

News from the Savannah River Site

NATIONAL NUCLEAR SECURITY ADMINISTRATION • AIKEN • SC 29808

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FOR IMMEDIATE RELEASE

Secure Wireless Technology Found to be Highly Reliable

AIKEN, S.C. (March 23, 2015) – Step by deliberate step, the Savannah River Site (SRS) is moving toward bringing the advantages of wireless network technology into secure environments.

Following a year of data collection in the National Nuclear Security Administration's (NNSA's) SRS Tritium Facilities, a wireless Tritium Air Monitoring cart has been assessed as appropriate for Safety Significant service. The cart is designed to continuously monitor the process rooms for the presence of tritium and, upon its detection, trigger visual and audible alarms.

During the year-long demonstration, system performance was evaluated by monitoring the network in real time, verifying that data was delivered consistently. Based on the data, the Savannah River Nuclear Solutions' (SRNS) Instrumentation, Controls, and Ergonomics (ICE) Technical Committee determined that the wireless air monitoring system demonstrated the high level of reliability required for a system that plays a major function in protecting worker safety. The SRNS ICE Committee is the responsible SRS authority for establishing standards of engineering design in instrumentation and controls, and consists of subject matter experts in the relevant fields.

Diagnostic tools that verify data delivery are integrated into the system, not just for use during demonstration and testing. These tools, along with the system's highly reliable wireless mesh architecture, which provides redundant data paths to ensure data delivery, and fail-safe design are crucial attributes for this application.



: Joe Cordaro of the Savannah River National Laboratory with the secure wireless Tritium Air Monitor cart.

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The test and resulting endorsement are important steps in demonstrating the ability to reap the benefits of wireless technology in a secure environment. The concept has potential for applications across the NNSA, other federal agencies and critical manufacturing facilities.

The Savannah River National Laboratory (SRNL) designed and fabricated the prototype wireless Tritium Air Monitoring (TAM) cart, funded by the Savannah River Tritium Enterprise's (SRTE) Plant-Directed Research and Development program, which funds innovative research, development, and demonstration projects relevant to SRTE's support for NNSA.

"Secure wireless technology offers a lot of advantages to help achieve our goals of improving reliability, reducing complexity and providing deployment flexibility for our TAM systems," said Lee Schifer, Director of Tritium Operations for Savannah River Nuclear Solutions, the company that manages and operates both SRTE and SRNL.

Wireless networks have become commonplace in homes, restaurants and retail environments, but up to now, they have not been suitable for secure environments. NNSA and its sites around the country could benefit greatly from the ability to use this type of wireless technology for radiation monitoring in nuclear facilities, where monitoring is essential for operating the equipment safely and protecting personnel. With the cost of running cable into a radioactive process room as high as \$2000 per foot, a wireless system could save millions in construction or upgrade of new nuclear facilities. Wireless air monitoring is also expected to be more reliable than its wired equivalent because it reduces the number of components in the air monitoring system.

Another key advantage is the freedom of movement that comes when equipment is not restricted by wires and cables. The sensors can be placed directly in the area of concern, instead of pumping air to the sensors' location.

The prototype TAM cart houses robust tritium monitoring equipment, a secure wireless transmitter, alarms, and a backup power source. SRNL contracted with General Dynamics to develop components for the ultra-secure short range wireless network.

The wireless TAM is an outgrowth of SRNL's collaboration with the National Security Agency (NSA) on a design for classified data transmission. NSA approved the prototype hardware for use in certain classified communication operations, such as the air monitoring system. It has been approved by NSA for use in NNSA's Nuclear Security Enterprise nuclear facilities. While the TAM's radiation sensor is specific to nuclear facilities, the short range wireless sensor network could be adaptable to other applications that require high reliability with ultra-secure protection of the wireless data network, including industrial control systems at critical manufacturing facilities.

"The collaboration with the NSA from the beginning of the project was key, ensuring secu-

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urity was built into every aspect of the design. The approval to use the design for classified data transmission, in place of Type 1 hardware, was a first for not only DOE/NNSA, but for any US Government Agency” said Joe Cordaro, Advisory Engineer with SRNL.

Savannah River Nuclear Solutions is a Fluor-led company whose members are Fluor Federal Services, Newport News Nuclear and Honeywell, responsible for the management and operations of the Department of Energy's Savannah River Site, including the Savannah River National Laboratory, located near Aiken, South Carolina.

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SRNS- 2015 - 318