

TUD μ Net: a Metropolitan-Scale Federation of Sensor Network Testbeds



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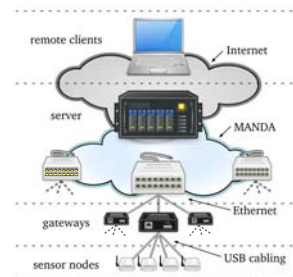
Context & Problem Statement

Software development for WSNs hard:

- wireless communication phenomena (interference, multipath reflection, fading, antenna diversity)
- complex sensing phenomena (magnetic fields, gas plumes, human behavior)
- experimentation logistics (batteries, flashing, etc.)

Proposed Approach

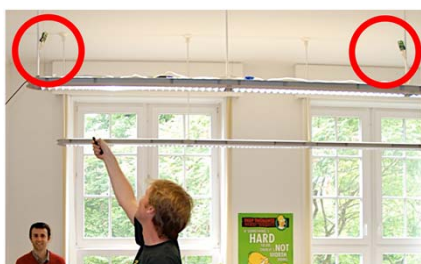
- deployment of several sensor nets
- development of support software for managing the software testing phase
- testbed interconnection via Ethernet-backbone



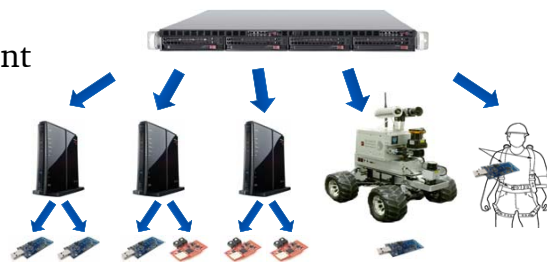
Current Status

Construction of TUD μ Net

- **testbed**: hybrid between simulator and target deployment
- **federation**: integrates multiple, autonomous WSNs



TUD μ Net



Site	Focus	Size
CS Dept.	networking, sensing & actuation	32 + 30 + 20
GKmM Lab	gas plume detection	50
surPLUShome	environmental monitoring	20
total (2012)		152

Web interface to manage experiments:

- hierarchical zones (enable division of areas)
- parallel job execution
- centralized coordination
- access control
- heterogeneity
 - sensors (light, humidity, CO, CO₂, temp., etc.)
 - nodes (TelosBs, Z1s, JCreates)
- basic system health monitoring



Ongoing Work

- extended health monitoring and healing
- emulation of node faults, fine grain control of node liveness
- extension to human-worn and robot-transported nodes
- support for further platforms (e.g., EconoTAGs)



GRK 1362: Cooperative, Adaptive and Responsive Monitoring in Mixed-Mode Environments

