ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

National Competence Center in Research
Mobile Information and Communication Systems
MICS

Deployment Support

A Sensor Network Maintenance Toolkit

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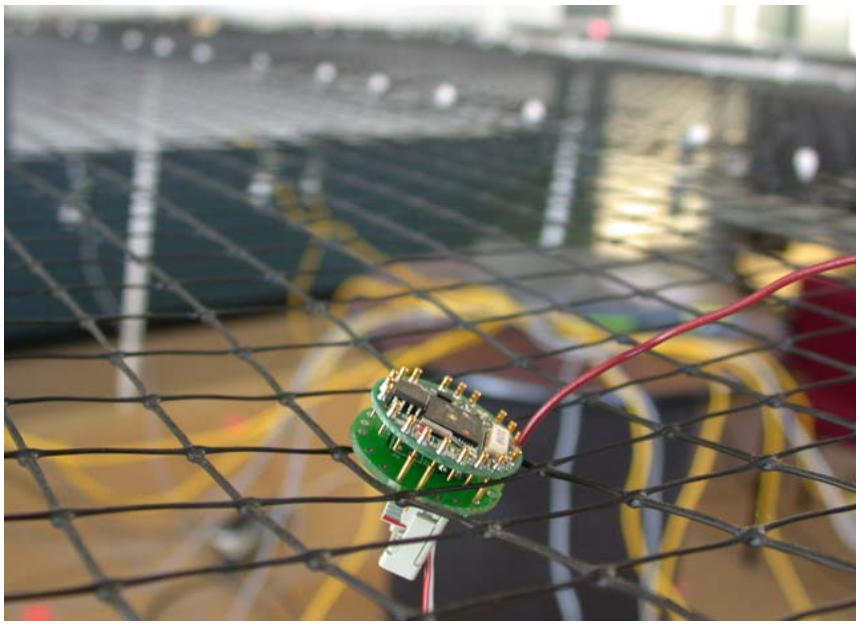
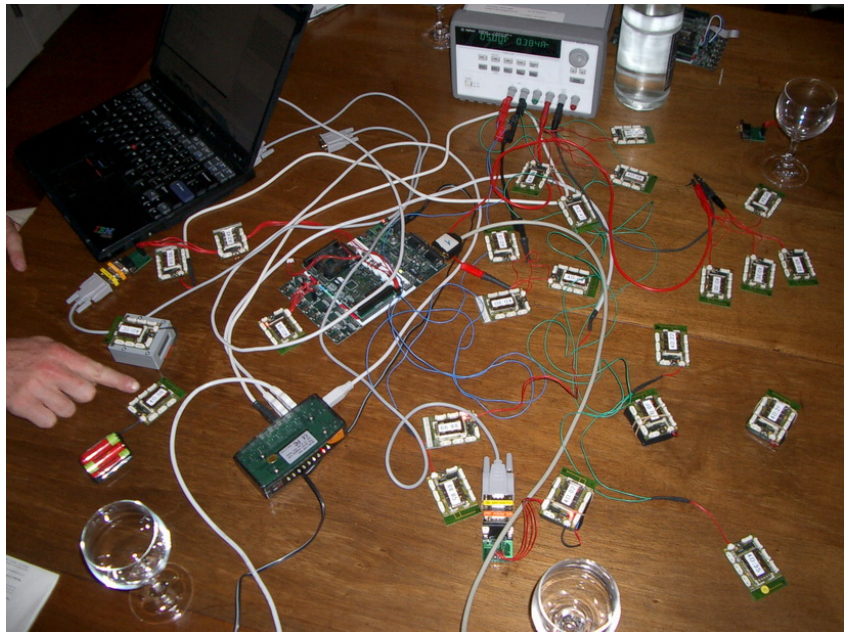




Today's WSN Design and Development

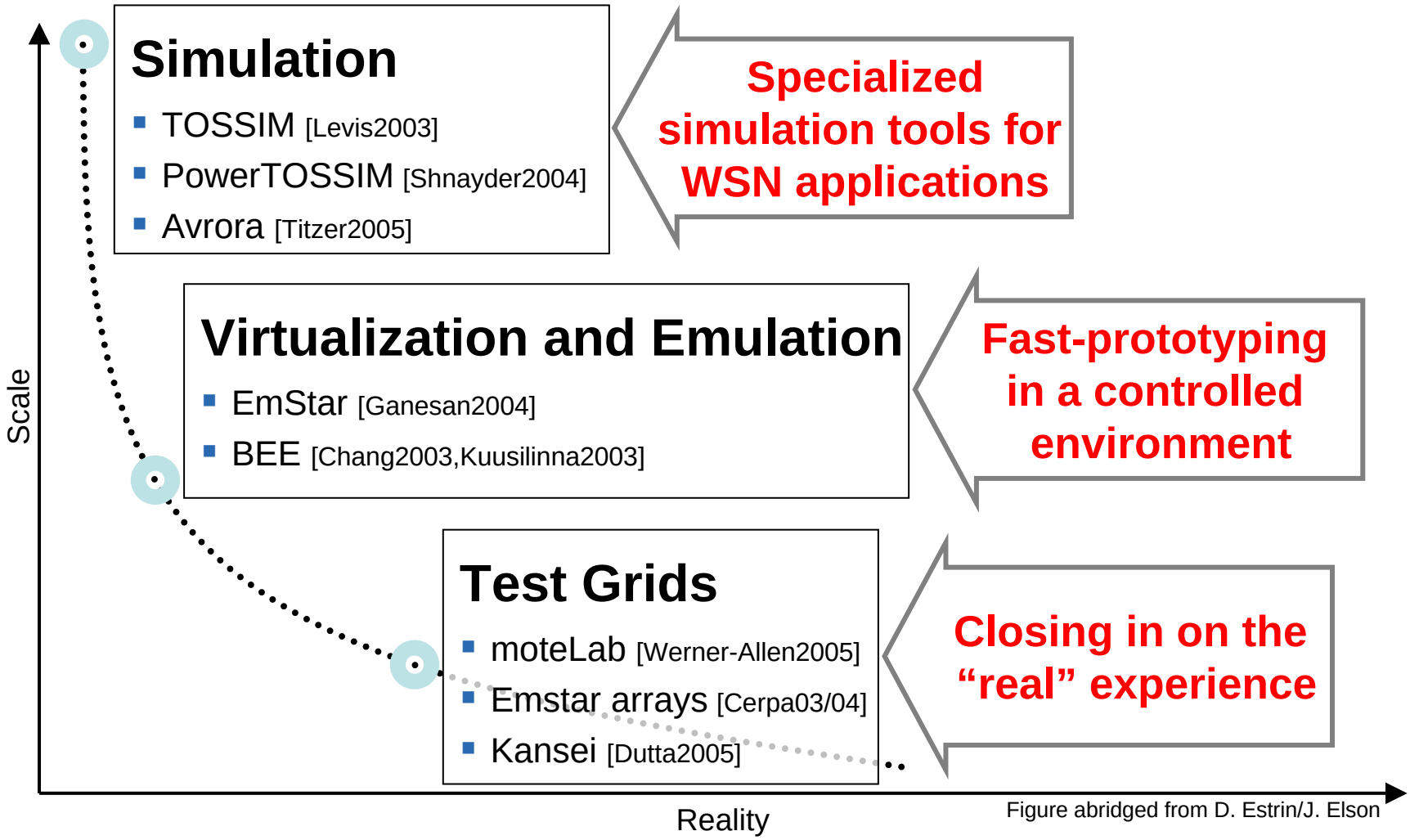


Figure abridged from D. Estrin/J. Elson

Today's WSN Design and Development

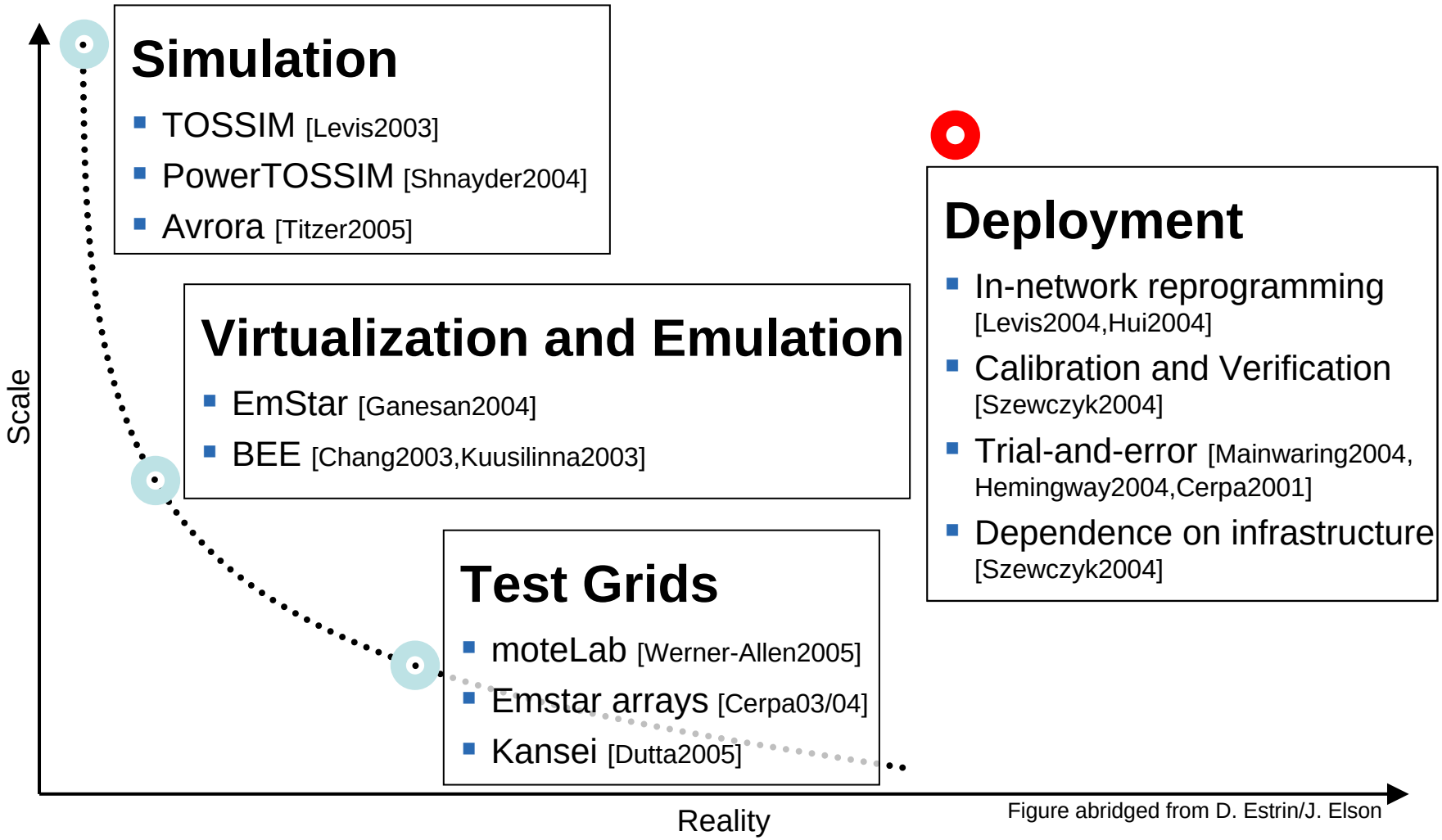


Figure abridged from D. Estrin/J. Elson

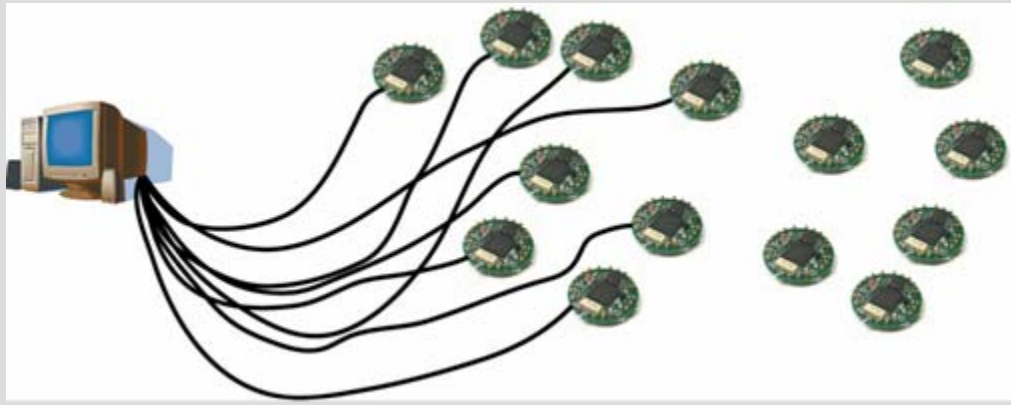
From Proof-of-concept to Real-world WSNs

Traditional test grid

- Wired
- Immobile
- Not scalable

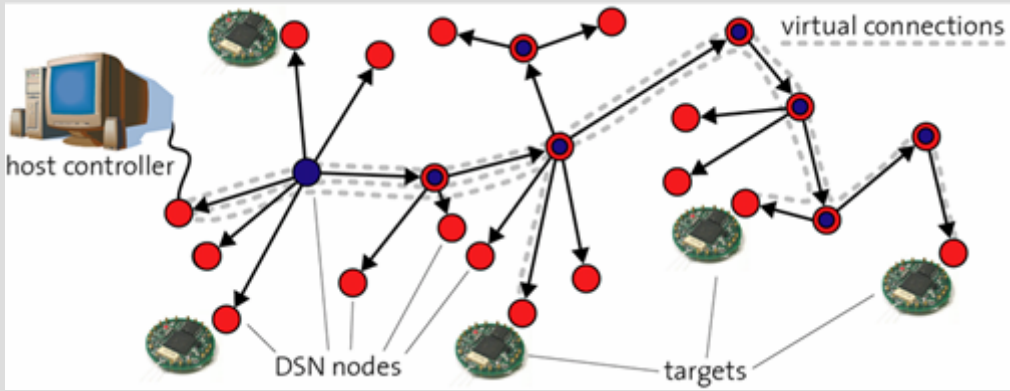
In-network tools

- Unreliable

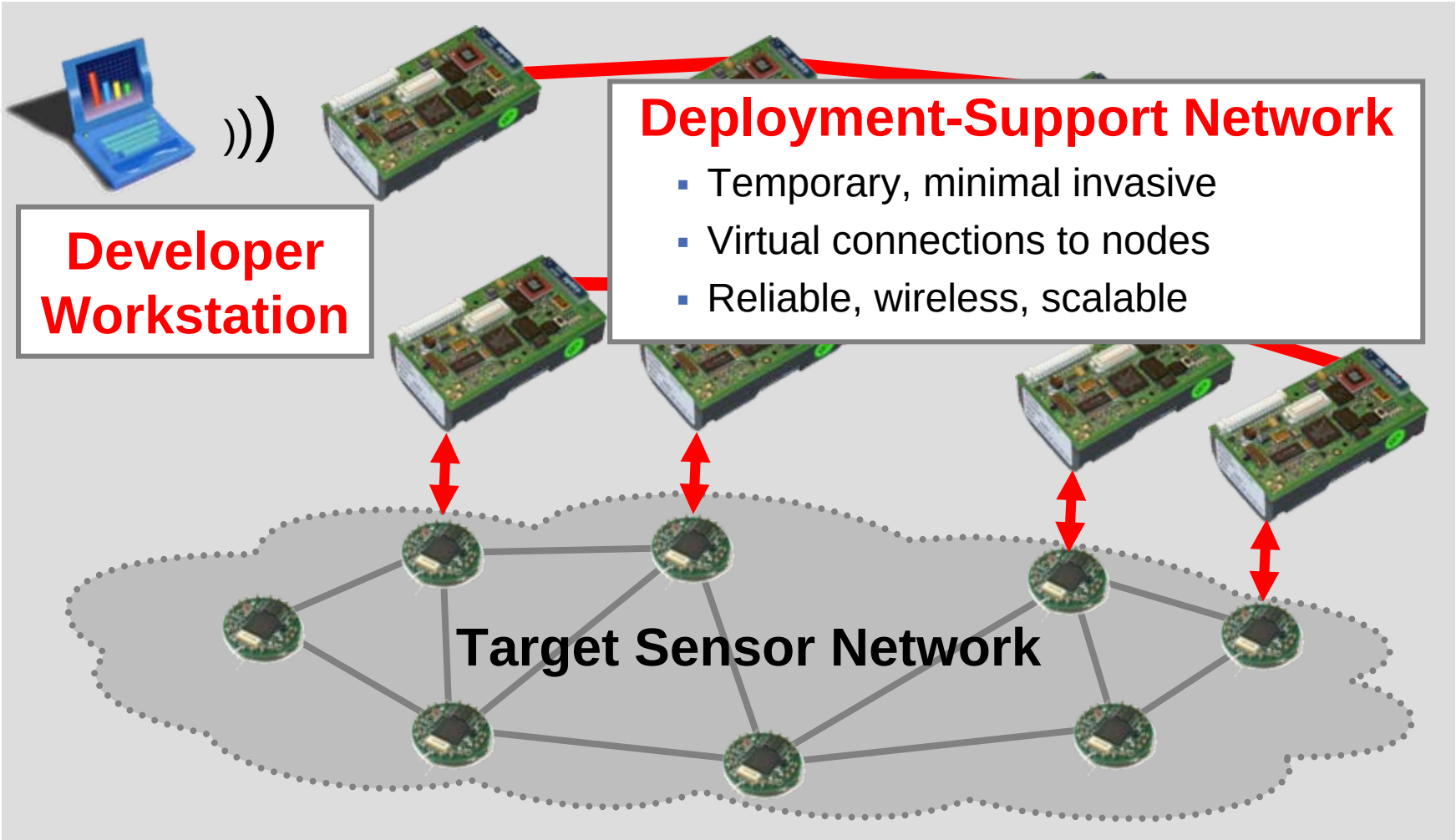


Self-organizing backbone network with deployment-support services

Deployment-Support Network



Next-Generation Deployment-Support



Debugging vs. Application Demand

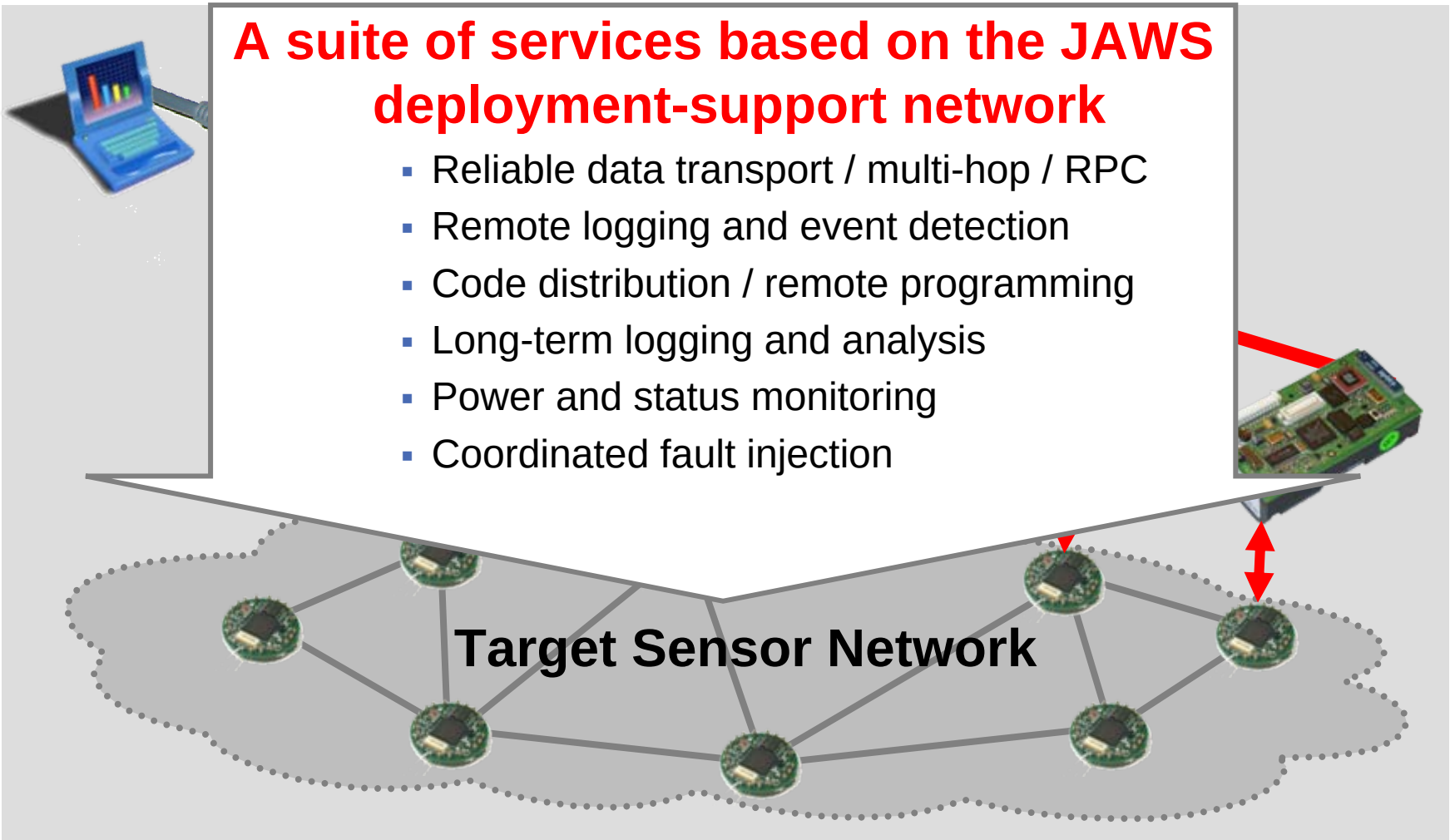
Architecture Demands:

- reliable medium data-rate radio
- large memory

Architecture Demands:

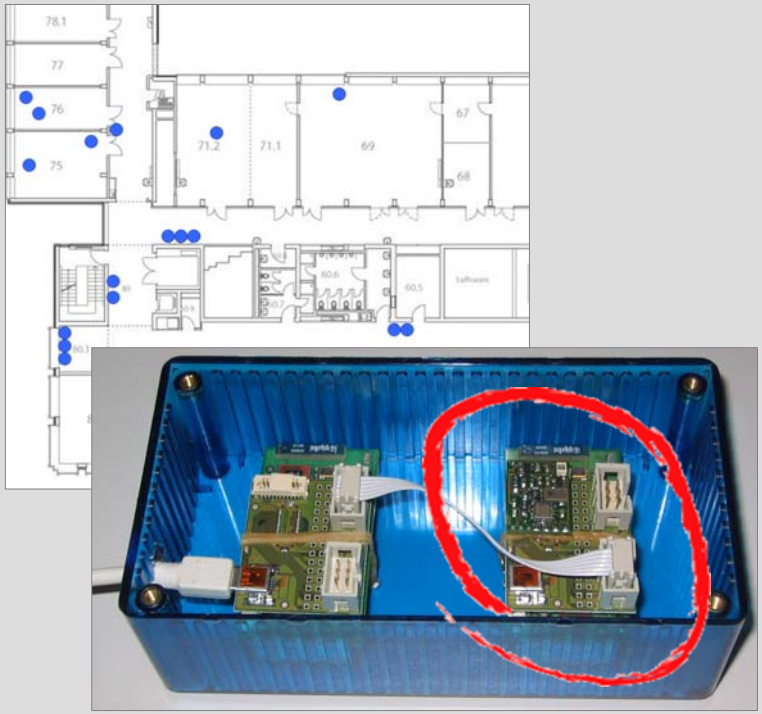
- low data-rate radio
- small memory

SNMT – Sensor Network Monitoring Toolkit



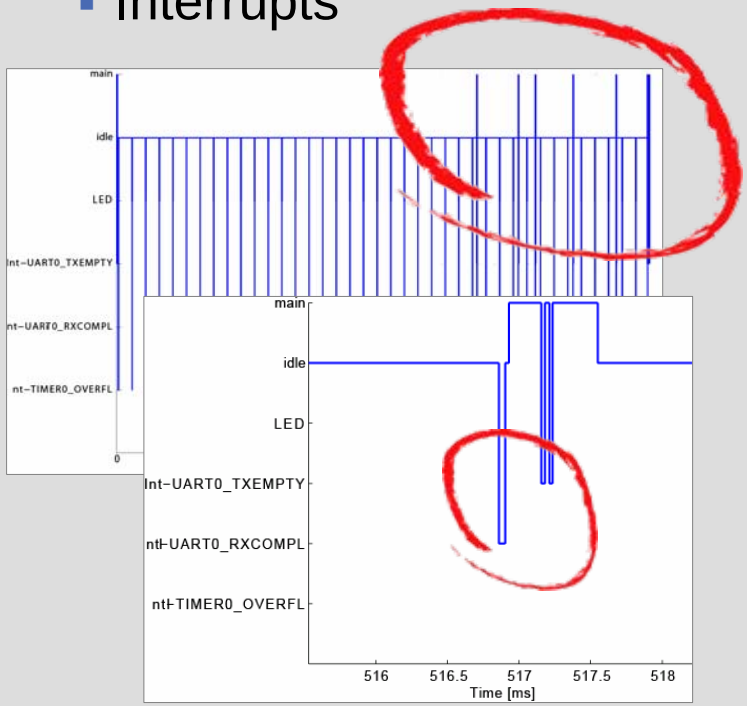
JAWS Application Example

Test Setup: 20+ nodes



Event Tracing

- Time-synchronized
- Context switches
- Interrupts



Current Status

Jaws Services

- Reliable data transport / Topology Control
- Event detection / remote logging
- Code distribution
- RPC
- Node status monitoring (battery level / image versions / …)

Tools

- User interface / command center
- Database
- Analysis scripts for Matlab
- Wireless access from Laptop or PDA

Target Interfaces

- BTnode rev.3 (AVR uC)

Ongoing Work

Jaws Services

- Reliable data transport / Topology Control
- Event detection / remote logging
- Code distribution
- RPC
- Node status monitoring (battery level / image versions / …)

Tools

- User interface / command center
- Database
- Analysis scripts for Matlab
- Wireless access from Laptop or PDA

Target Interfaces

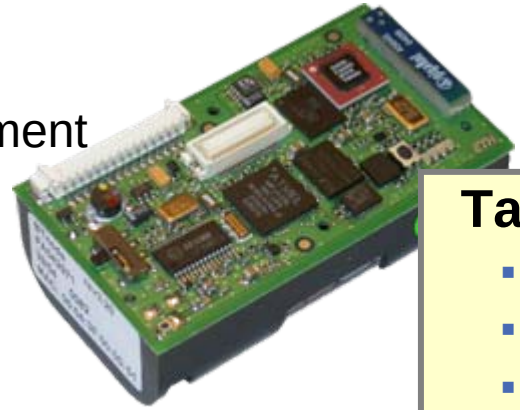
- BTnode rev.3 (AVR uC)
- Tmote (MSP430)

Adding Services / Interfaces

JAWS Application

Codesize 100 kB

- Topology Control
- Connection Management
- Data Transport
- Caching
- Node Management

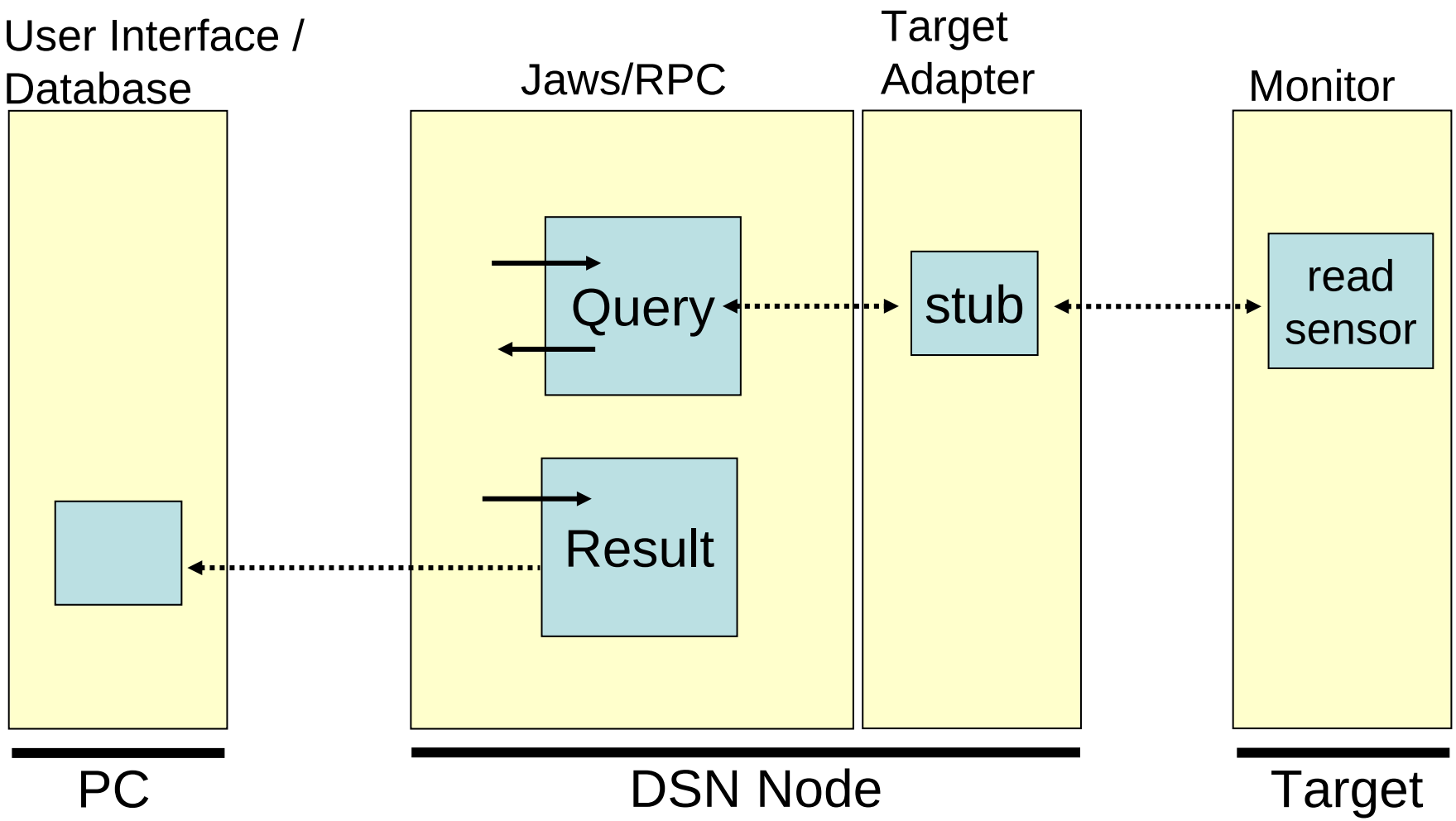


Target Adapter 4 kB
- Target Control
- Programming
- Logging

WSN Target Application

Monitor 2 kB
- Threads/IRQs
- High level context

Example


User Interface / Database
Jaws/RPC
Target Adapter
Monitor
Query
stub
read sensor
Result
PC
DSN Node
Target

Thank you!

Questions?

http://www.btnodes.ethz.ch