



IP CREW

Cognitive Radio Experimentation World

TUB Testbed Infrastructure

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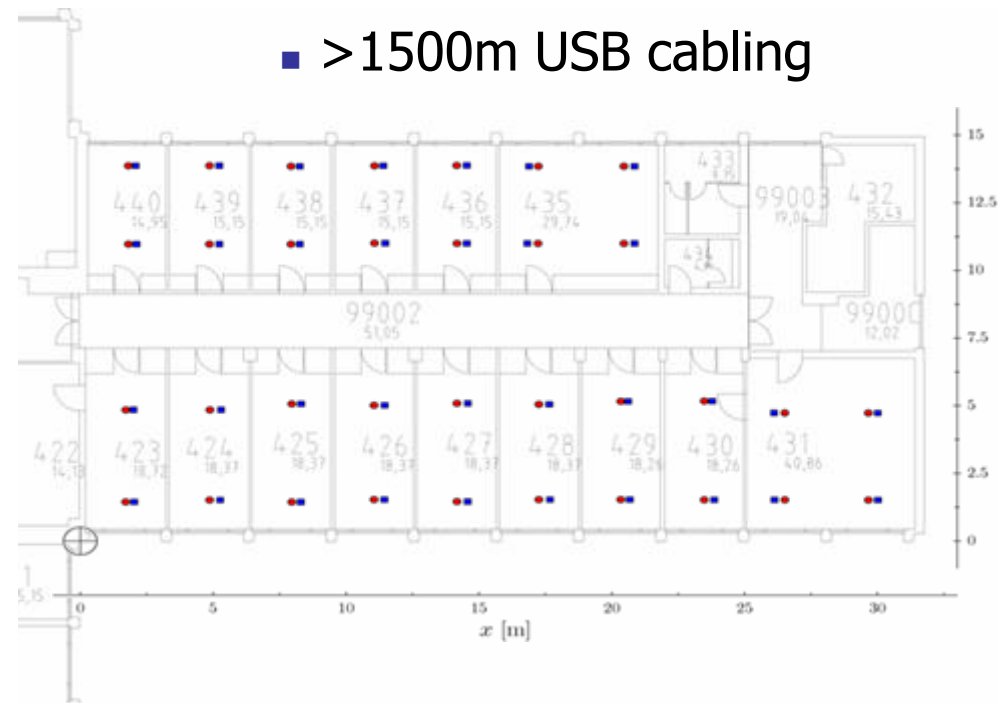
TKN Wireless Indoor Sensor network Testbed (TWIST)

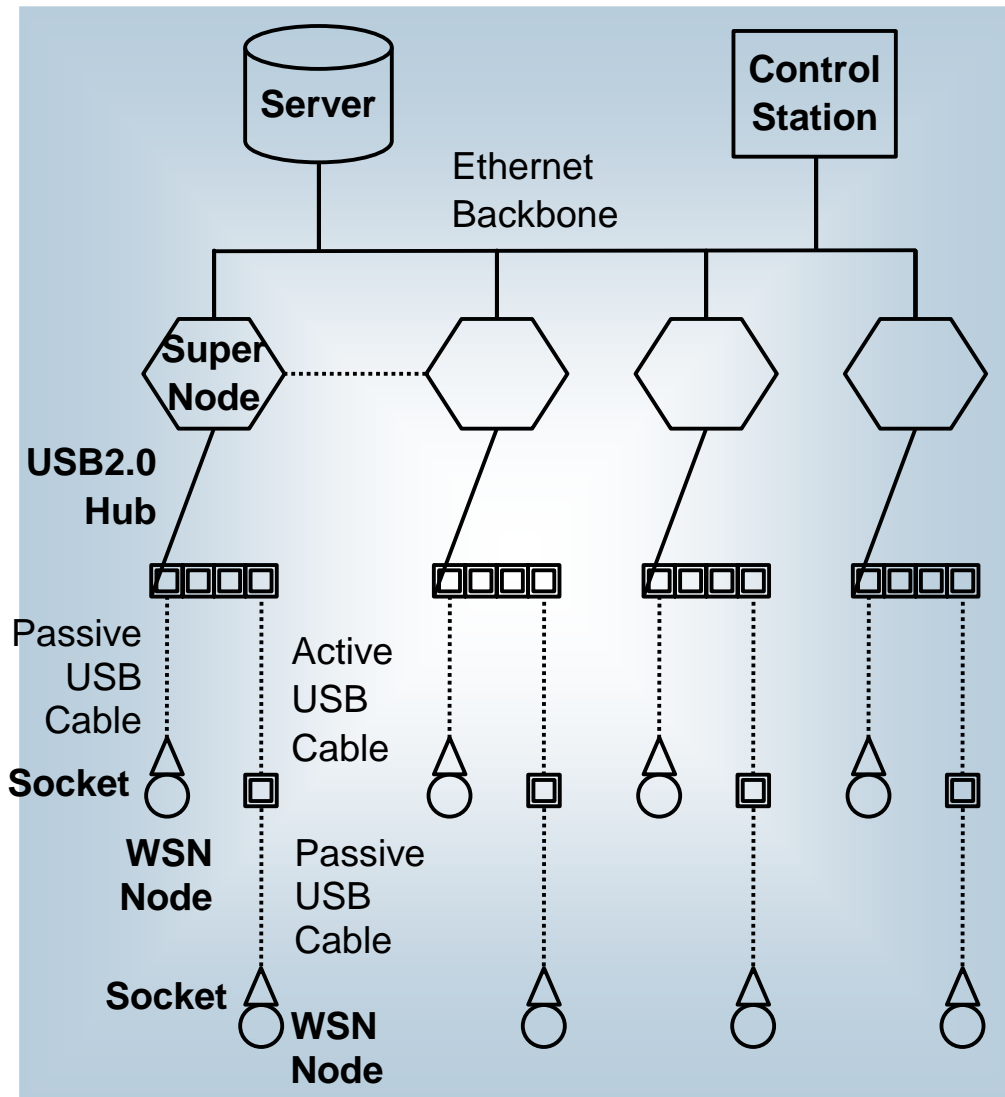
- 204 sensor nodes: 102 Tmote Sky & 102 EyesIFXv2
- Covers 3 floors (> 40 rooms) of an office building at the TU Berlin campus
- Can be accessed locally or remotely via web-interface

Mobile components

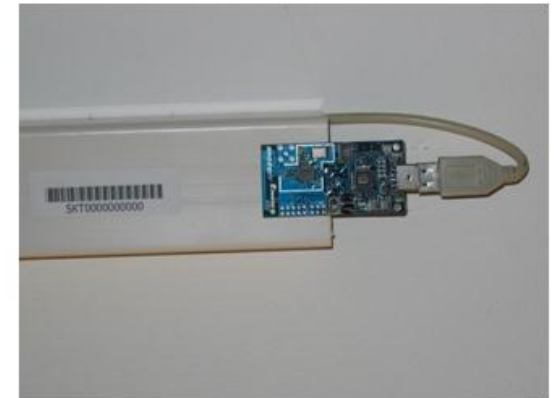
- Mobile robot (iRobot Roomba), which can be programmed to follow certain trajectories inside the TWIST building; various devices can be mounted on the robot
- A set of wearable sensor nodes (Shimmer2 platform) for BAN experiments
- A set of low-cost USB Spectrum Analyzers (spectrum sensors) for the 2.4 GHz ISM band.

- Spans 3 floors of the TKN office building
 - More than 1500 m² of instrumented space
- Current configuration: 204 **sensor nodes**
 - 102 tmote sky
 - 102 eyesIFXv2
 - 41 super nodes
 - 51 USB hubs
 - >1500m USB cabling

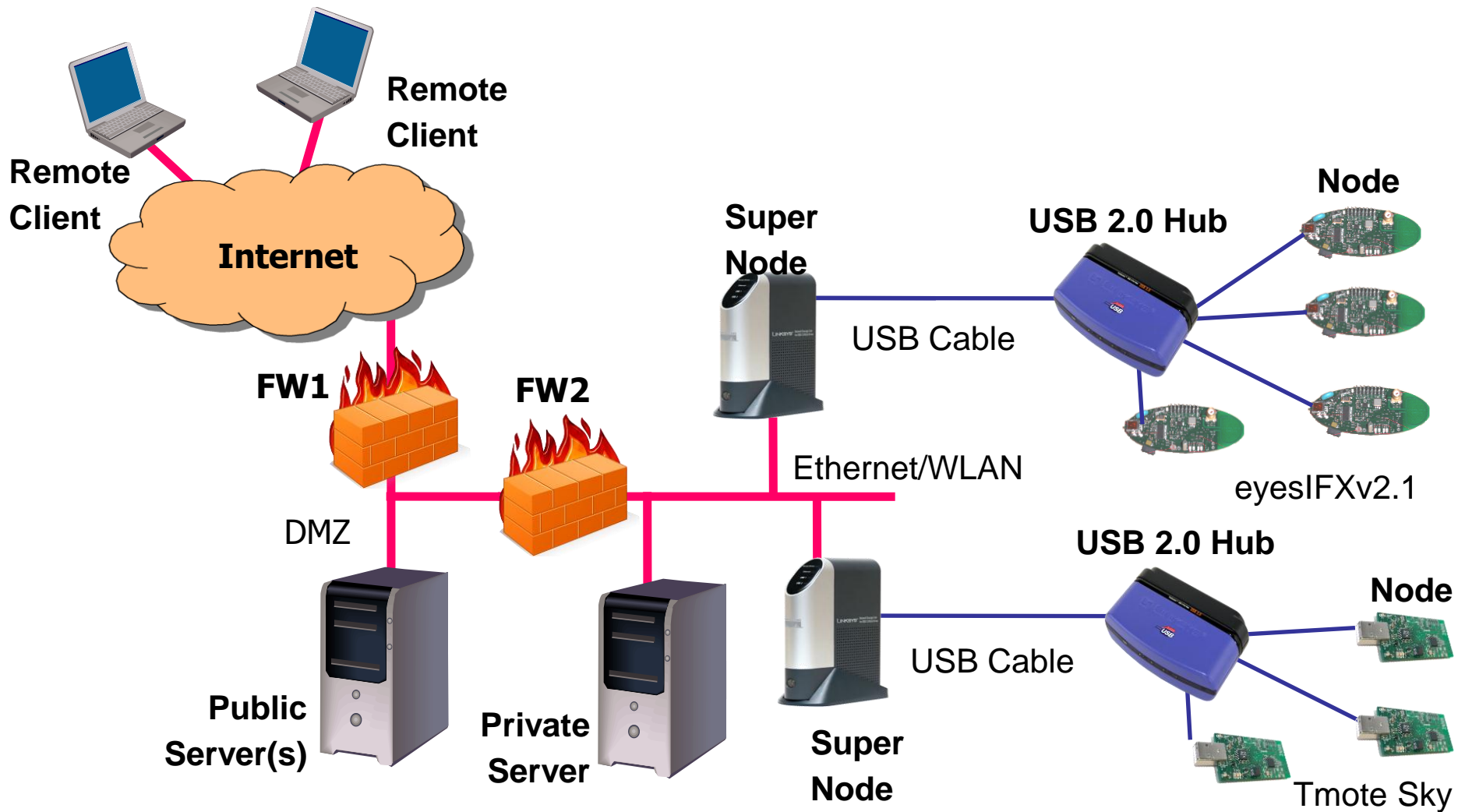




Super node (NSLU2)

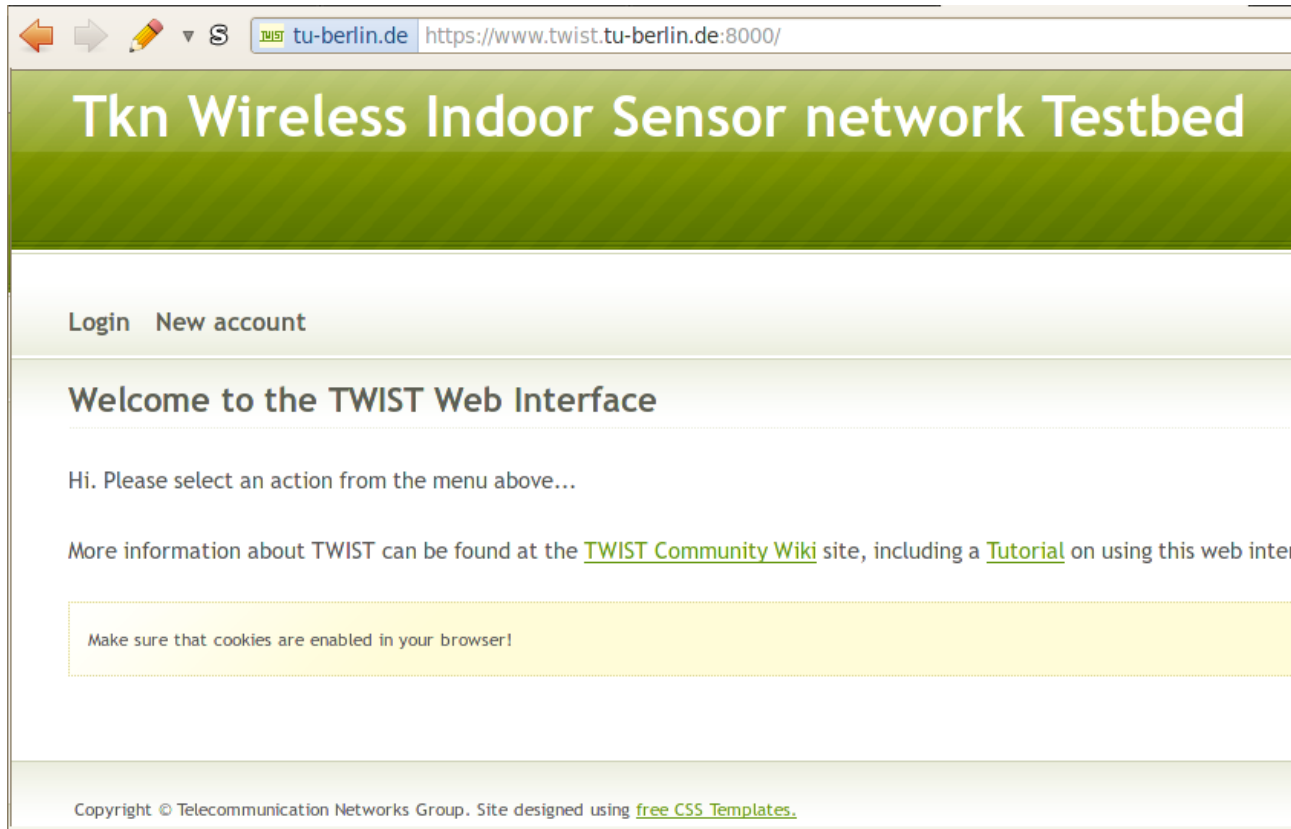


WSN Node (Tmote Sky)

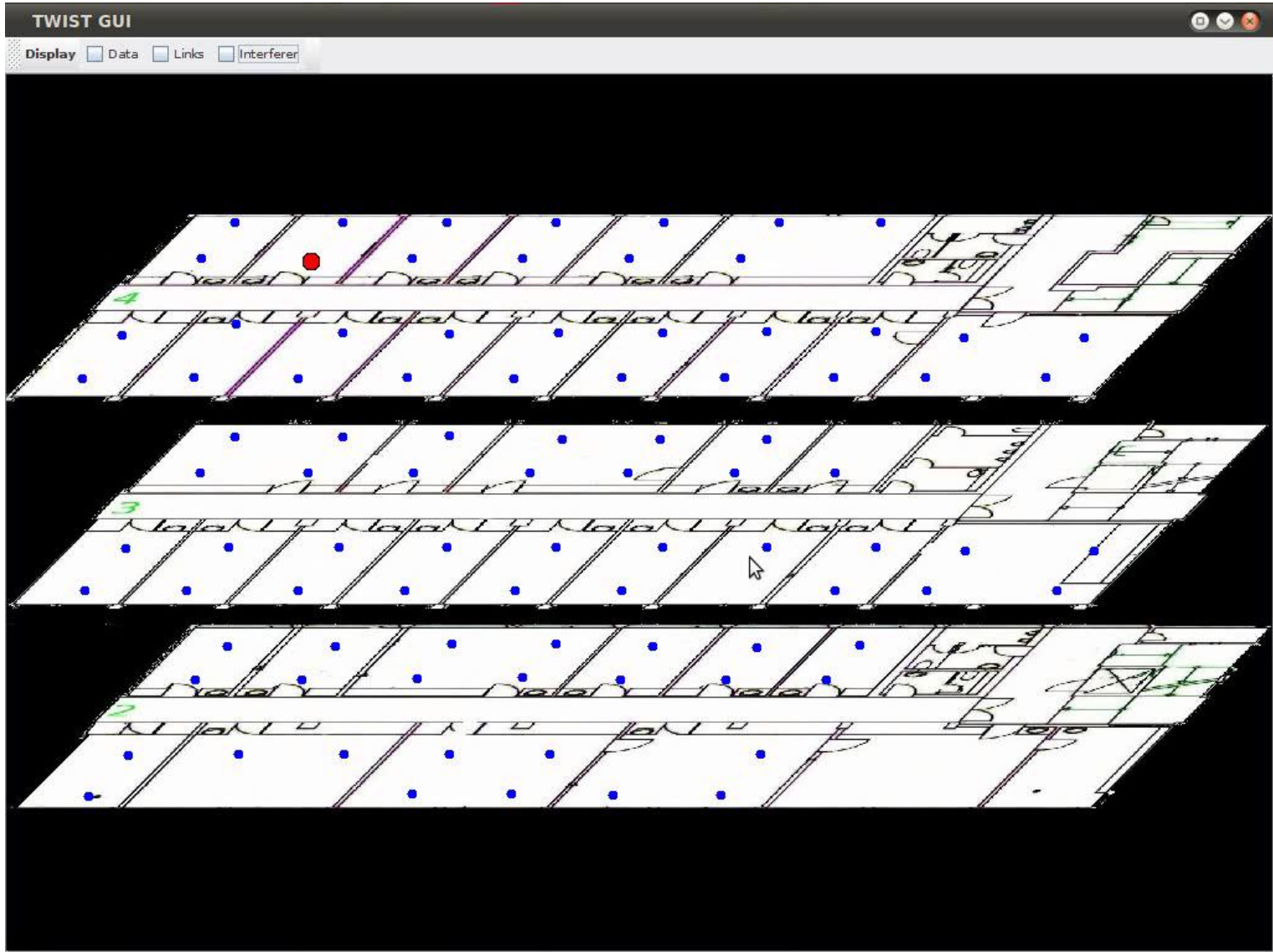


- Basic services
 - Node configuration
 - Network-wide re-programming
 - Out-of-band extraction of debug information
- Additional features
 - Support for heterogeneous platforms
 - Active power control
 - Support for hierarchical networks
- Built on open standards, open architectures, open source

- Web-interface: <https://www.twist.tu-berlin.de:8000/>



- Web-interface services
 - Account registration
 - Job registration
 - Sensor node firmware installation
 - Active power control
 - Tracing of results (node output) to text file
- In addition there is a serial control channel to every sensor node via SSH tunnel (to TinyOS SerialForwarder)
- Tutorials available on CREW portal
- Several papers have been written with results obtained on TWIST (SenSys, IPSN, TOSN, EWSN, ...)

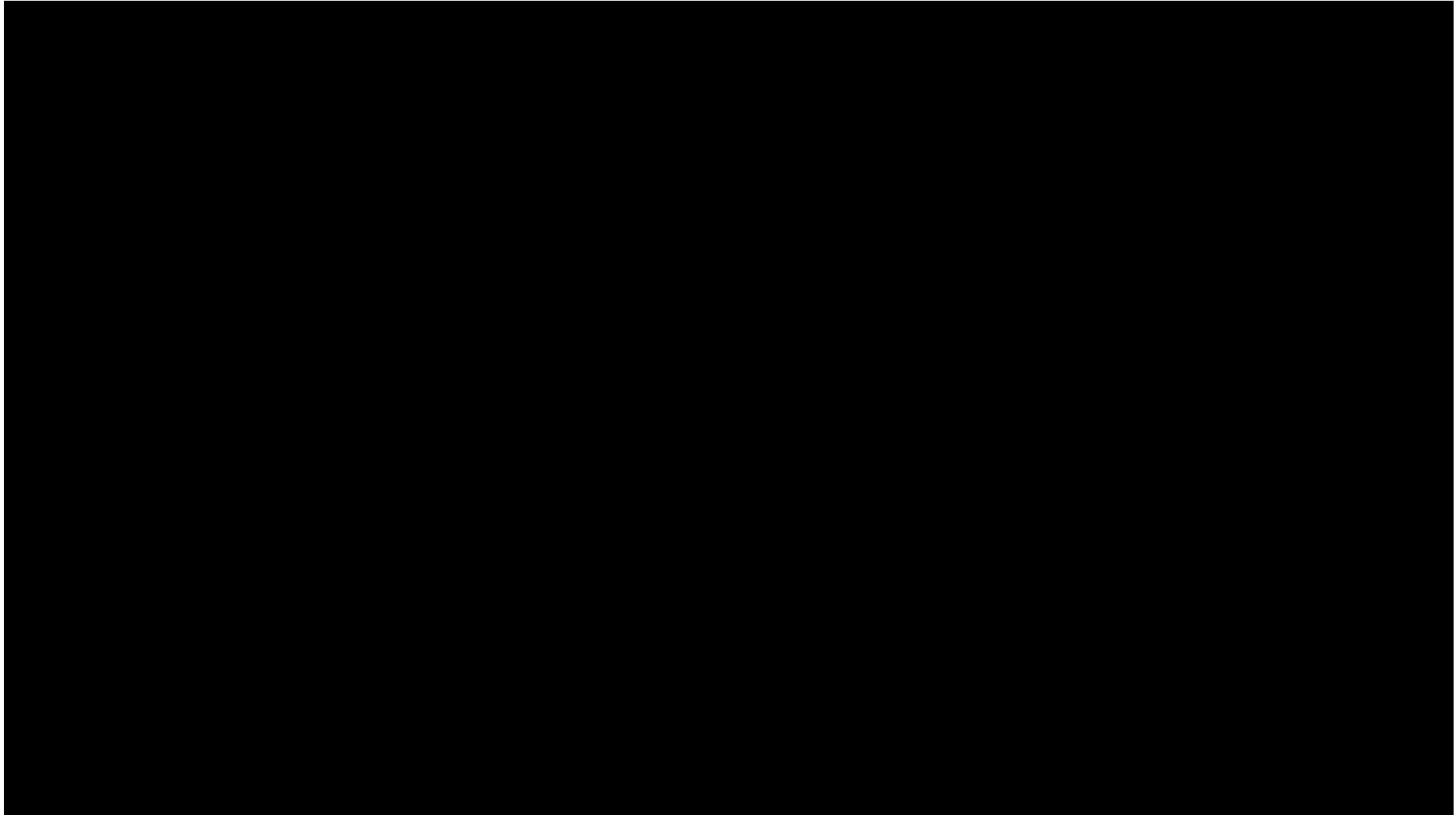


- TWISTbot: iRobot Roomba with a Microsoft Kinect sensor
- Can be programmed to follow certain trajectories in the TWIST building (scripted waypoints)
- CR Devices can be mounted on the robot, e.g. to record RF environmental maps, or perform experiments emulating body area networks





TWISTbot Demo



■ 8-16 Shimmer2 wearable sensor nodes

- Two radios: CC2420 transceiver and a Bluetooth radio
- Acceleration sensor and various medical sensor boards
- MiniSD Card (2GB) to store measurement traces
- We additionally provide a custom setup that allows to connect the BAN nodes via a digital I/O control channel (cabling).



■ Several WiSpy 2.4x USB Spectrum Analyzers

- Small, mobile, low-cost devices to scan RF noise in the 2.4 GHz ISM band
- We provide a customized software framework, which provides an experimenter with fine-grained control over the parameter setting (e.g. select only a subset of the entire 2.4 GHz ISM band)

