PermaSense

## Achievements, current status and further work

Igor Talzi and Christian Tschudin, University of Basel
slides for the MICS-TinyNode Development Coordination
meeting, EPFL Lausanne, Sep 27, 2006

PermaSense stands for…

- Building and customizing a set of wireless measurement units for use in remote areas with harsh environmental monitoring conditions
- Gathering of environmental data that helps to understand the processes that connect climate change and rock fall in permafrost areas

Project Partners

Geo side (Uni Zurich)

Deployment area (Jungfraujoch, France)

Shockfish SA (Lausanne)

UniBas

AlpuG (Davos)

Industrial partners

Local Zur & Bas workshops

…

Since Feb 2006: Getting started, getting connected …

Current state, research areas

PermaSense (2006-)

Spring 2006

1st generation PermaSense system

HW spec
(TinyNode platform,
sensors interfaces)

Drivers dev

GPRS link

NW+Middleware

Web-portal

Fall 2006

PermaSense (-2009)
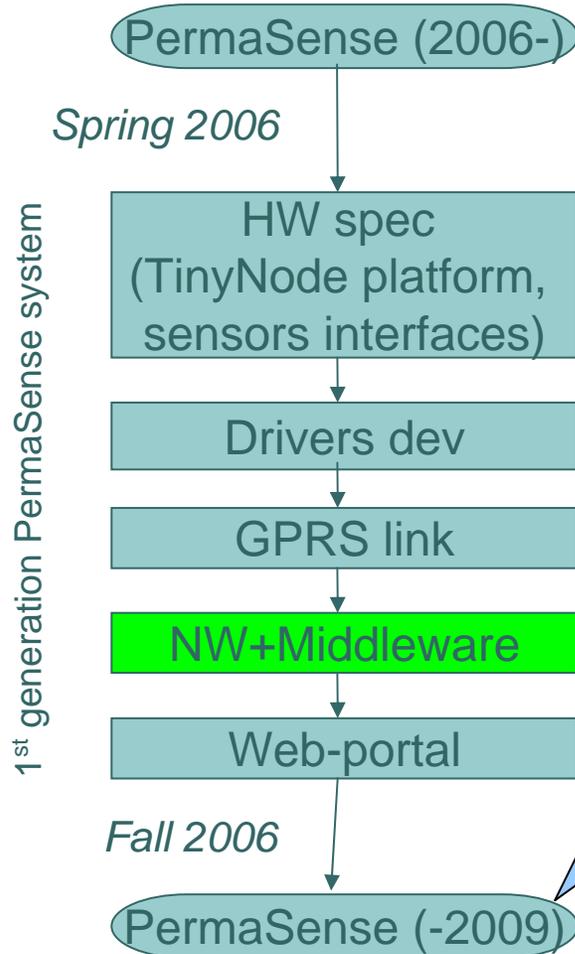
1. Multi-hop routing, redundant GPRS gateways

2. Mobile code for config and ad hoc queries

3. Robust data collection, in-network replication

4. In-network (seismic) data compression
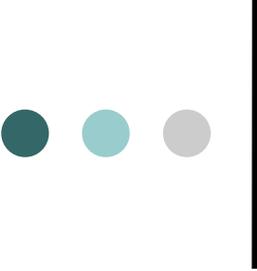
Quick snapshot

- Low-level SW side:

  - TD-like MAC based on Skew Balance Time Sync Protocol for ICNs (long-term stability, fine tuning via commands injection, post-calibration)

  - permanent flash storage (flash + SD)

  - sensors support, unique sensor id

  - GPRS gateway (bridge, conf, time sync); multi sink

  - FEC scheme (DECTED)

  - data flow + enhanced FEC (BCH codes) + end-to-end ARQ

  - multi-hop routing (deep integration with the MAC-layer)

  - small changes to OS: T2-like time subsystem, network types
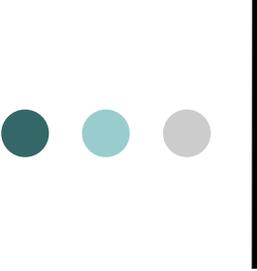
Quick snapshot (cont.)

○ High-level SW side:

- terminal monitoring program

- data sink front-end software (database, web interface, conf utilities)
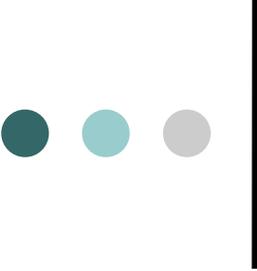
Quick snapshot (cont.)

- HW side:
    - new mother boards
    - sensor rods
    - enclosures
    - protective shoes
    - other electrical stuff
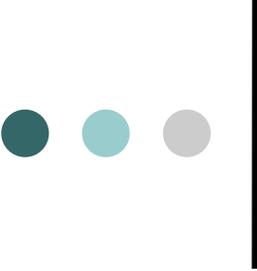
Ongoing activities and further steps

- First PermaSense deployment is doing right now in Jungfrau
- System hardening coz nobody repealed Murphy's laws
- Second deployment site in France (autumn-winter 2006)
- "Born stupid? Try again." - second generation (next summer)

The end

Thanx for your attention