RFA-18-15451, Radiation Testing for Nuclear Inspection Systems

The nuclear energy industry needs higher-image quality and higher rad-hard vision systems for refueling and inspection operations that are required every 12-18 months for all operating commercial reactors. Difficulties are encountered during refueling operations that include reading the serial numbers of fuel assemblies (due to contaminants and thermal currents in the pool) and the necessity of ‘working blind’ when attaching the grappling assembly to the top of the fuel assembly. Current cameras cannot get closer than two meters to the core without burning out in approximately 20 minutes, requiring an expensive and time-consuming replacement.

The proprietary Enduray Vision System from Vega Wave Systems, Inc. is designed to withstand more than 400 times the radiation level of the Vidicon-based systems, the highest radiation tolerant system in use today. The Enduray Vision System is a high-radiation-tolerant video camera, with control electronics, a PC controller, and advanced image acquisition and processing software.

This project will test the Enduray Vision System at the Argonne National Laboratory Low-Energy Accelerator Facility where the radiation source is non-neutron activating and will enable easy access to quickly inspect and evaluate the Enduray Vision System for debugging or in case of system malfunction. This interim testing will prove and improve the product before testing in a relevant nuclear reactor environment.