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Multihop multi-channel scheduling for wireless control in WirelessHART networks

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The WirelessHART standard uses TDMA and channel hopping to control access to the network and to coordinate communication between network devices, in order to enhance reliability and to improve the throughput of the network. A problem in utilizing multiple channels is that current devices are usually equipped with a single transceiver. Thus, a node can only transmit or receive on one channel at a time. Moreover, contrary to today's wired control systems, if a single access point is used the communication becomes the bottle neck of the control system. Therefore this paper presents how one may schedule the WirelessHART communication using two access points. Furthermore the paper describes a scheduling algorithm managing a multihop multi-channel networked control system based on the WirelessHART standard. A simulation example of a multihop multi-channel network is also shown, using the fixed packet lost utility of the Matlab/Simulink-based tool TrueTime.

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