



Can open source electronics platforms be beneficial for early warning systems?

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Wireless Sensor Networks (WSN) have received great attention from the research community in the last few years, mainly due to the theoretical and practical efforts to face challenges that led to mature solutions and adoption of standards, such as Bluetooth [1] and ZigBee [2]. A large number of different applications today include measurement solutions for pressure, temperature, humidity, inertial and strain-gauge sensors as well as transducers for velocity, acceleration, vibration, flow position and inclination [3] by using Micro-ElectroMechanical Systems sensors (MEMS) that can be integrated (with all the necessary circuitry) to wireless sensor nodes. The main challenge is to make WSNs with low power requirements, high speed communication, small form factor and more important, make them at low cost. The fulfilment to these requirements led to a number of commercial solutions [4] that can be used as general platforms for adding a number of sensors for monitoring and processing. Although commercial solutions present some obvious advantages, they suffer from two drawbacks: they cannot be characterized as low cost and they don't provide long range communications (without cost increase).

The purpose of this study is to demonstrate the use of open source electronic prototyping platforms that significantly decrease the cost, while at the same time they fulfil the above requirements. Our solution is oriented for early warning systems that based on real time geophysical measurements which can be implemented using MEMS. Apart from the description of the platform and implementation procedures, details from two case studies will be provided: a real time accelerometer node capable to provide long range communication and a review of acceleration MEMS for field measurements.

References

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