Sensor Network Platform Kit (SNPK)

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with Roman Lim, Mustafa Yücel and the MICS team
About the Sensor Network Platform Kit

- To make current state-of-the-art technology really workable for practitioners.
- Enabling a quick launch of new sensor applications, including web/database interfacing and testing.
- Targeting “standard environmental-monitoring” applications.

Approach
- Components that are state-of-the-art and known-to-work
- Combines industry technology with know-how and reliable research prototypes
- Public, opensource solution

- Born out of the need of many partner projects within MICS.
Sensor Network Platform Kit – Components

1. Low-Power Wireless Sensor Network
   - TinyOS-2.x
   - MSP430 based motes (Tmote Sky, TinyNode)
   - General purpose data gathering application (LPL, CTP, dissemination, deluge...)
   - Ultra-low power – low duty-cycle data gathering (Dozer)

2. Backend Data Gathering
   - Global Sensor Network (P2P database backend http://gsn.sf.net)

3. Testbed/Tools
   - Deployment-Support Network
   - Eclipse IDE for TinyOS

4. Technical support for MICS member projects
   - Staffed support
   - Testbed services
   - Documentation and tools
Sensor Network Platform Kit – Status and Outlook

- Public availability
  - tinyos-2.x-contrib/ethz

- Support team started in December 2006 (2 technical staff + students)
  - Technology evaluation
  - Knowledge-base
  - Testbed setup and integration (DSNmonitor)
  - WSN application design (harvester)

- Started to work with three “customer” projects

- Feedback of the software to TinyOS-2.x in the future.
The Sensor Network Museum™

SNM - The Sensor Network Museum™

Hello to the sensor network museum. Here we want to store reference data and links for different platforms, have fun exploring.

This collection is based on a wiki page. If you want to add or edit information, visit us at about access to this wiki.

Sensor Networks Routing Protocols
- SNM - Sensor Networks Protocols for Information via Negotiation
- Directed Diffusion
- Power Routing
- Q-RC (Routing with compression using Q-learning)
- Survey papers on routing

Sensor Networks MAC Layer Protocols
- S-MAC
- T-MAC
- 8-MAC
- P-MAC™
- Z-MAC™

Sensor Network Simulators
- The Network Simulator
- Gmnet++
- SIMON
- VENS
- QualNet
- GnuSim

Sensor Network Hardware Systems
Tatiana Bokhara has already done quite a good job in her listing of current platforms is maintained by the Imperial College London.

BTnodes - A Distributed Environment for Prototyping Ad Hoc Networks
Projects: Sensor Network Museum

Museum™ - Particles

TinyNode 584
- 8-bit microcontroller and a Xilence

The Sensor Network Museum™ - TinyNode Sky

Manufacturer: TinyNode

Features:
- TI MSP430F1491 (16-bit microcontroller) with 2.5 MHz
- 20 MHz, 40 MHz, 80 MHz
- Embedded C2500 IEEE 802.15.4 Wireless Transceiver
- On-board flash, temperature and light sensors
- Ultra low-power consumption (150 mW)
- Easy to interface with Arduino
- Programming and interface via USB
- 5V pin expansion port
- 22.5 cm

Power Consumption - Typical Operation

<table>
<thead>
<tr>
<th></th>
<th>TinyNode Sky™</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Supply</td>
<td>2400 mAh Li-Ion</td>
</tr>
<tr>
<td>Memory Use</td>
<td>2.1 V (min. 2.7 V during flash programming)</td>
</tr>
<tr>
<td>Battery Capacity</td>
<td>2400 mAh</td>
</tr>
<tr>
<td>Regulator Supply</td>
<td>Internal linear regulator for 2400 mAh battery at 1.8 V</td>
</tr>
<tr>
<td>UC Sleep (without radio on)</td>
<td>0.0135 mW</td>
</tr>
<tr>
<td>UC, active, radio on</td>
<td>5.4 mW</td>
</tr>
<tr>
<td>UC, active, radio idle, forwarding</td>
<td>65.5 mW</td>
</tr>
<tr>
<td>UC, active, radio idle, forward</td>
<td>59.5 mW</td>
</tr>
<tr>
<td>Max. Power (UC, active, radio TX + flash write)</td>
<td>94 mW</td>
</tr>
</tbody>
</table>

*Typical data sheet values as reported for the whole system (computed at 3.6V)

http://www.btnode.ethz.ch