

Planning a Wireless Sensor Network

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Aspects of planning

The big picture

Physical Sensors

Networking options

Powering options

Physical installation, protection

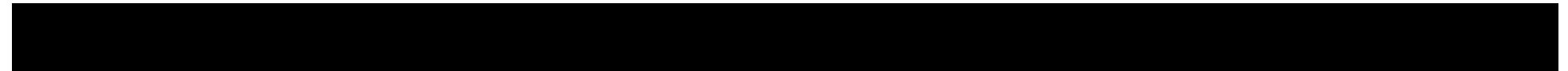
Data transport

Data management

Maintenance

Budget

The actual deployment



The big picture

- **What do you intend to do and why?**
- **What are your goals and outcomes?**

Physical sensor

- Choosing the right type
- size
- price
-

Calibration

- initial
- re-calibration? How often?

Networking options

- Wired (ethernet, fiber)
- Wireless
 - 802.15.4, zigbee
 - 802.11 WiFi
 - GSM/GPRS
 - satellite
 - Bluetooth
 - Frequency choice

Wireless networking: Frequency aspects

- higher frequency, higher data rate
- higher frequency, shorter reach
- lower frequency, better penetration (through objects, environment)

Site survey

- Interference, coexistence?
- Conditions that change over time? Seasons? Traffic?

Powering options

- Dependent or autonomous?
- Autonomous options
 - Battery only
 - Solar
 - Wind
 - Hydro
 - Thermal, vibrational energy harvesting
 - (Wireless power transfer)

Physical installation, protection

- Environmental protection
 - Weather
 - Lightning
 - Wind
 - Humidity
 - Fires
- Animals?
- Social aspects, human factors
 - theft? Vandalism
 - cleaning personnel :)

Data transport

- From sensor to database, archive, lab
- How often?
- Protocol
- Security aspects
- Delays, failure, failover

Data management

- Where does the data go?
- Database design, format, organization of data
- Backup
- Access, dissemination, openness?
- Visualization
- Security, data integrity
- Imagine a scenario where data are manipulated -
e.g. early disaster warning systems, radiation

Maintenance

- Long term maintenance & support
- Hardware replacement plan
- Physical distance from “civilization” to deployment location
- Unattended restart, recovery
- Human factors

Budget

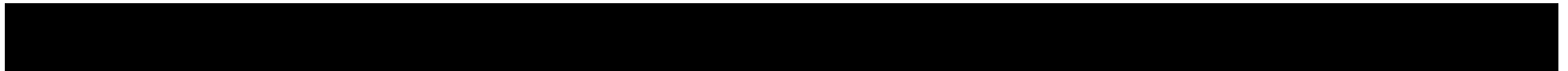
... :)

The actual deployment

Communications: How do lab and field teams communicate during the actual deployment?

Transport: Getting there and back

What to take: we typically forget essentials like umbrellas, water, charged batteries,



Conclusion: my personal

Top 3 of things that go wrong in WSN

1. Power

**2. Not having a maintenance / operations plan -
including people, budgets, travels, ...**

3. Now you have data ...

but you don't know what to do with them

