

MICS Working Group 2

Sensor and Actuator Platforms

Kickoff Meeting – ETH Zurich

Location: Gloristr. 35, Room ETZ H81 – 10:30h

<http://www.ee.ethz.ch/about/bsinformationen> **EN**



The NCCR must be more than the sum of its projects ...

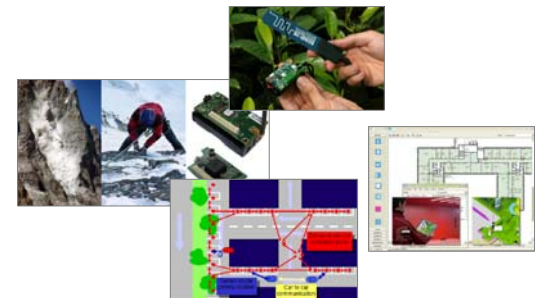
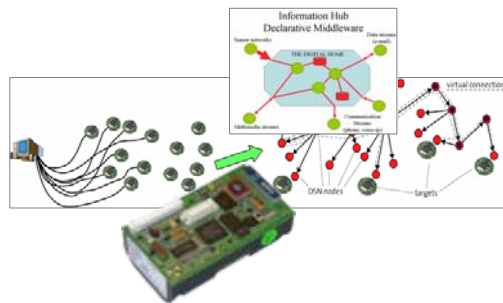
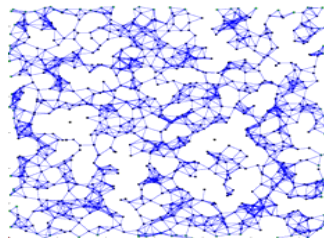


NCCR Structure

Theory

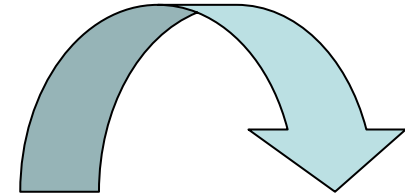
Systems
 Platforms

Applications



Application Centric View - Synergies

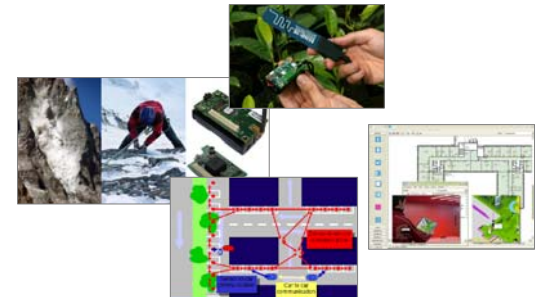
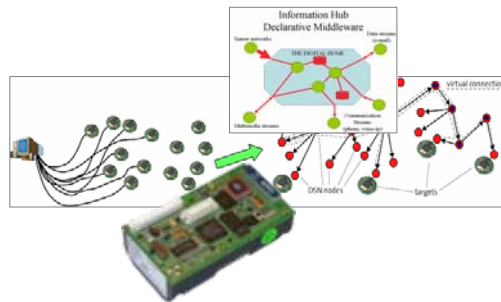
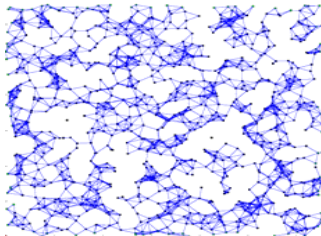
Share Know How



Theory

Systems
Platforms

Applications



Application Centric View - Synergies

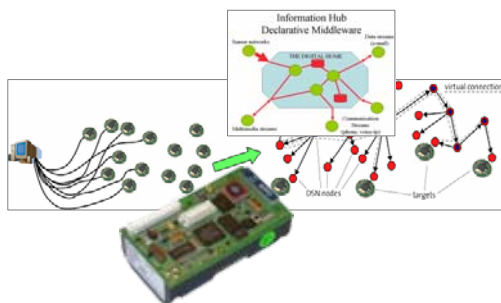
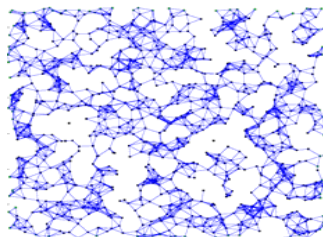
Use Scientific Results
Tools and Platforms



Theory

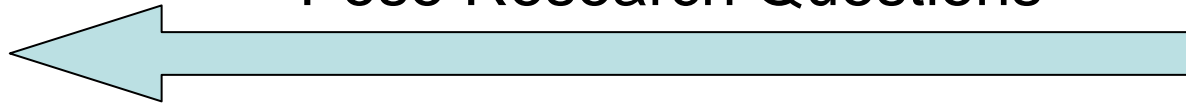
Systems
Platforms

Applications



Application Centric View - Synergies

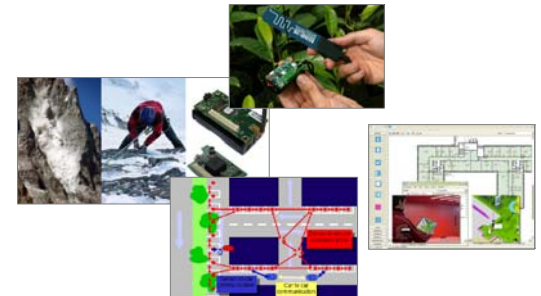
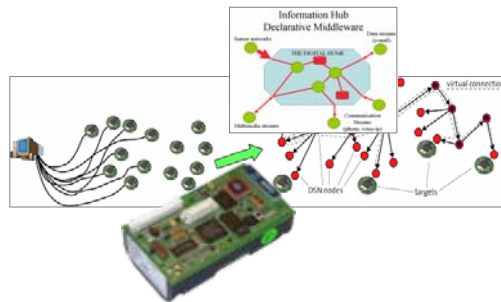
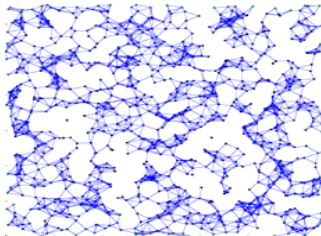
Pose Research Questions



Theory

Systems
Platforms

Applications



The NCCR Nightmare

- **Application projects develop their technology in isolation. They do not interact with other NCCR projects.**
- **They do not provide feedback to theory, systems and platform projects.**
- **They do not incorporate results from other NCCR projects (first and second phase). They do not make of the vast amount of experience present already.**
- **They do not share knowledge, tools, platforms.**

WG2 Organization

- **Coordinators: Lothar Thiele, Matthias Grossglauser**
- **~4 meetings per year to share**
 - Experiences in using hardware/software platforms, sensors
 - New developments within and outside of MICS (technology watch function)
 - Promote interaction with ‘theory’, ‘systems and platforms’
 - One feature technology talk per meeting
- **Mailing list**
- **Data repository, knowledge exchange**
 - Web based BSCW or Wiki
 - Platform Database – The Sensor Network Museum
- ...

Tentative Schedule for 2005/2006

- **December 2005 – Kickoff Meeting**
 - Topic: Requirements and challenges of MICS applications

- **February 2006**
 - Topic: MICS and other hardware platforms, sensors

- **XXXX 2006**
 - Topic: Operating systems, programming infrastructure, testbeds, deployment

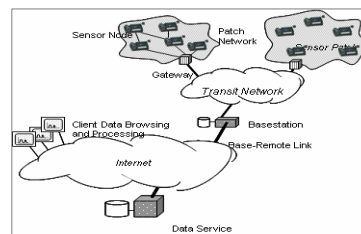
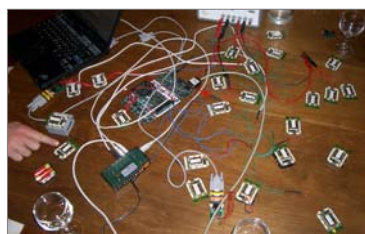
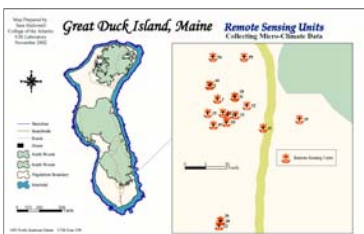
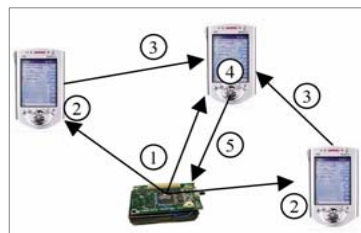
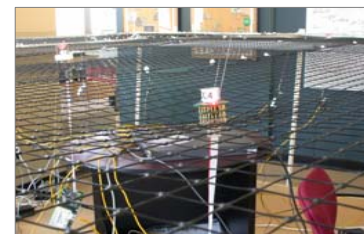
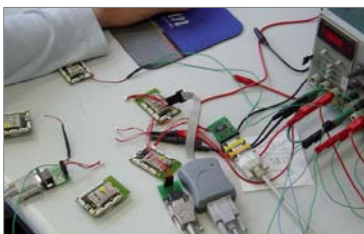
- **XXXX 2006**
 - ? Hands-on workshops on different topics ?

Today's Schedule

- **Introduction – Goals, people**
- **10' presentations on applications and requirements**
 - Karl Baumgartner, HEIG-VD – Architecture of a scalable WSN for pollution monitoring
 - Ruben Merz, EPFL – A UWB interference platform
 - Amre El-Hoiydi, CSEM – The Ultra Low-Power WiseNET System
 - Kay Roemer, ETHZ – Deployment of Sensor Networks
 - Henri Dubois-Ferriere, EPFL – SensorScope II & III: Requirements and Status
 - Thomas Lochmatter, EPFL – Distributed Odor Source Localization
 - Christian Tschudin, U Basel – Sensing while there still is Permafrost: in June 2006
 - Markus Waelchli, U Bern – Distributed event detection and localization architecture for WSNs
 - Edoardo Charbon, EPFL – Real-Time Avalanche and Landslide Analysis through SNs
 - Michal Piorkowski, EPFL – Smart Park Mobility
 - Ali Salehi, EPFL - Global Sensor Networks
 - Lothar Thiele ETHZ – Smart Buildings
- **Discussion**
- **Planning for 2005/2006**

WSN Development Reality

It is hard to deploy anywhere beyond 10-20 nodes today.



Coordinated methods and tools are missing today.

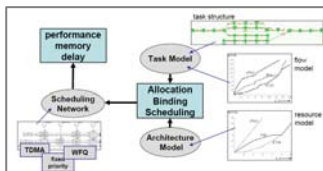
MICS Platform Experience and Resources



**Shockfish
TinyNodes**



TinyDB



Semi-Automatic DSE



TmoteSky



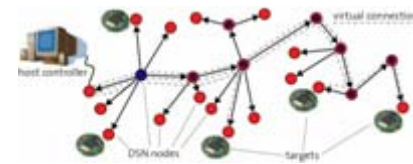
SensorScope



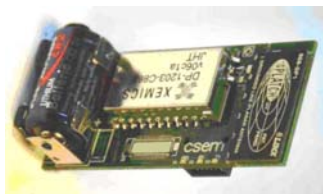
**Mica Motes +
TinyOS**



**BTnodes
BTnut Tutorial**



**Deployment-Support
Network**



WiseNet



**TinyOS2
Working Group**



Scatterweb

MICS Application Requirements

	Pollution	UWB	Wise Net	Deployment	Sensor Scope	Odor Source	Permafrost	Event Detect	Avalanches	Mobility	Global	Building
# Devices	+++++	no	yes	+++++	+++++	+/-	+/-	+/-	+/-	yes	+/-	yes
Miniaturization	+/-	no	yes	+/-	no	+/-	yes	no	yes	+/-	no	+/-
Autonomy	yes	no	yes	yes	yes	yes	+++++	no	yes	yes	?	yes
Battery power Lifetime	yes	no	+++++	yes	yes	+/-	yes	?	yes	yes	+/-	+++++
Environmental hazards	yes	no	?	no	+++++	yes	+++++	no	+++++	yes	no	yes
Infrastructure access	yes	no	yes	yes	yes	no	yes	?	yes	no	+++++	yes
Performance computation	no	+++++	no	no	no	yes	no	+++++	yes	yes	yes	no
Performance networking	no	yes	no	yes	no	no	no	no	yes	no	yes	no
QoS	no	?	no	yes	no	no	no	no	yes	no	no	+++++
Location	yes	yes	no	+/-	yes	yes	+/-	yes	+++++	+++++	+/-	yes
Sensors	yes	no	no	no	yes	+++++	yes	+++++	yes	yes	?	yes
Testing Deployment	+++++	yes	yes	+++++	yes	yes	yes	yes	yes	yes	+++++	yes

MICS Application Types

- **Periodic, duty-cycled, low-power SNs**
 - Pollution, WiseNet, SensorScope, Odor Sources, PermaSense, Smart Buildings
- **Specialized test systems**
 - UWB platform, Event detection, Avalanches, SmartPark
- **Tools, testbed infrastructure**
 - Deployment

MICS Common Base Infrastructure

Many applications have similar requirements.

- Periodic, duty-cycled, low-power SNs

Establish a “known-to-work” platform for MICS members

- For “standard” data collection and analysis
- Hardware (+embedded software)
- Software systems (access, infrastructure)
- Support through staffed “product group”

~5 groups interested

- Murphy, CSEM, Yverdon, Tschudin, Thiele, Grossglauser

Tentative Schedule for 2005/2006

- **December 2005 – Kickoff Meeting**
 - Topic: Requirements and challenges of MICS applications

- **February 2006**
 - Topic: MICS and other hardware platforms, sensors

- **May 2006 – Industry Forum**

- **XXXX 2006**
 - Topic: Operating systems, programming infrastructure, testbeds, deployment

- **XXXX 2006**
 - ? Hands-on workshops on different topics ?

People & WG2 Participation Status

Aberer	Publish subscribe	OK
Alonso	Xtream	
Braun	Event detection	OK
Charbon	Avalanches	OK
Grossglauser	SmartPark	OK
Hovestadt	Building Games	
Hubaux	Watersense	OK
Martinoli	Odor localization	OK
Mattern	Deployment	OK
Morari	Building	OK
Murphy	Data dissemination	OK
Robert	UWB	OK
Skriverik	UWB	OK
Thiele	Deployment	OK
Tschudin	Permasense	OK
Vetterli	Sensorscope, Watershed monitoring	OK
Wattenhofer	Theory	OK
Wittneben	UWB	OK