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Title: PARSECS_RT: A real-time PARSECS-based communication protocol stack for critical sensing applications

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Abstract: The real-time characteristics of modular systems have been a long sought-after goal in many industries including automotive, aeronautics or mobile robotics. Yet scientists and practitioners are still struggling to find widespread implementation solutions that may accommodate diverse inter-modular real-time communication requirements. In an attempt to cover this research gap, the current paper proposes a real-time version of the PARSECS protocol for low-end devices. Our new protocol, coined as PARSECS_RT, was designed according to Open Systems Interconnection Reference Model. It offers a full communication stack from the physical layer to the application layer on top of the SPI interface in order to provide a stable, hard real-time communication platform. PARSECS_RT was evaluated in real and simulated environments providing promising results.

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