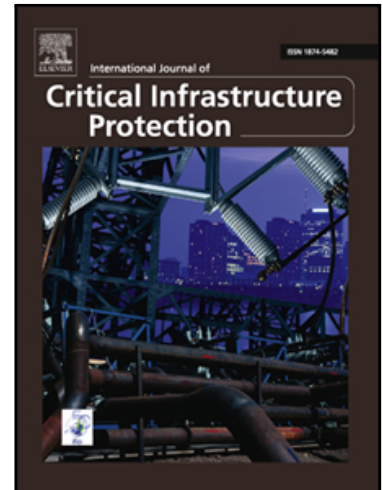


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A dual-radio approach for reliable emergency signaling in critical infrastructure assets with large wireless networks

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Abstract

Wireless communications techniques are finding their way into industrial applications, but commercial wireless technologies lack the dependability required for critical applications in very large networks. In many wireless-controlled industrial facilities, safety regulations mandate real-time communications for tasks such as emergency shutdowns. This requires a wireless communications architecture that supports the coexistence of non-real-time and real-time tasks. To address this requirement, this paper proposes an architecture that augments a wireless mesh network with a unidirectional long-range communications system. Various configuration parameters of the system, including its security features, are optimized. Additionally, a physical realization of the architecture is evaluated using a series of experiments, including some performed on a real solar tower power plant. The experimental results demonstrate that the extension of a wireless mesh network with a unidirectional long-range communications system provides safety and scalability for industrial applications while promoting cost effectiveness and energy efficiency.

Keywords

Critical Infrastructure Assets; Industrial Automation; Emergency Signaling; Large Wireless Communications Networks

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