GENESI: Green sEnsor Networks for Structural monItoring

How to keep smart buildings healthy?

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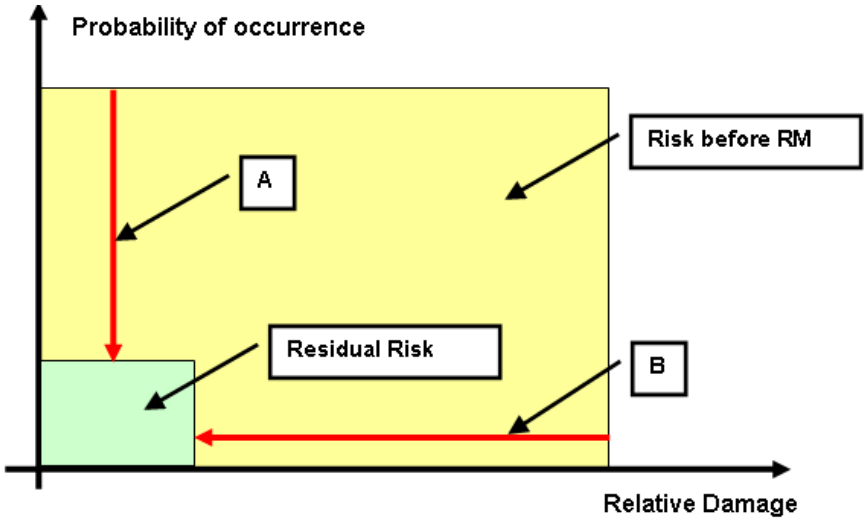
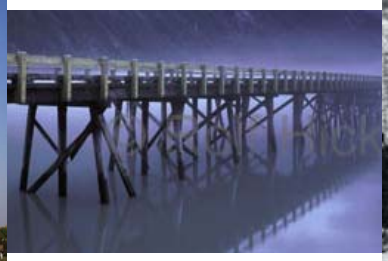
Structural health monitoring: a methodology to reduce risks



- A: Monitoring as early warning system can alert to improve structure stability and thus prevents structure collapse.
- B: Monitoring can alert to evacuate building on time before collapse

Market Size

- Europe has 7 billion square meters of commercial and governments facilities and buildings, more than 5 billion square meter of dams and bridges


- rehabilitation, renewal, replacement and maintenance of these structures are estimated to **require expenditure of at least one Trillion Euros**
- We expect WSN-based structural health monitoring to have a market size in the order of **tens of Billions**

How GENESI contributes to smart buildings

- GENESI system will enable long lasting monitoring of buildings **structural health**
  - important component of a smart building
    - public buildings often suffer from poor maintenance
    - historic building maintenance is of primary importance for Europe
    - embedding sensors in a building under construction allows to monitor it over time, for decades
      - securing buildings at risk in case of earthquakes, digging, underground construction
        - » saving lifes
        - » reducing costs

Impact on smart buildings technology

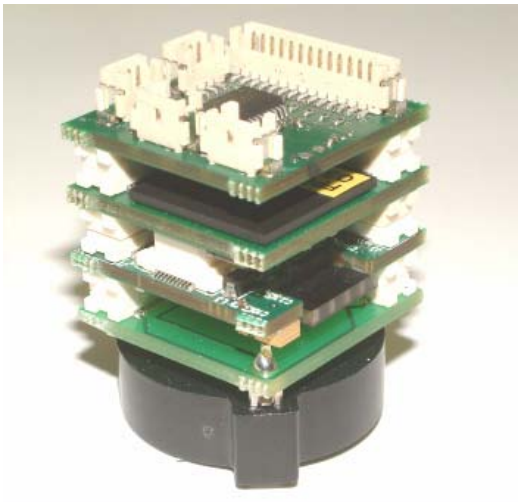
- GENESI advancement in WSN technology are more general and can be applied to more traditional smart buildings applications
- Key general WSN contributions
  - Radio triggering
  - Multi source energy harvesting
  - Robust, QoS aware communication protocols
  - Context awareness and learning techniques

WSN Platform for Smart Buildings

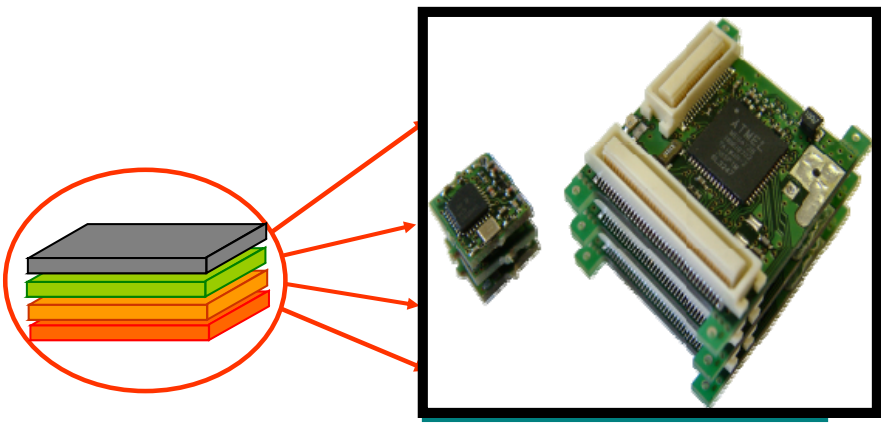
- **Hardware and Software platform Developed for WSN Prototyping:**
- **Development of Miniaturised Autonomous 3-D Modules**
- **Distributed, Ad-hoc Wireless Sensor Networks**

Key criteria

•Miniaturised, Modular, Reconfigurable, Scalable, Robust



Tyndall 25mm Mote

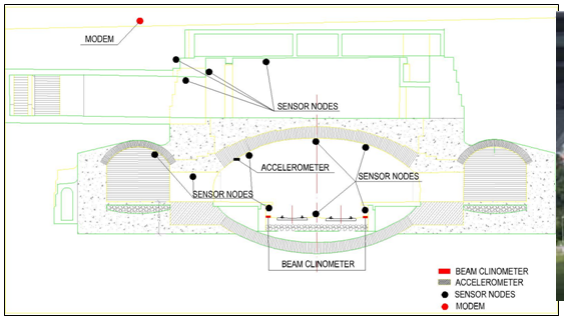


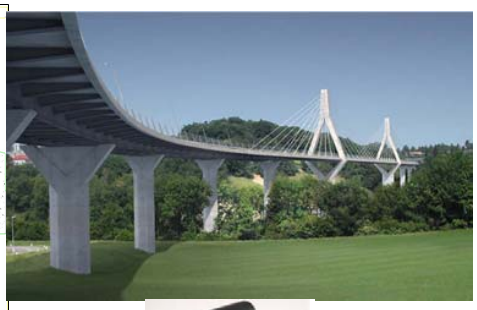
Embedded v Attached v Wired

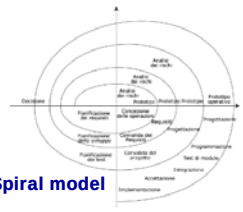
- Monitoring of a tunnel under construction
- Each monitoring section is constituted by 2 or 3 concrete segments equipped with 6 strain gauges with vibrating string.

- Monitoring of the metro station Colosseo
- Existing station
- Contineous monitoring, during excavations under the metro station, real time data communication

- Monitoring during construction of the Poya Bridge in Switzerland







Spiral model

Metodology

Mixed test-bed and in lab experiments

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Thanks for your attention.