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Title

Getting Hobos to Talk to You: a wireless extension to hobo dataloggers

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Getting Hobos to Talk to You: A Wireless Extension to Hobo Data Loggers

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Introduction: A robust sensing backbone to support cutting edge research systems

Advantages of Onset Data Loggers

- Familiar to biologists
- Improved data quality from a decade of hardware development
- Reliable system including onboard memory storage and backup
- Solid foundation of usability
 - Wide array of plug and play sensors
 - Standard sensor interface allows easy sensor additions to deployments
 - Automatic self-configuration for any combination of up to 15 sensors
 - *Smart Sensors*

Advantages of Two-Way Wireless

- Data and hardware fault detection through *Confidence*
- Real time data collection and analysis
- Remote reconfiguration of the network
 - Change sensor sample rate, erase data logger memory, set time, etc.
- Automatic upload to remote database
 - SensorBase* or others

Problem: Increase biologist confidence in and usability of our wireless sensing systems

Systems Not Built for Biologists

- Lack of inherent trust in cutting edge systems
 - Less testing
 - Research interest focused on one area of the system
- Less developed sensor hardware
 - Noisy data
 - Not field hardened
- Poor usability
 - Systems written by researchers for research

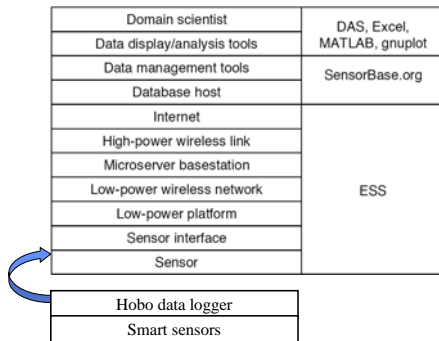


Questions

- How to add reliability and stability?
- How to design a sensing system familiar to the end user?
- How to cross the boundary between CS and Biology research?
- Can we entice scientists in other fields to use our systems for their research?

Solution in Progress: A combination of reliable sensing hardware and wireless networking

Extensible Sensing System (ESS)



Software Link to Data Logger

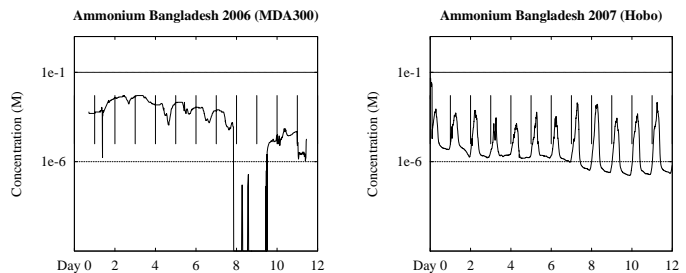
- Communication to hobo platform enabled over its proprietary serial protocol
- Hobo data logger acts as a multi channel sensor platform
- Each channel is either system information or a *smart sensor*
- Smart sensors are self identifying and hence auto-configurable
 - Sensor data is identified and translated to real values at the microserver based on individual sensor configuration information
- Translated data is uploaded to *SensorBase* for storage and analysis

Hardware Setup and Cost Estimation

- **Mote hardware**
 - Mica2 mote from Xbow - \$125
 - Serial interface board - \$95
- **Sensor hardware**
 - Weather station data logger - \$199
 - Smart sensors - ~\$70 - \$200 each
- **Connection**
 - Custom serial cable - ~\$10
- **Base station**
 - Intel Stargate + mote - \$720



Old vs New Data



Old system data versus hobo logger data

Future Work

- Cheap hardware interface between motes and data loggers
- Additional automation of tedious and obscure configuration
- Use of low power sleep modes to increase mote battery life

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