CIRRIS System Fact Sheet

BACKGROUND

This project assists the Department of Defense by providing a prototype Common Operating Picture (COP) of the physical and cyber layers across the entire spectrum of strategic, expeditionary, joint, and combined environments for priority critical infrastructure sectors. The benefit of this COP is a potential 25% reduction in the total fuel consumption at Forward Operating Bases as operations transition from the local grid to isolated secure enclaves and back.

The purpose of the prototype is to demonstrate the feasibility of an Energy Management System maintaining cyber security while integrating external and internal sensors to reduce fuel consumption by up to 25%.

Purpose/Objective

The Street Legal –Almeria Analytics Team will use VERDE licensed technology (license held by Almeria Analytics) to engineer a prototype cyber secure complete spectrum COP including the strategy, requirements, architecture, and design specifications for Enterprise wide deployment. The benefit of using this VERDE based Common Operating Picture within a FOB distributed Energy Management System is to reduce fuel consumption by 25% while responding to mission demands as required.

The Prototype

There is a continuing need for tools to integrate new control systems into the evolving FOB microgrids, including those integrating renewable sources and new schemes for reducing fuel requirements. Thus, these models ultimately need to be verified and trued up using data from instrumentation. The models must be robust to assumptions in regards to the conductor types and sizes as well as generator characteristics. We need new tools to consider the transition of FOB systems from local grid operation to microgrid operation and back. Lastly, the scheme for controlling frequency of the microgrid when not connected to the local grid system is not well developed. The system must be able to integrate the many tools that are under development and validate with appropriate demonstrations that would yield immediate benefits.

The EMS system must integrate collected data into other constellations of analytics and diagnostics to be feasible.

The COP vision is to monitor in real time the Supervisory Control and Data Acquisition (SCADA) systems, SLI will update its design of a transformation version of VERDE (DoD VERDE), so that the DoD can use the ingest engine to gather the system status and external threat data and parse it into different analytics and display threats to the physical infrastructure in real time. This prototype will include behavioral models as well as physical models to extend the COP into cyber battle space. The SLI technical objective is to give DOD/U.S. Army leadership a view of the cyber battle space within the physical layer to support decision-making and efficient energy management.

In 2014, SLI provided US Army NETCOM foundational documentation for VERDE and COP. A legacy version of VERDE was installed at the Army Cyber Operation Integration Center (ACOIC) and placed into beneficial use. In addition new features and modifications were suggested making this system deployable Enterprise wide. Output layers from VERDE analysis and modeling components were integrated through the DAGGER tool to trigger the other tools within the Army Cyber Analytics Laboratory to the other Constellation tools.

In the new prototype, SLI will re-design and test this system and provide for Enterprise –wide accreditation and deployment. SLI will also deploy SLI's existing COP capability on the DOD's operational network for a pilot demonstration. As necessary, SLI will provide additional analytics or visualizations that will further strengthen DOD/U.S. Army's ability to see, block, and maneuver cyber threats based on operation center specific requirements without sacrificing management of dispatched power.

A key piece of the FOB microgrid control system is providing a graphical display overview which will show the microgrid performance including overall system efficiency, individual generator loading levels and efficiencies, power flows, reserve generation (spinning and supplemental), and load use and distribution (critical and non-critical). Using the VERDE system, the resulting disruptions from cyber disruptions can be observed on a geographical display with web access from remote locations. The operator can see the results visually and numerically overlaid on a microgrid layout. Different operational modes of the generator and load states (on/off, maybe off for maintenance for example) can be observed at multiple remote locations to show the impact on the microgrid reliability and efficiency parameters and the control and communication effectiveness.

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