

A Complete Design Flow of a General Purpose Wireless GPS/Inertial Platform for Motion Data Monitoring

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Abstract

This work illustrates a complete design flow of an electronic system developed to support applications in which there are the need to measure motion parameters and transmit them to a remote unit for real-time teleprocessing. In order to be useful in many operative contexts, the system is flexible, compact, and lightweight. It integrates a tri-axial inertial sensor, a GPS module, a wireless transceiver and can drive a pocket camera. Data acquisition and packetization are handled in order to increase data throughput on Radio Bridge and to minimize power consumption. A trajectory reconstruction algorithm, implementing the Kalman-filter technique, allows obtaining real-time body tracking using only inertial sensors. Thanks to a graphical user interface it is possible to remotely control the system operations and to display the motion data.

Keywords: GPS, Kalman filter, MEMS inertial sensors, wireless communication

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