

APODS Enhanced Optical Sensors

An operational requirement for new ship and carrier construction is automatic monitoring and control of the electrical systems, such as generators, power converters, load centers and circuit breakers. Present current and voltage sensors are large and heavy which will result in significant increases in weight and space if legacy sensors are used.

Optical current and voltage sensors that weigh only ounces, occupy cubic inches of space and can perform the task of sensors that weigh hundreds of pounds and are several cubic feet in size have been developed for the commercial industry under US Dept. of Energy SBIR funding. High density use of these sensors in Navy Carriers and Ships will allow optimum power system control and monitoring. Widespread use of these sensors will enable automatic damage assessment of critical ship loads by being able to remotely determine the location of opens or shorts in electrical supply cables as well as abnormal supply levels. These sensors have been developed for this application by Airak, Inc.



The goal of this project is to take the current sensor and the voltage sensor from the laboratory environment (known as Technical Readiness Level (TRL) 4) to actual demonstration of a prototype on a shipboard environment (TRL 7). ACI, working with Airak, will accomplish this through a series of development tasks.

Task one is to define system specifications and ruggedization guidelines and parameters for a prototype fiber optic current sensor system.

Task two will be to miniaturize the sensor electronics, manufacture the sensor systems and perform a test bed qualification of the system.

Task three will be to install the sensors on an actual shipboard platform to demonstrate the ability to monitor selected parts of the electrical system.

The project is being managed through an Integrated Product Team, consisting of representatives from the Program Executive Office (PEO) for Carriers, PEO-Ships, COMNAVSEASYS COM, the Office of Naval Research, Naval Surface Warfare Center-Carderock (Philadelphia branch), Airak and ACI. The IPT will be chaired by PEO-Carriers and will oversee the efforts necessary to develop, test and evaluate the sensors to determine their suitability for applications in combat ships, especially CVN-21.