adrenaline-fuelled experience, where we get to competitively tackle issues that have a major impact on society, by providing imaginative, innovative engineering solutions.
- Brett Wilson and Professor Jian Guo Zhu

Matthew Wolter, Matthew Paul, and Jonathan Bliss (United States)

Our team has developed a modular 2-part system consisting of 1) multiple edge-processing Power System Probes (PSP) each supporting connection to 12 protective relays or meters simultaneously to assess settings/meter data and 2) a Command-and-Control server to aggregate, analyze, and visualize data collected by the PSPs.

We are thrilled at the opportunity to provide the Bureau of Reclamation a custom solution to tackle ever evolving critical infrastructure protection needs in the interests of U.S. public safety and economic security.
- Matthew Wolter, Matthew Paul and Jonathan Bliss

Rahavi Brothers (Canada)

We have provided a solution to this challenge which is reliable, scalable, and consistent. Whole hardware is selected intelligently from on-the-shelf products and it is easy to supply. Software part is developed based on the very flexible platform which covers all scalability and user friendly requirements.

AMPS Challenge provided the chance of applying our intensive Industrial Automation and SCADA experience in the hydro-power plant protection and monitoring. NERC compliance standards, power-plants protective relays and etc are other interesting topics that we have learnt from this challenge.
- Rahavi Brothers