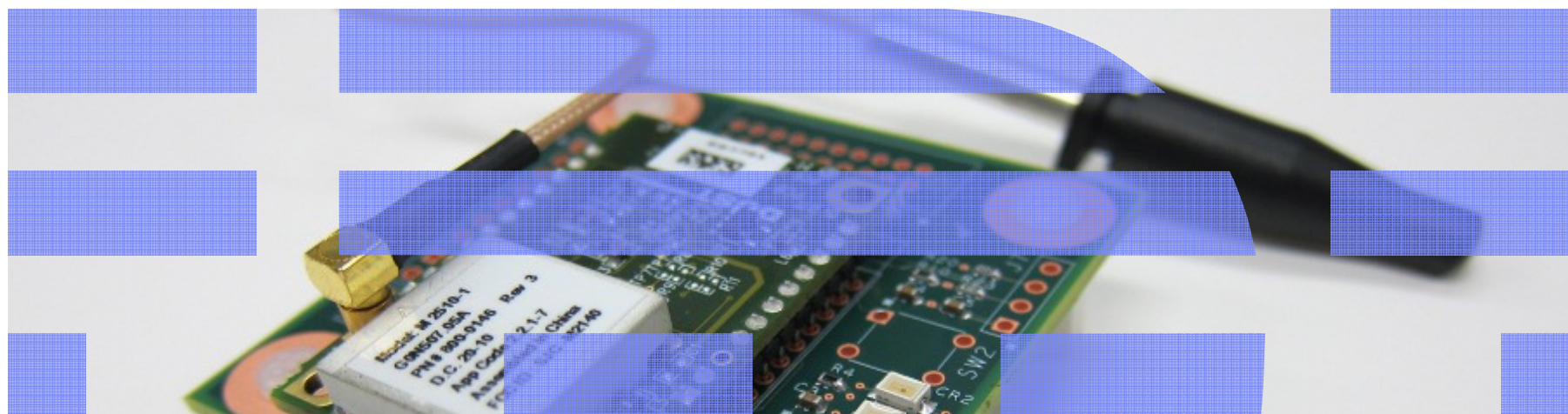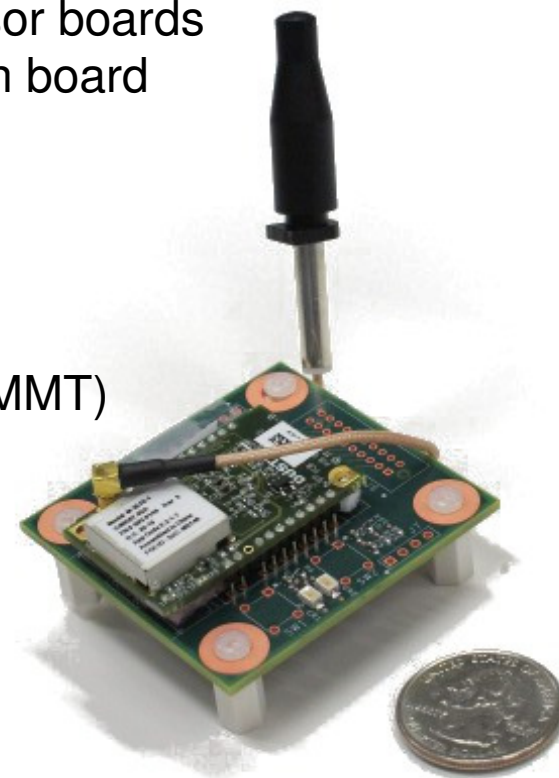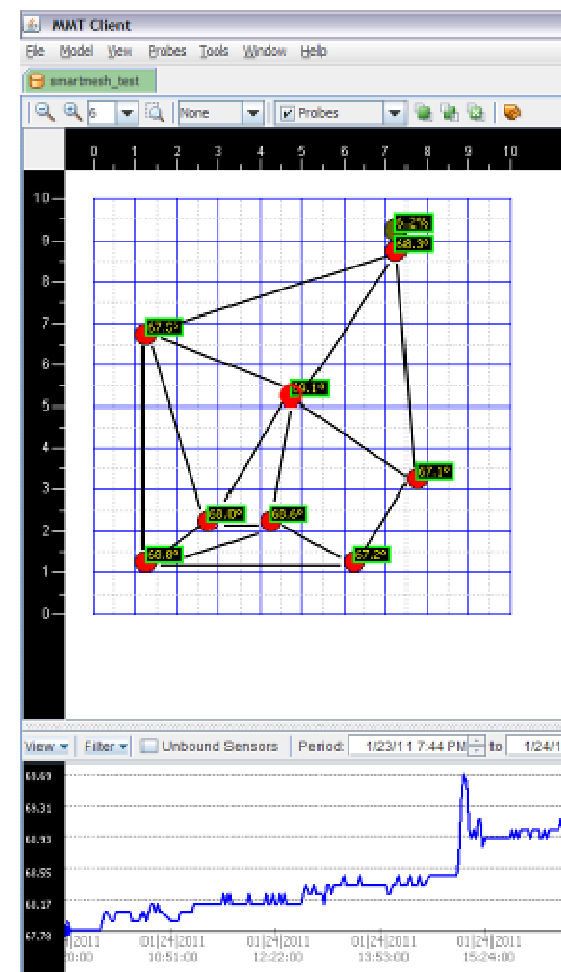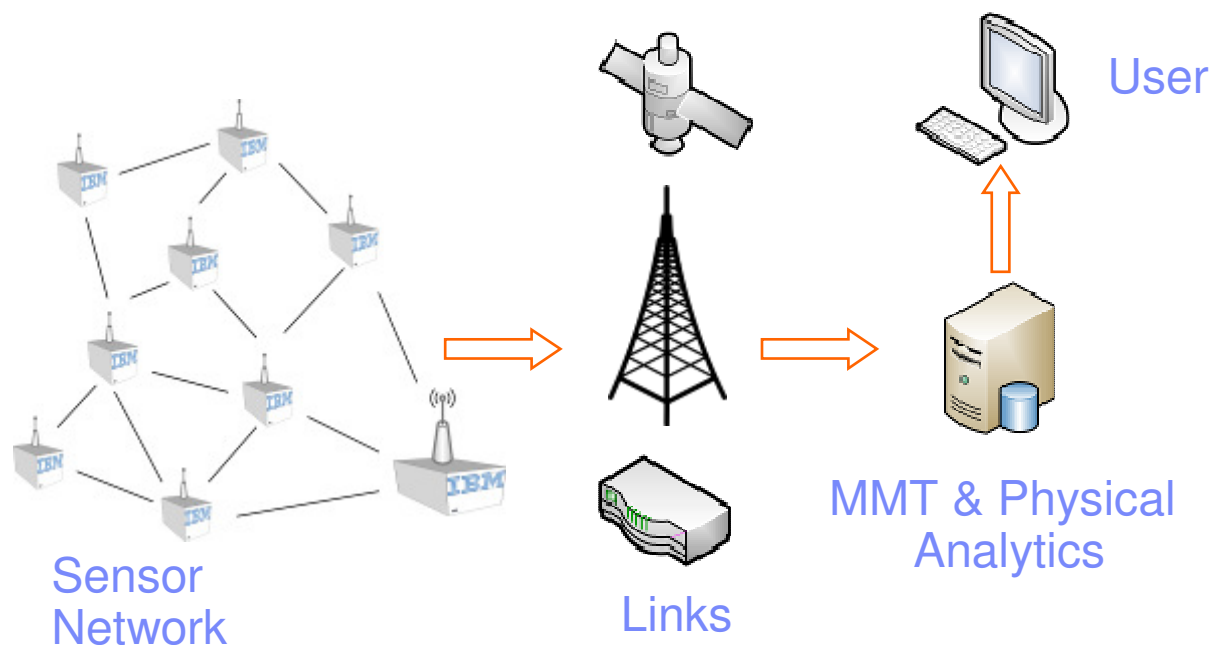# Low-Power Mote Technology
IBM MMT Wireless Platform

Low-Power Mote Technology (LMT)

- IBM wireless sensor platform

- Unique advantages
  - Ultra low power consumption leveraging time-synchronization protocol
  - Flexible and modular design
    - includes radio chip, low power microcontroller, sensor boards
    - designed to support multiple sensors and expansion board
  - Very small footprint
  - IBM system design

- Applications
  - Business platform
    - Data Center Monitoring and Energy Management (MMT)
    - Telecom Central Office Monitoring
  - Research Platform
    - Art conservation management
    - Environmental Monitoring and Management
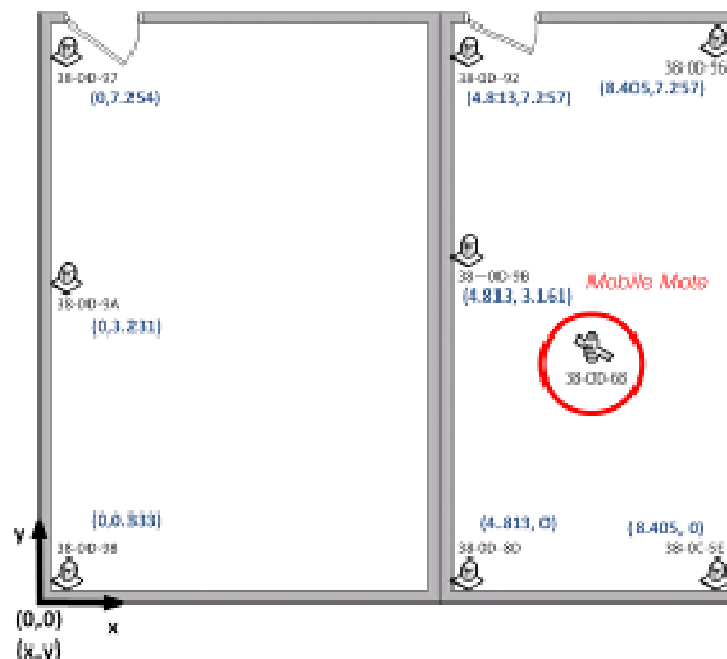   - Hygiene Compliance by Hospital workers

LMT Wireless Measurement Platform

- Vision
  - Flexible solution bridging remote and ubiquitous sensing
  - Integration with smart environments & internet of things

- Technology
  - Monitoring (sensors)
  - Controlling (actuators)

- Endless Applications
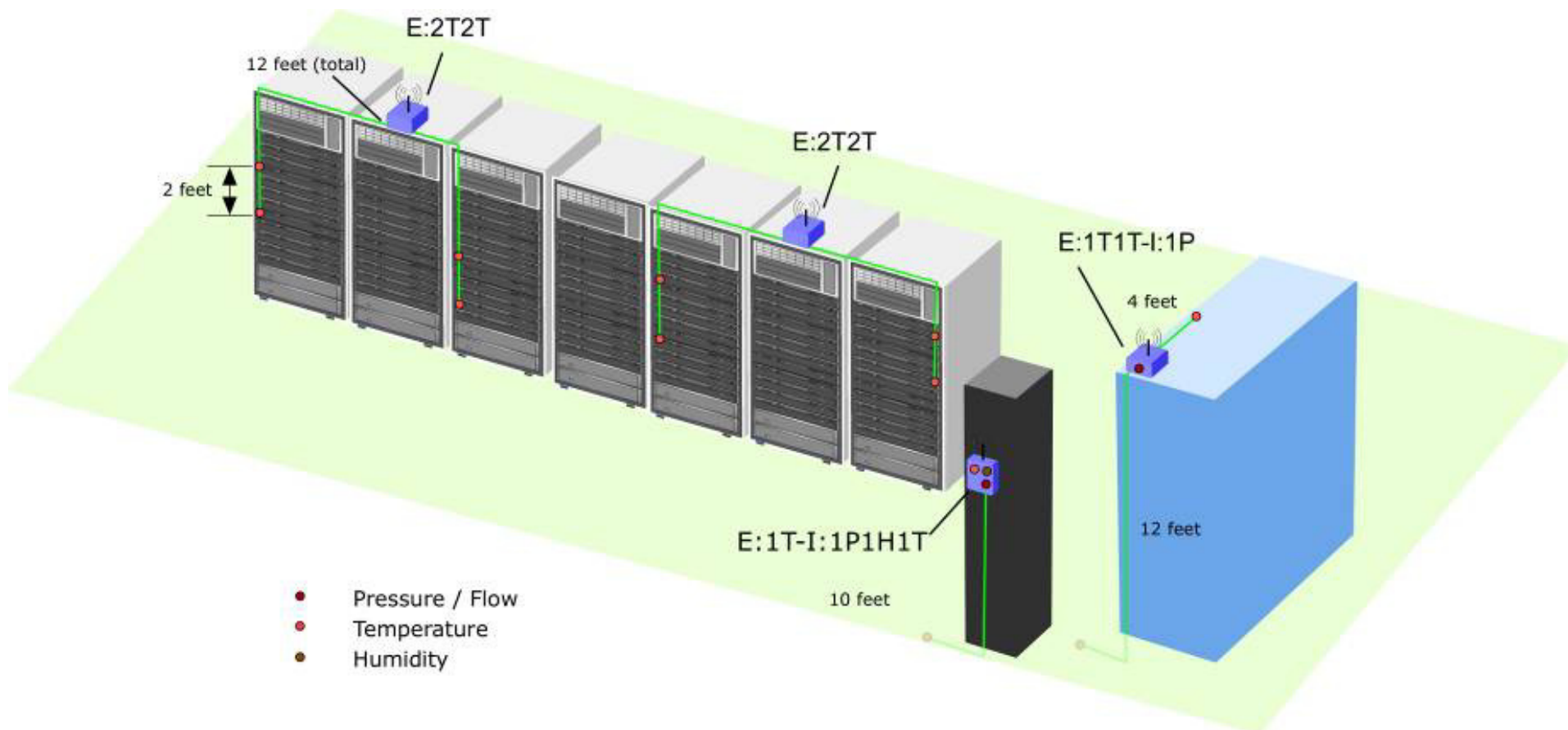 - Environment, occupancy, asset tracking

User

Sensor
Network

Links

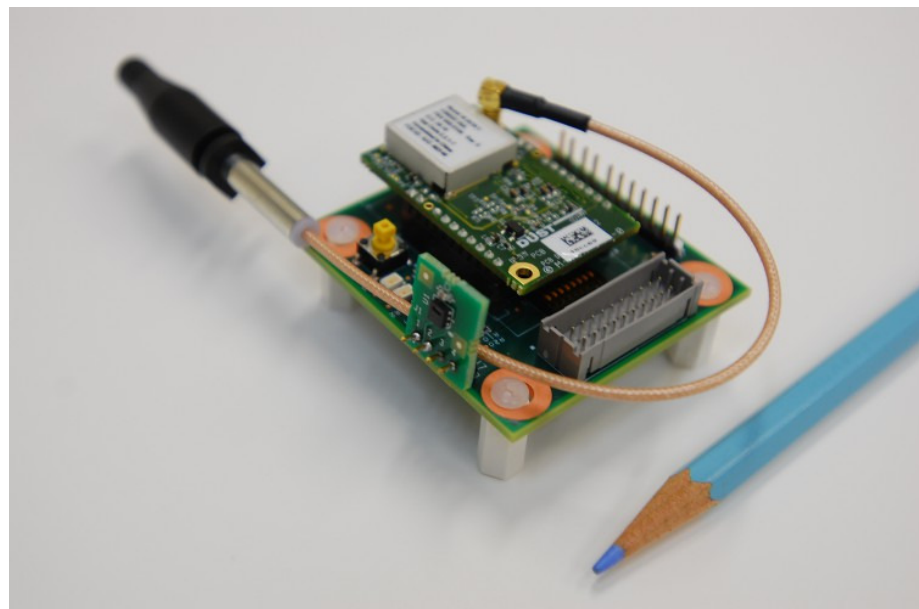MMT & Physical
Analytics

3

LMT Sensing and Localization

- Forms mesh network, highly reliable, robust and scalable

- Localization capabilities (down to 1-2 feet)
  - Assets and people

- Environmental sensing:
  - Temperature, Humidity, Dew point
  - Pressure, Air flow
  - Particulates
  - CO_2, SO_2, CO, VOC
  - Air quality, Corrosion
  - Presence and Occupancy
  - Door positions
  - Assets, Location

Application for Data Centers

E:2T2T

12 feet (total)

2 feet

E:2T2T

E:1T1T-I:1P

4 feet

E:1T-I:1P1H1T

12 feet

10 feet

- Pressure / Flow
- Temperature
- Humidity
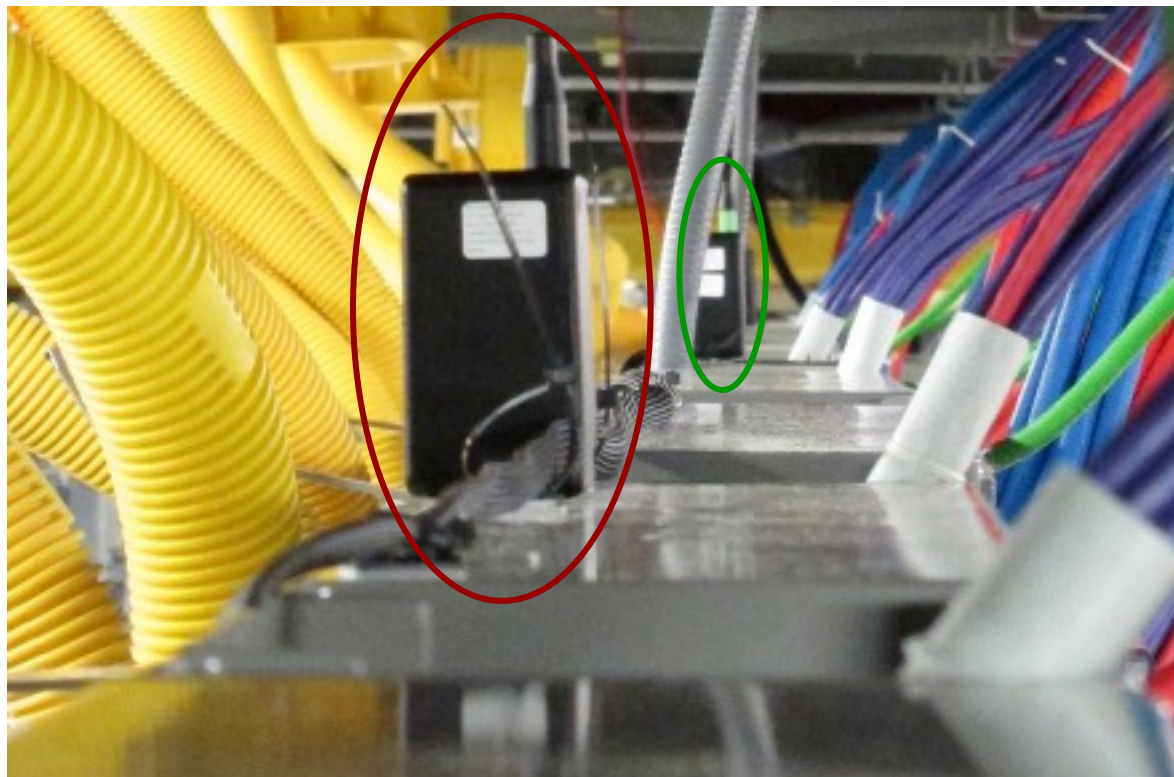
LMT Sample Devices

Motherboard
and Radio

Corrosion Sensor
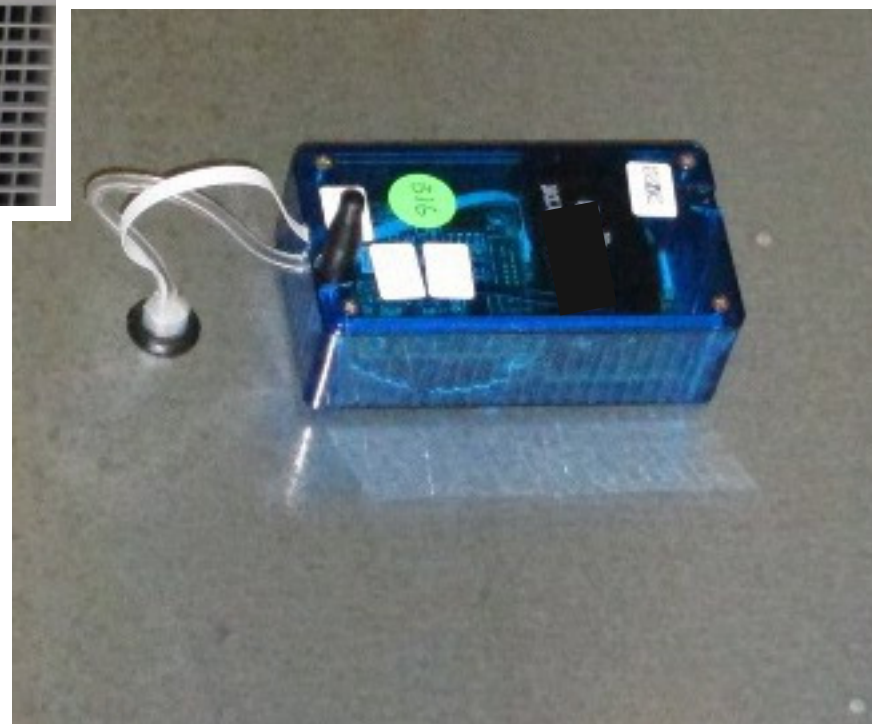

Humidity and
Temperature Sensors

Temperature
and
Humidity Sensors

Pressure and
Temperature Sensors

Application for Hospital Hygiene Compliance

- Staff with RFID **badges**

- **Motes** with RFID reader &

A (capacitive, noise)
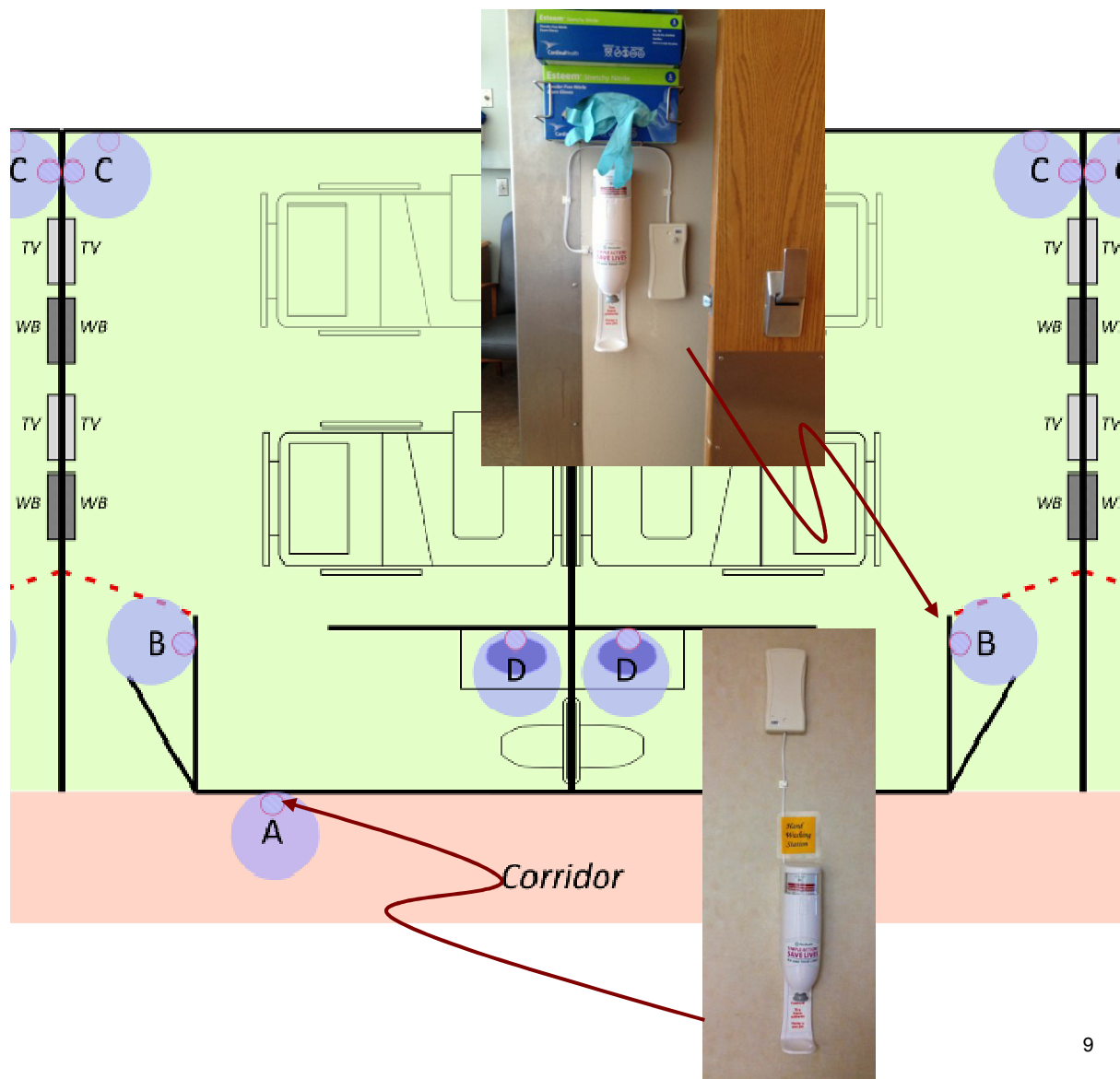- sanitizer use
- noise

B (capacitive, PIR)
- sanitizer use
- room entrance

C (capacitive, RH, T)
- sanitizer use
- relative humidity
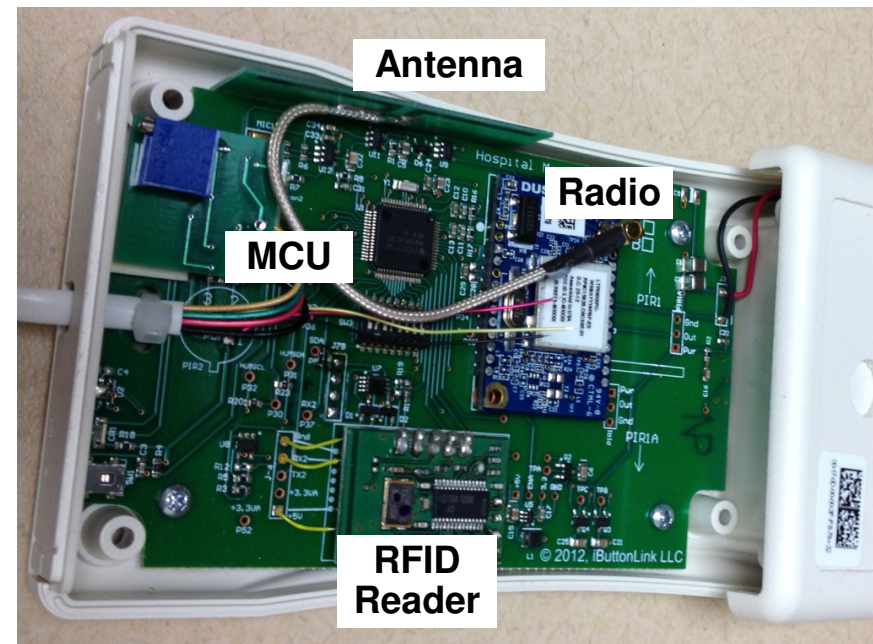- temperature

D (capacitive)
- sanitizer use

Corridor

Motes and Active RFID Technology

Motes

- Active RFID reader

- Wireless mesh network
  - Multihop communication

- Multiple sensors support
  - Temperature and RH
  - Magnetic
  - Capacitive
  - Pressure
  - Noise

- Battery powered

Active RFID tags

- Periodic ID transmission

- Battery powered

Antenna
Radio
MCU
RFID Reader

Active RFID Tag