Smart, Low-Cost Electronics Flushes Legionella Bacteria from Shower Facilities

Challenge and Solutions

Legionella bacteria are a well-known source of health hazards in water supply systems. Contaminated aerosols inhaled during showering cause infections in the lungs. In the Netherlands alone, around 800 people are hospitalized for Legionella infections every year, while the official related death rate is approximately 80. Regulations require building owners to take measures that minimize the risk of Legionella growth. Regularly refreshing water in the piping is an effective method for this, but may not happen in shower facilities that are not used every day. Automated systems exist to ensure proper water quality, but they are expensive and do not scale well, especially in retrofit situations. The SmartFlush project developed an application specifically for shower facilities in gyms and larger sports venues that overcome these challenges. The system is setup around the Smart Valve units. These are simple electronic valves unit that control the water flow for a single showerhead, combined with an autonomous timer-based flushing cycle for extended idle periods. The units feature wireless connectivity and automatically form a mesh network that communicates the condition of each showerhead. A single gateway module collects this information, typically for tens of units, and sends it to a web portal where building janitors and service personnel can monitor the state of the system. SmartFlush also sends alerts when malfunctions are detected and service is required. The portal platform bundles information across various locations, depending on customer- and user-access levels. The Internet of Things makes it possible to provide highly integrated functionality using just one extended layer of many single-channel devices.

EuroCPS support

Intel Research and Development supported Van Mierlo in setting up a proper platform for the gateway. Initially Van Mierlo used Intel Edison modules and later switched to an off-the-shelf Intel based NUC. The development of the gateway software was essential to Van Mierlo's innovation in this project.

Digital skills

Van Mierlo: expertise in embedded systems/product development, measurement and control and light weight wireless mesh networks.
Aqua Assistance: Legionella prevention services and systems.

Impact/What's Next

The SmartFlush system is affordable and easy to install for a multitude of practical configurations, leading to more reliable Legionella protection at lower cost of ownership than existing solutions. Van Mierlo has a distributed proof-of-concept system running at separate test locations. The results of this evaluation will be integrated in the development of the commercial product, whose launch is planned for late 2018. The company expects to implement the system in approximately 50 locations with, typically, 25 shower units each. This installation will double each year until at least 10,000 units have been installed. At that point, Van Mierlo will transfer the business and technology to a spinoff company with a staff

of approximately 10 to handle sales, support and further development. SmartValve will substantially reducing Legionella-related health problems at minimal cost for taxpayers.

Company
Van Mierlo Ingenieursbureau
Founded: 1987
Employees: 10
Van Mierlo Ingenieursbureau is an independent design company specializing in development of intelligent electronics for measurement and control applications.
www.vanmierlo.com

Example of one of the test setups simulating three showerheads