EYES project overview

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Overview

EYES:

a research project, addressing selected topics hardly understood in Europe when EYES started!

General goal:

Develop architecture and technologies for building self-organizing, collaborative, and mobile wireless sensor networks

Facts & Figures

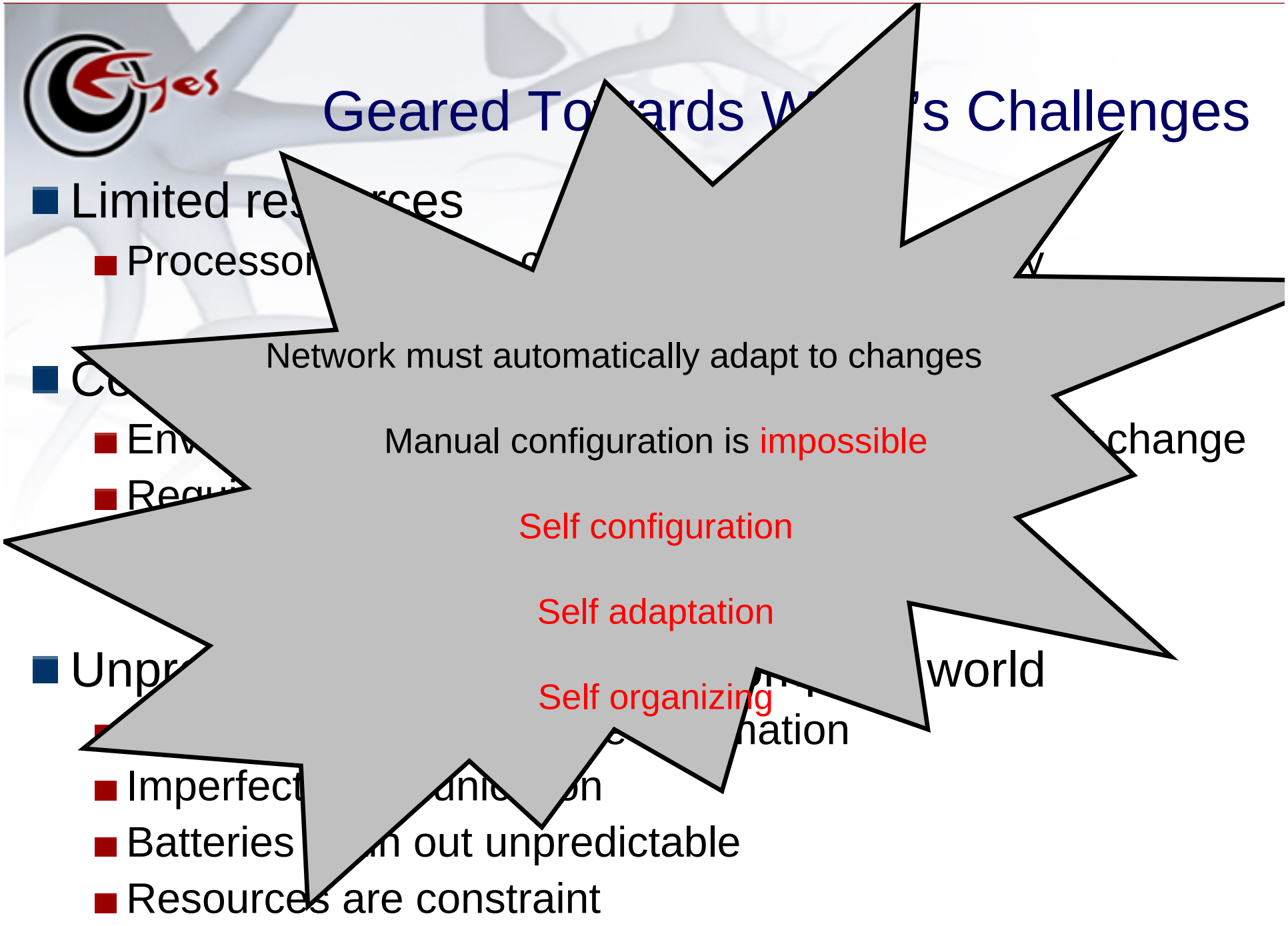
- Some facts
  - Duration: 3 years; started 1-3-2002
  - Budget: 4.730 MEuro
  - Number of person/years: 39 fte

- Partners
  - University of Twente / CTIT (coordinator)
  - Nedap N.V., Groenlo
  - Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Italy
  - Rome University “La Sapienza”, Italy
  - Technical University of Berlin, Germany
  - Infineon Technologies, Austria

Areas of Interest

- Large-scale prototypes
- EYES research areas:
  - Network protocols:
    - MAC
    - Routing, transport protocols
  - Enabling mechanisms:
    - localization
    - synchronization
    - clustering
  - Security
  - “in network” distributed services/algorithms within sensor networks

Primary metric: energy efficiency



Geared To[illegible]ards W[illegible]'s Challenges

- Limited res[illegible]rces
  - Processor[illegible]
- C[illegible]
  - En[illegible]change
  - Requ[illegible]
- Unpr[illegible]world
  - [illegible]nation
  - Imperfect [illegible]unic[illegible]on
  - Batteries [illegible]m out unpredictable
  - Resources are constraint

Network must automatically adapt to changes

Manual configuration is impossible

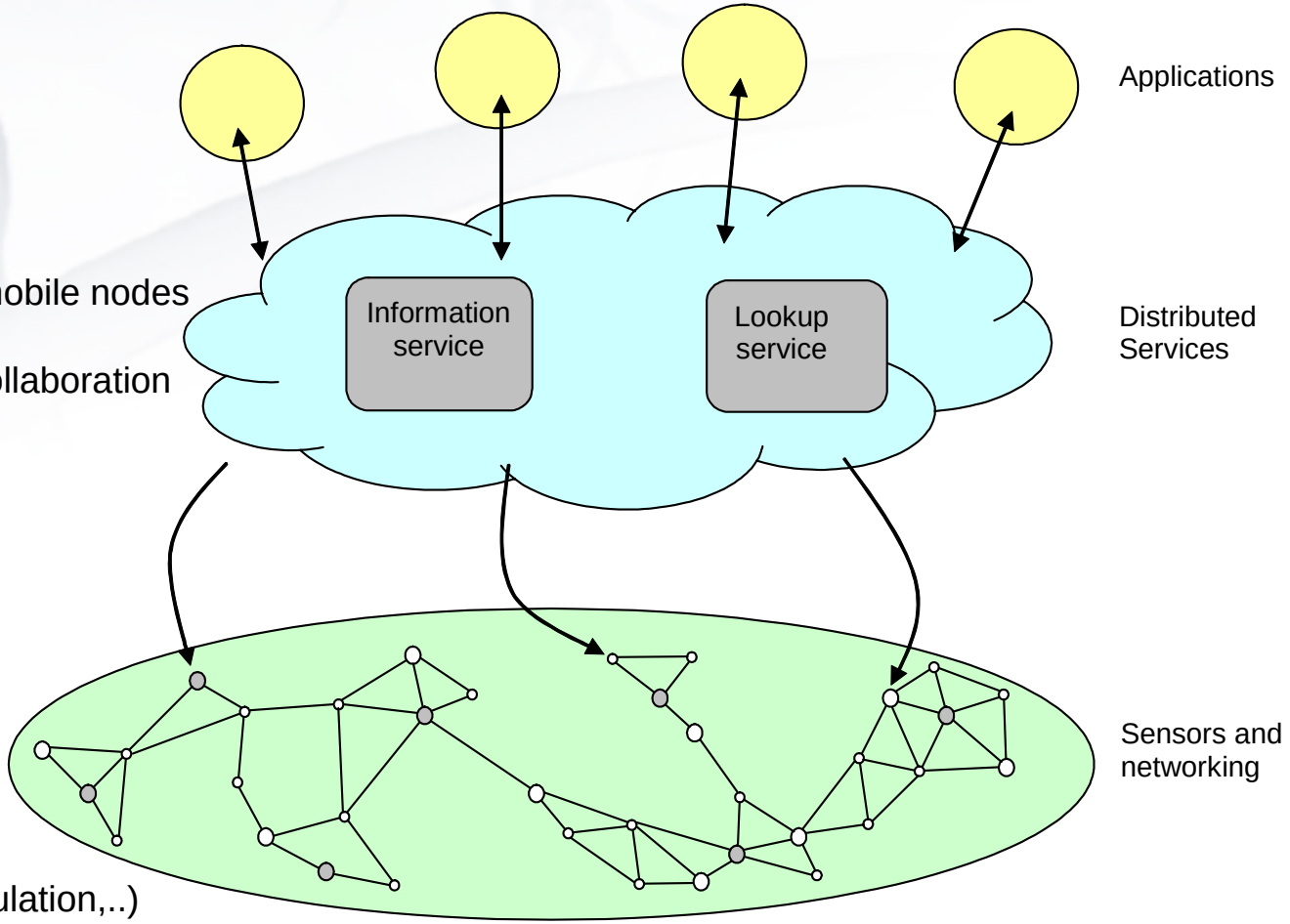
Self configuration

Self adaptation

Self organizing

Abstraction layers of Sensor Network Architecture

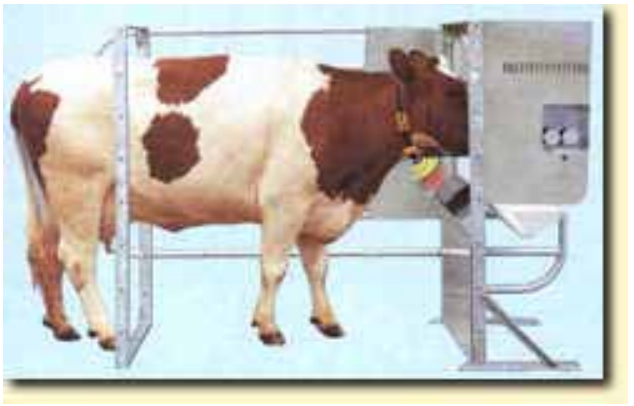
- Distributed services supporting mobile nodes
- Security
- Service discovery, consensus, collaboration
- Semantic addressing



- Nodes, system support (OS, simulation,..)
- MAC, routing, clustering, etc. (cross-layered)
- Coding, data reliability
- Localization and time synchronization

Application example (1) Farming, e.g. cows

- Using smart sensors attached to the cow, milking equipment, and feeding points
  - Monitor milk while milking
    - Detect illness
    - Monitor quality
  - Monitor movement of cows
    - Detect illness
    - Detect right period for insemination
      - Only few days per month
      - A miss costs 30 euro!
  - Feed the cow towards its specific needs

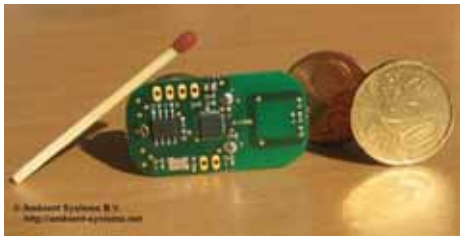


Application example (2)

- Distributed access control systems
  - Using small smart sensors in door locks & accessories
    - Several year unattended operation without battery changes
    - Auto-configure, scalable & reliable
    - Localization contributes to ease of installation and tracing
- Building automation
  - Using small smart sensors to monitor environmental conditions (temperature, humidity, light)
    - Several year unattended operation without battery changes
    - Auto-configure, scalable & reliable
    - Semantic addressing and service discovery

How can you benefit from the results obtained in EYES?

- Two hardware platforms are available, based on
  - an MSP430 processor with
  - RFM1001 radio (nedap), or
  - Infineon radio (Infineon): available as development kit, including TinyOS
- Ambient Systems B.V.
  - a spin-off company from the University of Twente and the EYES project
  - Offers tiny embedded networking platforms, energy efficient protocol suite, and a real-time OS
  - www.ambient-systems.net



- Operating systems
  - AmbientRT
  - MSP430 platform is now supported in TinyOS
- Most research results are publically available!

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