Sandia National Laboratories

Energy, Climate & Infrastructure Security

Modernize the Grid

Lemnos Interoperable Security Program

Partnership between Sandia National Laboratories and industry through the Lemnos project clearly demonstrates how collaborations between industry and government can transform R&D into commercialized security products with significant impact.

Teaming with partners and participating vendors has provided a broad range of capabilities for the continued evaluation of Sandia's reference model.

Lemnos Interoperable Security

The Lemnos Interoperable Security Project is a multiyear U.S. Department of Energy National SCADA Test Bed effort highlighting a security interoperability framework for communications supporting the energy sector. Originally developed from the OPSAID project for the DOE/NSTB Program, Lemnos enables utilities and vendors to clearly communicate user needs, product features, and configuration parameters of control systems cyber security products.

Partners

Participating Vendors

By developing and publishing interoperable configuration profiles for security products, Lemnos has made it possible for vendors to develop interoperable solutions and create more reliable, clearly defined, and interoperable security devices by following an agreed-upon set of vocabulary and metrics.

Collaboration between Sandia and Industry

Lemnos operated under extensive industry and government collaboration to bring R&D from Sandia into a commercially available, tested solution. Led by EnerNex Corporation, partnered with Sandia National Laboratories (SNL), Schweitzer Engineering Laboratories (SEL), and Tennessee Valley Authority (TVA) and involving additional participation from Industrial Defender, GarrettCom, Phoenix Contact, N-Dimension Solutions, Siemens, and RuggedCom, the Lemnos project clearly demonstrates how collaborations between industry and government guides R&D towards addressing industry needs with significant impact.

Sandia provided Lemnos with the primary technical research, prototype architecture, and design input to the project to allow for a quick technology transfer into industry.

Under the OPSAID project, Sandia created an interoperable security architecture for common process control system add-on security devices, and developed a reference implementation using open-source software and standardized hardware. Under Lemnos, Sandia and SEL worked together to develop a commercial prototype (SEL) and a reference implementation (SNL) using open-source software, and then connected their devices—via the Internet and within the TVA lab—to demonstrate interoperability.

In December 2009, SEL released the SEL-3620 Ethernet Security Gateway, demonstrating that the Lemnos approach results in a scalable, robust, and interoperable security solution.

Commercialization Path

Security devices configured according to the Lemnos interoperability configuration profiles interoperate with one another seamlessly. Participants involved are able to contribute to the Lemnos interoperability configuration profiles, validate successful interoperability amongst the other participants, and potentially enhance the security features of their existing products. In addition to focusing on interoperable security solutions, the Lemnos project is now focusing on transferring the existing security features of the current rack mount solution into a smaller form factor device, the size of a USB dongle, that can be moved closer to or integrated within the end devices that are being protected.

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