SRNL, automakers to develop high-performance wireless sensors networks

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Several industries use wireless sensors, which can monitor chemical processes or equipment activity and then transmit the data over a wireless network. Still, many facilities that could benefit from the use of wireless sensors must continue to use a wired network instead, because the reliability, speed and security of the current generation of wireless sensors do not meet their needs.

The U.S. Department of Energy's Savannah River National Laboratory and U.S. automakers now have teamed up to develop a new high-performance platform for these sensors that not only serves the industry's needs, but also meets the DOE National Nuclear Security Administration's requirements for security and reliability for use in its facilities.

SRNL has entered into a cooperative research and development agreement with the United States Council for Automotive Research LLC (USCAR), the collaborative automotive technology organization for Chrysler Group LLC, Ford Motor Company and General Motors Corporation. The purpose of the collaboration is to develop a new platform for short range wireless sensors networks that meets the NNSA requirements, and can also be adopted as the industry standard.

Under the agreement, SRNL will develop designs and specifications for the new wireless hardware, then engage a qualified wireless manufacturer to make a prototype, which the partners will test and validate. The ultimate goal of the agreement is to produce a standard for

wireless sensor platforms that can be adopted by the International Society of Automation, a global instrumentation, systems and automation standards body.

"As partners with SRNL in this endeavor, we look forward to creating an industry standard for wireless sensor platforms that meets the needs of both industry and government and enables significant cost savings for both," said Don Walkowicz, USCAR executive director. "Traditionally, collaborations between the U.S. automakers and U.S. government laboratories have resulted in innovation and great success."

Both the automotive industry and the NNSA have needs for wireless sensors that are reliable, secure, high speed and able to resist interference from existing systems. This agreement between a DOE laboratory and USCAR to produce a single, agreed-upon platform will broaden the customer base for resulting sensor designs, making it more attractive for developers to design hardware that meets the NNSA requirements.

In the automotive industry, for example, replacing hard-wired body shop robots with wireless-controlled robots would be a prime application area for a new secure, wireless sensor network.

NNSA and its contractors use sensors in their facilities to monitor chemical processes, vibration on large pumps and blowers, and environmental conditions such as shock, vibration, and linear acceleration. The ability to use wireless, rather than wired, sensors, when constructing new facilities or installing new sensors in existing facilities will bring considerable cost savings. NNSA sensors typically exist in gloveboxes or "hot cells," which protect workers from exposure to radioactive or chemical hazards. The cost of running cables in "hot" facilities is more than $2,000 per foot. The electrical/instrument portion of such a facility may have a budget of as much as $400 million; a

conservative estimate of the cost savings to use wireless sensors networks has been estimated at $50 million. Existing facilities that are already contaminated would be able to add instrumentation at less than 10% the cost of a wired solution.

"We are pleased to be working with the three U.S. automakers through USCAR to create an industry standard for wireless sensor platforms," said Joe Cordaro, SRNL advisory engineer and former chair of the NNSA Network of Senior Scientists and Engineers, who is serving as SRNL lead for the initiative. "Our common needs will drive a design and framework that are applicable in government and non-government facilities, ultimately providing economies of scale, and ensuring robust and reliable requirements for wireless sensor platforms globally."

Source: Savannah River National Laboratory