**Wireless Data Logger Networks**

*Ph.D Forum - IPSN’12*

_by Javier González_

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**CONTEXT**

**INTERACT**

INTERACT is an EU-founded, FP7 infrastructure project. Its main goal is to build capacity for research and monitoring along a network of 33 terrestrial field bases in northern Europe, Russia, US, Canada, Greenland, Iceland, the Faroe Islands and Scotland.

www.eu-interact.org/

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**PROBLEMS**

Stand-Alone data loggers ➔ Networked System

Integrating stand-alone digital devices not affected by the MEMS revolution, and equipped with a high-speed serial interface (115200bps) into a networked system has proven to be a challenge for commercially available EPIC and TelosB based systems. We refer to this problem as Wireless Serial Data Transmission (WSDT).

- Monolithic, Bulky, Expensive and Energy Inefficient sensors

Scientists are more interested in precision than in spatial coverage. Reliability and Robustness are top requirements.

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**Hardware Design & Programming Frameworks**

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**DATA MANAGEMENT & TIME SERIES**

**How do we integrate a sensor net with a DBMS?**

- Flexible Data Loading
- How to deal with data sets coming from diverse sources and structure?
- Enforce Usage Control
  - Define some kind of usage control policies for data generated in the arctic ecologists community is an open issue. Designing an infrastructure for enforcing these policies is also an open issue.

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**ONGOING WORK**

**Data Forwarding at High-Baudrates**

Sustaining high speed serial data forwarding is a problem for EPIC and TelosB motes running TinyOS. For a mote to support a 115200 baud data rate, the UART must be available every 0.07ms. Since (i) the UART is interrupt-driven and (ii) there are components in TinyOS that either are non-interruptable or disable interrupts, this causes the UART to miss interrupts and thereby data.

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**Efficient Data Loading, Access Control & Usage Control**

We focus on how to handle vast amounts of diverse, small data sets. Also, we aim to provide a tool to organize the management, publication and archival of these data sets. This problem was originally pointed out by Jim Gray. Access and usage control are necessary to enforce existing data policies.

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**Biography**

My name is Javier González. I am 24 and I started my 3-year Ph.D in November 2011 at the IT University of Copenhagen. My Ph.D is partly funded by the FP7 infrastructure project INTERACT, under the supervision of associate professor Philippe Bonnet. After obtaining both my Bachelor and Master’s at the University of Valladolid I moved to Denmark, where I carried out my Master’s Thesis and stayed as a Ph.D.

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**Image taken from TinyOS Programming**

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