

# Embedded sensor board

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# Overview

The talk covers . . .

1. H/W features (microcontroller, sensors, comms)
2. Usage experience (sensor capabilities, programming)
3. Applications

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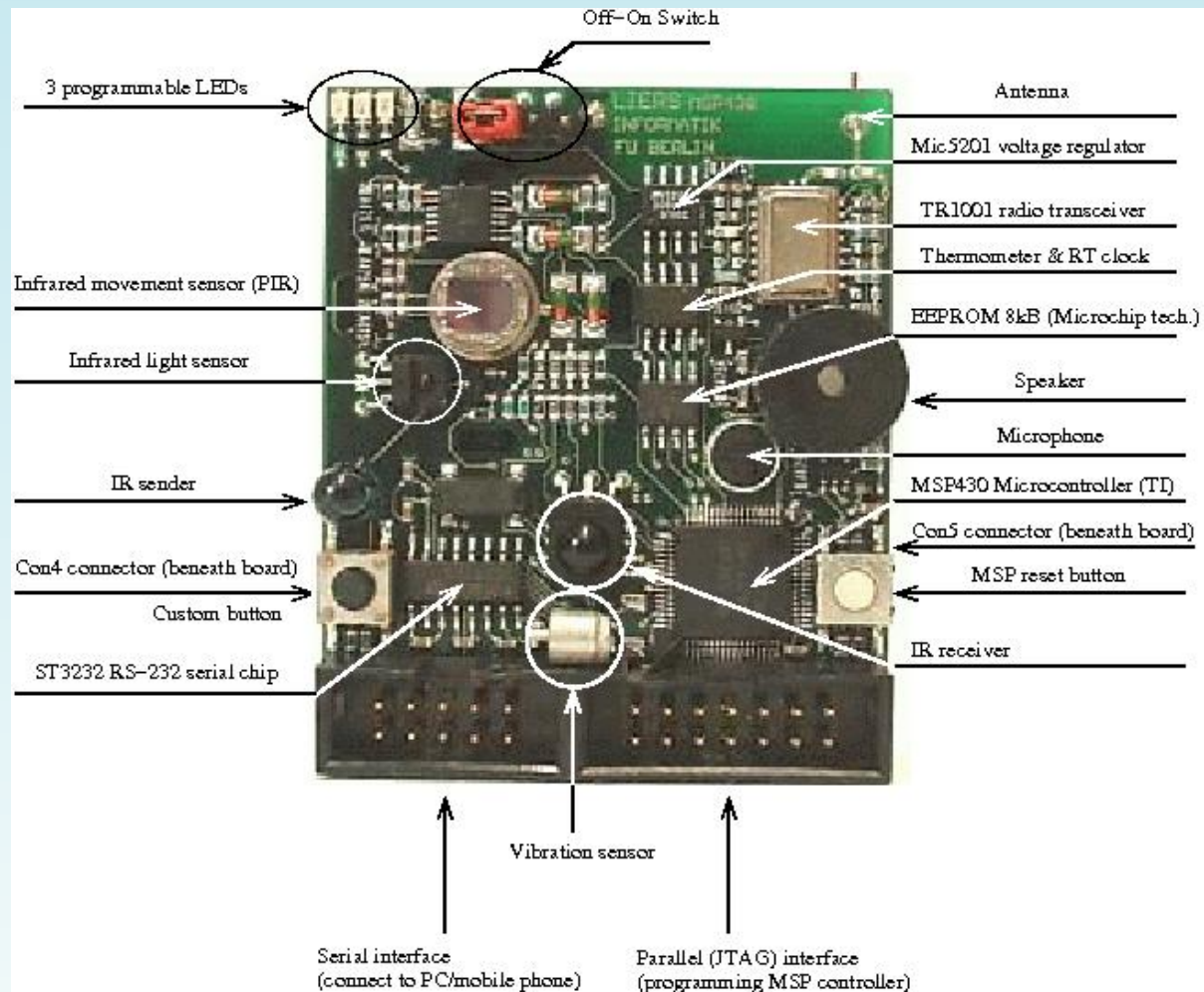


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- Software replacement over the air



# Specifications - Hardware





# Means of sensing

- Temperature ( $-55^{\circ}$  to  $+125^{\circ}$ ,  $\pm 2^{\circ}$ )
- Light intensity
- Vibration
- Microphone (detect upto 120 dB)
- PIR movement detection (5 m)
- 2 buttons (reset and custom)



# Means of communication

## IN/OUT

- Serial (cable to pc or cell, upto 115 kb/s)
- Radio transceiver 858 MHz (0.1 to 300 m, 19kb/s)
- IR transmitter/receiver

## Just OUT

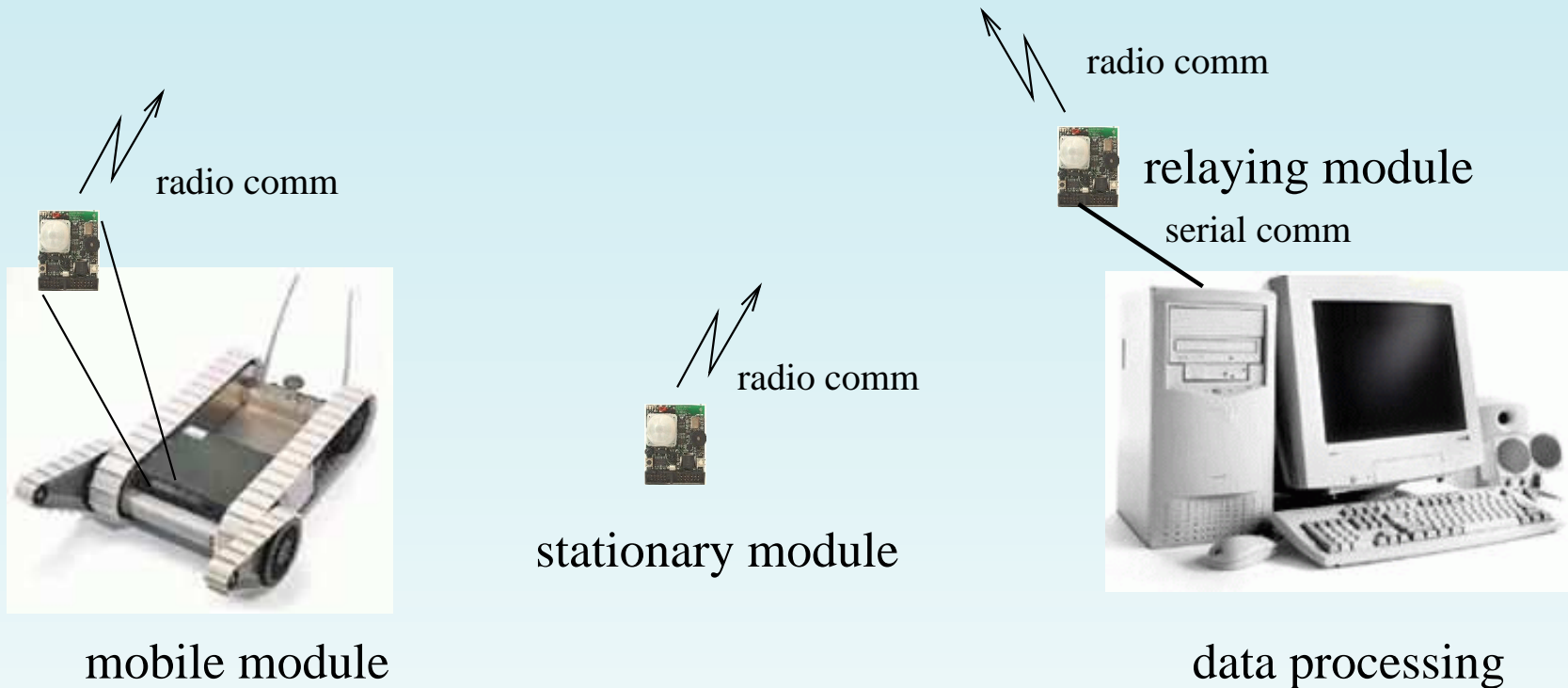
- Beeper
- Three LEDs



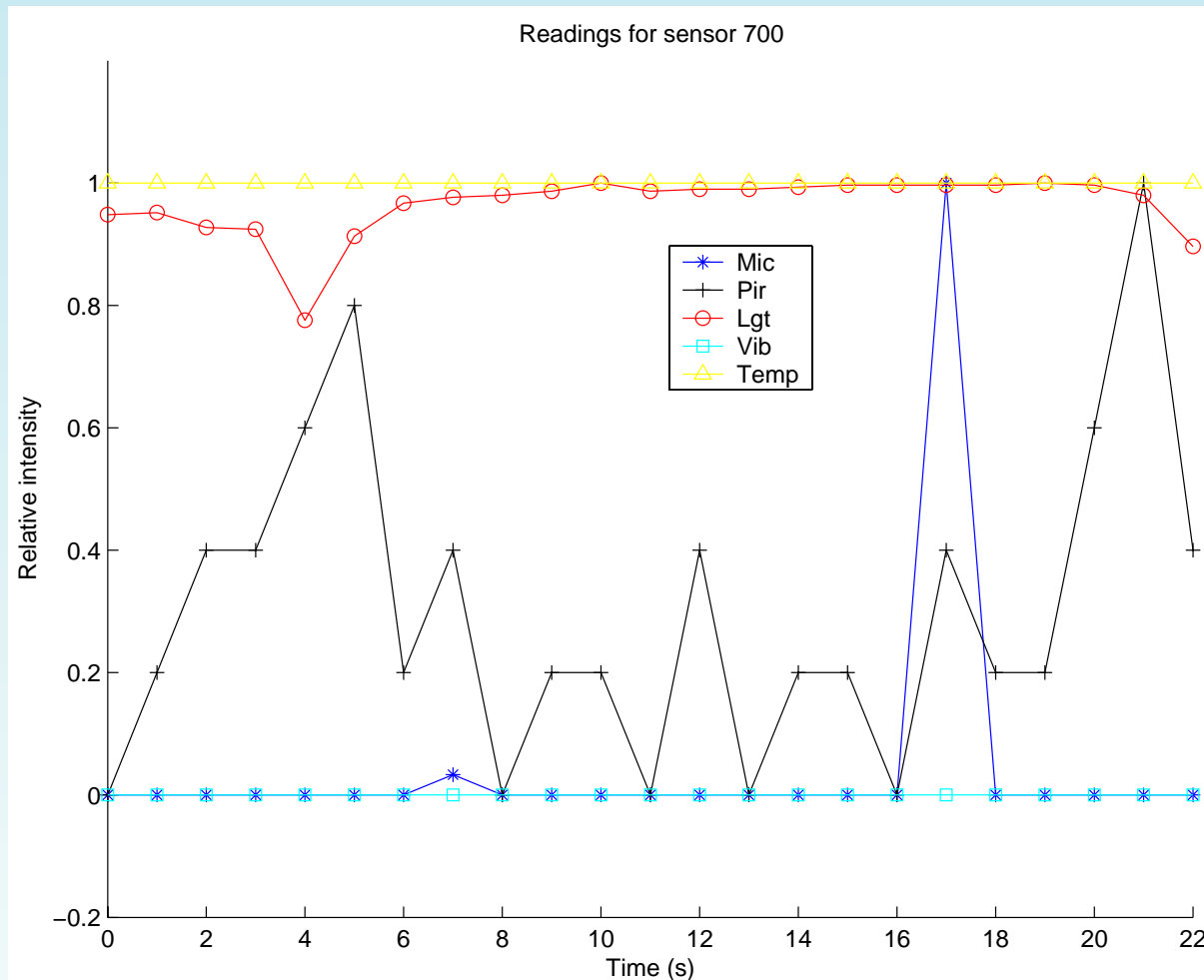
# Specifications - Software

- Supplied OS for handling events (triggers, radio messages, etc)
- **Firmware and User applications**
- Can host other OSs such as TinyOS or Contiki
- compile: msp430-gcc, flash: IAR C-SPY, platforms: Win, Linux, FreeBSD

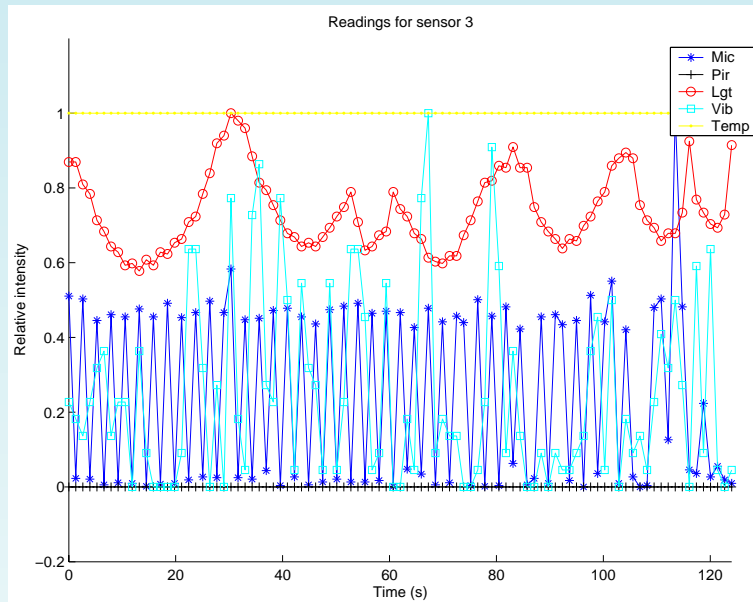
# Sensor experiments: setup



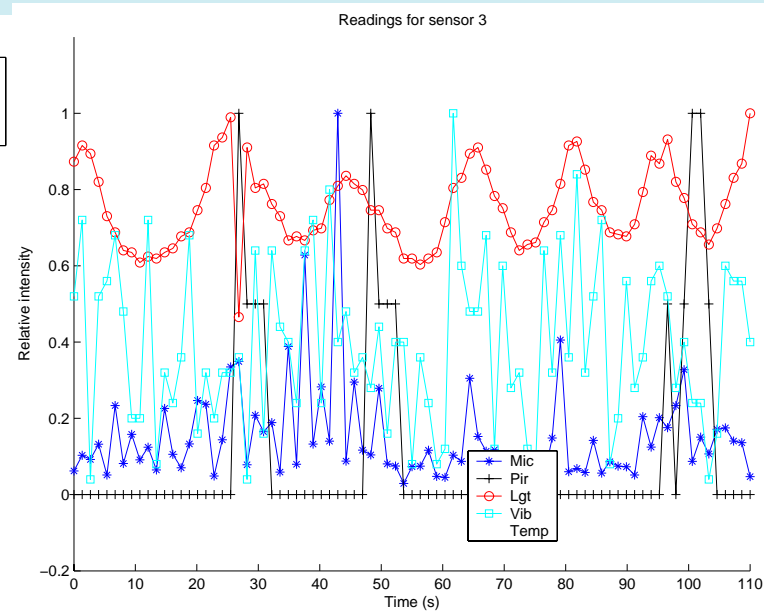
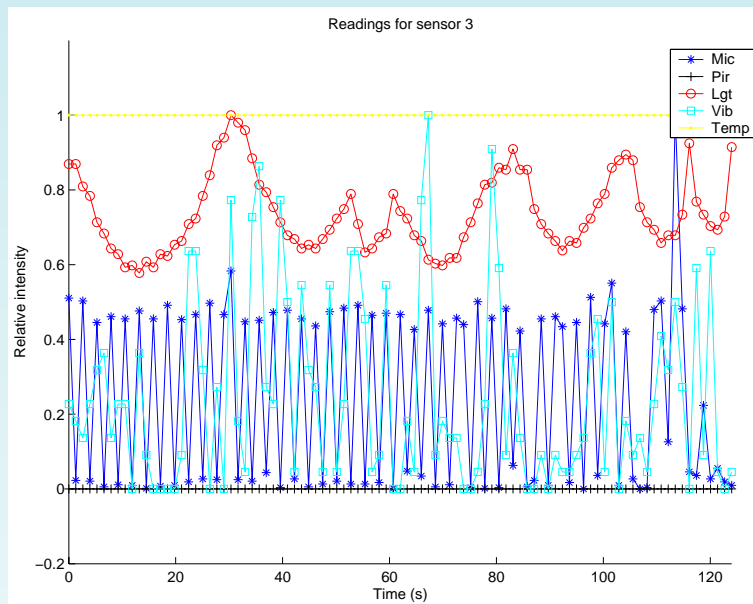
# Stationary sensor



# Mobile sensor



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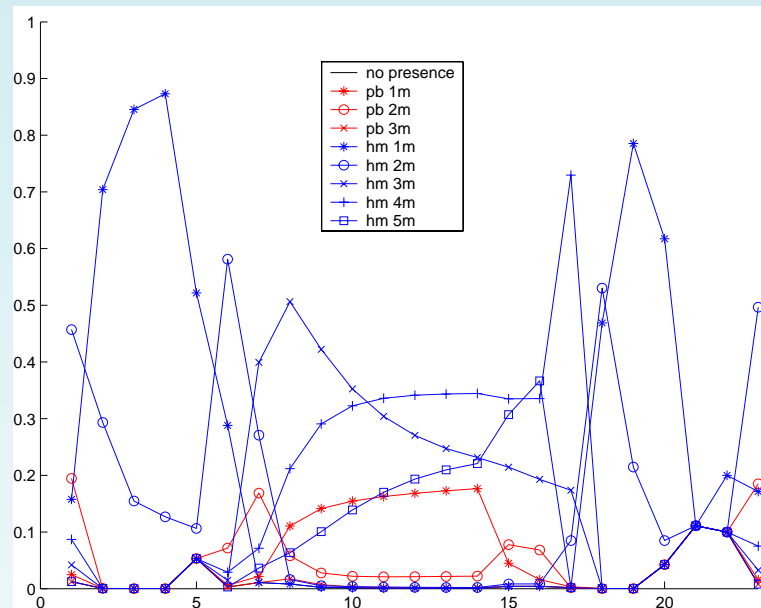
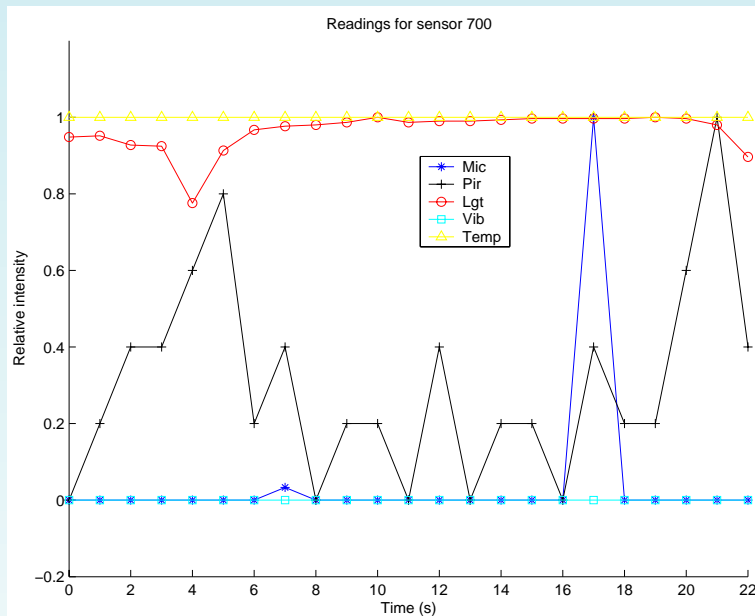
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- Bayesian inference and classification

# Time integrated data fusion for classification



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- **Sensor equipped members of battle groups**
- **Building coverage** with packbots - in collaboration with FMV