

WIDE

”DEcentralized and Wireless Control of Large-Scale Systems”

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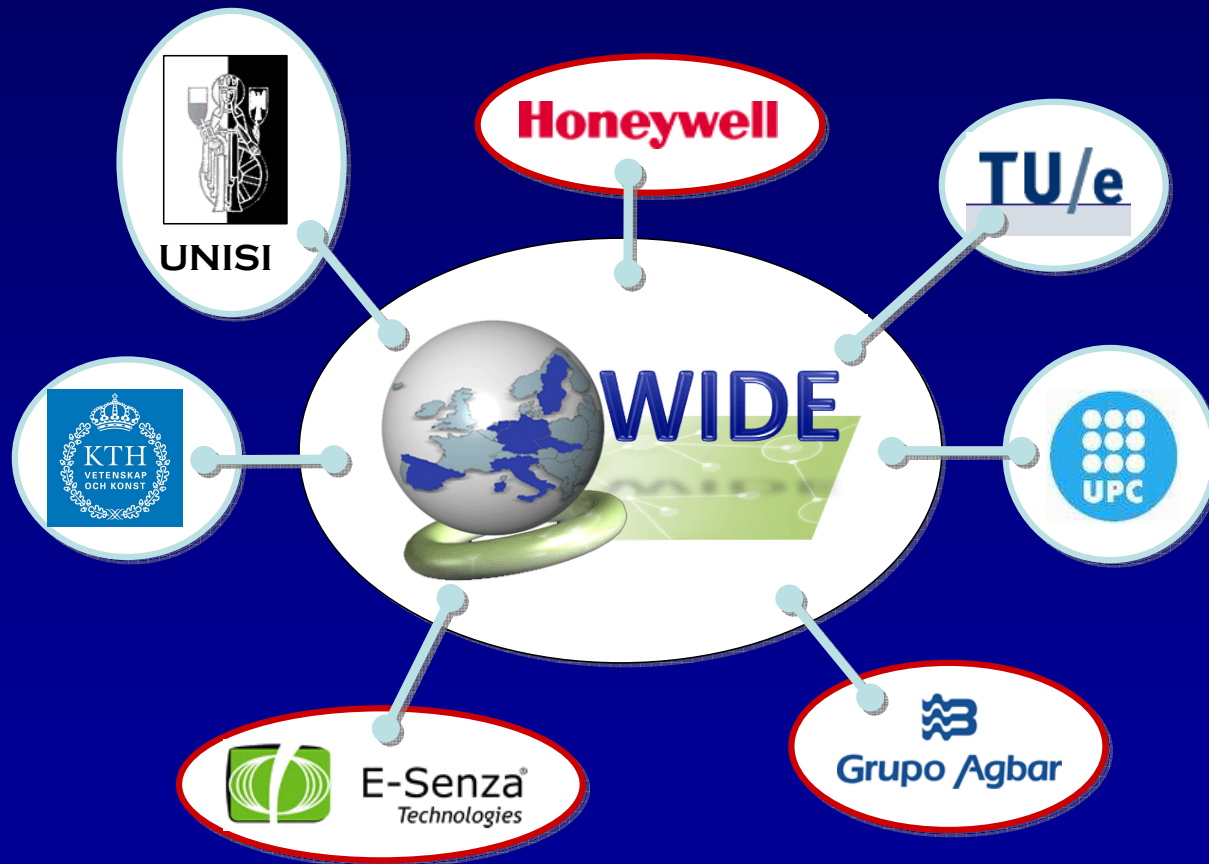


Univ. of Trento

<http://www.wide.dii.unisi.it>

WIDE Project (2008-2011)

- ICT-FP7-Call 2 (2008-2011), total budget 2.7M€. Started Sept. 1, 2008
- Objective ICT-2007.3.7 “Networked Embedded and Control Systems”



*WIDE focuses on **advanced control** of large-scale processes, exploiting feedback from **wireless sensor networks**, and on validating the approach on a **real city water distribution system***



<http://www.wide.dii.unisi.it>

Control of large-scale systems

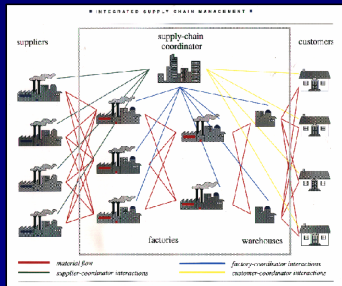


traffic networks

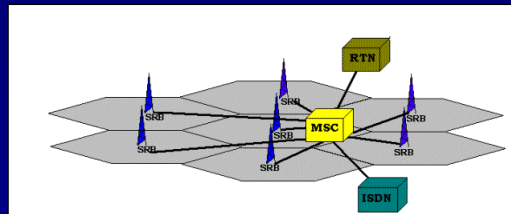


power systems

- Characterized by spatial distribution (large # of states, inputs, outputs)
- Lack of centralized information

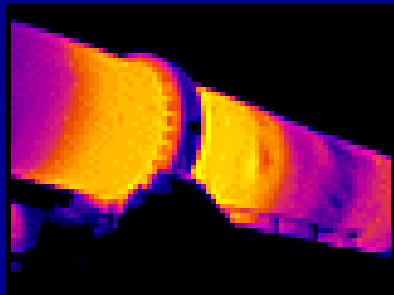


supply chains



cellular networks

- Lack of centralized computing capabilities
- Changes in topology



distributed parameter structures



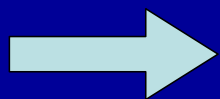
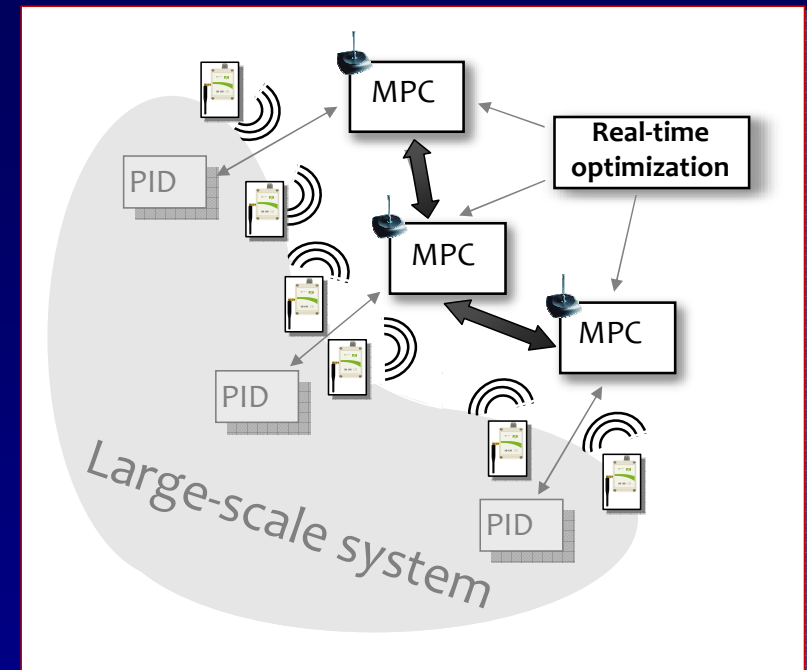
water distribution networks

Need for distributed control schemes

Need for flexible distributed information gathering systems

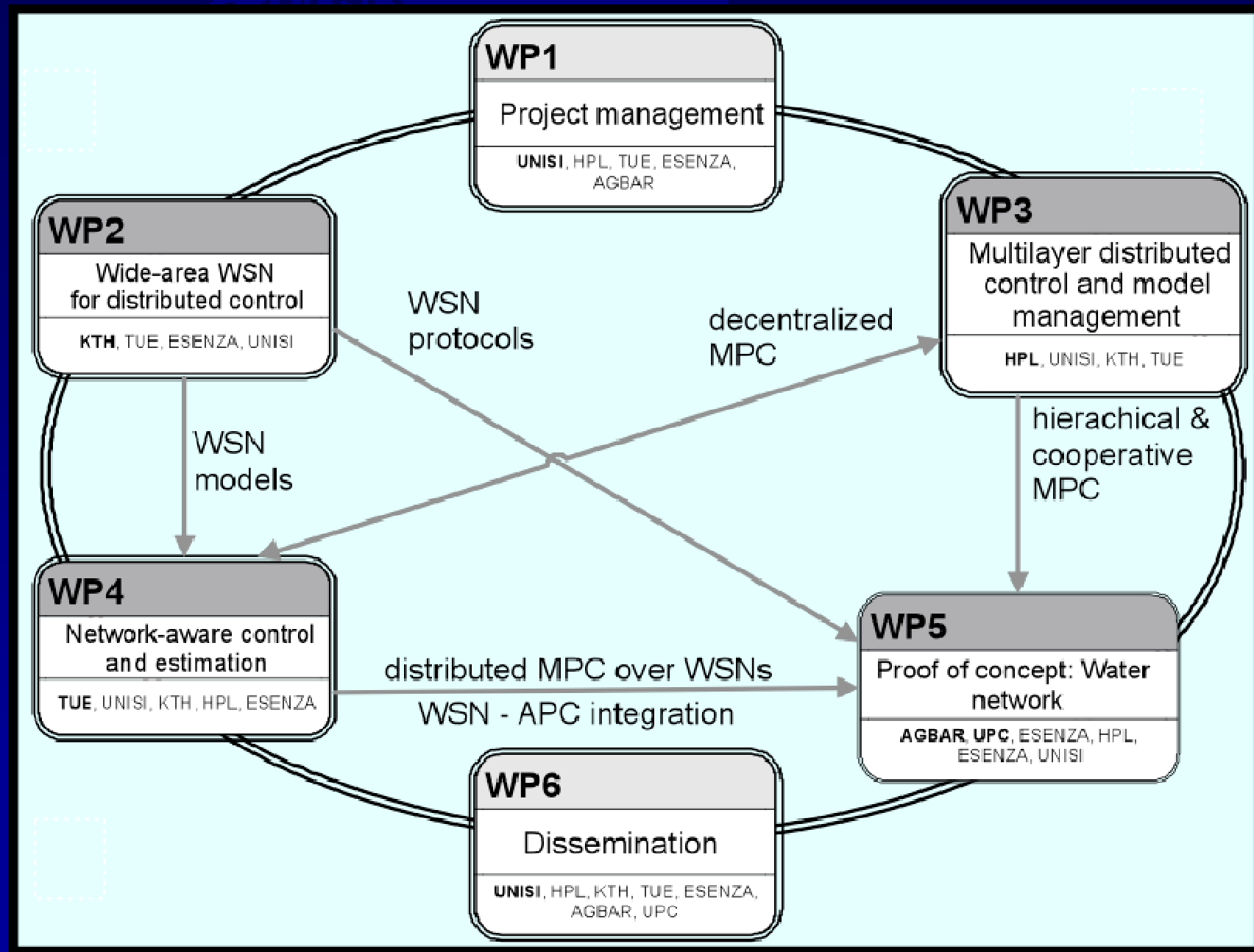
WIDE Objectives

- **Model management:** How to derive/identify submodels? How to map *global* control specs into *local* problems coherently?
- **Decentralized and hierarchical MPC** for dynamically-coupled large-scale systems:
- **Control-communication co-design:**
 - (1) feedback-oriented wide-area WSNs
 - (2) network-aware control algorithms
- **Demonstration** on the water distribution network of the city of Barcelona

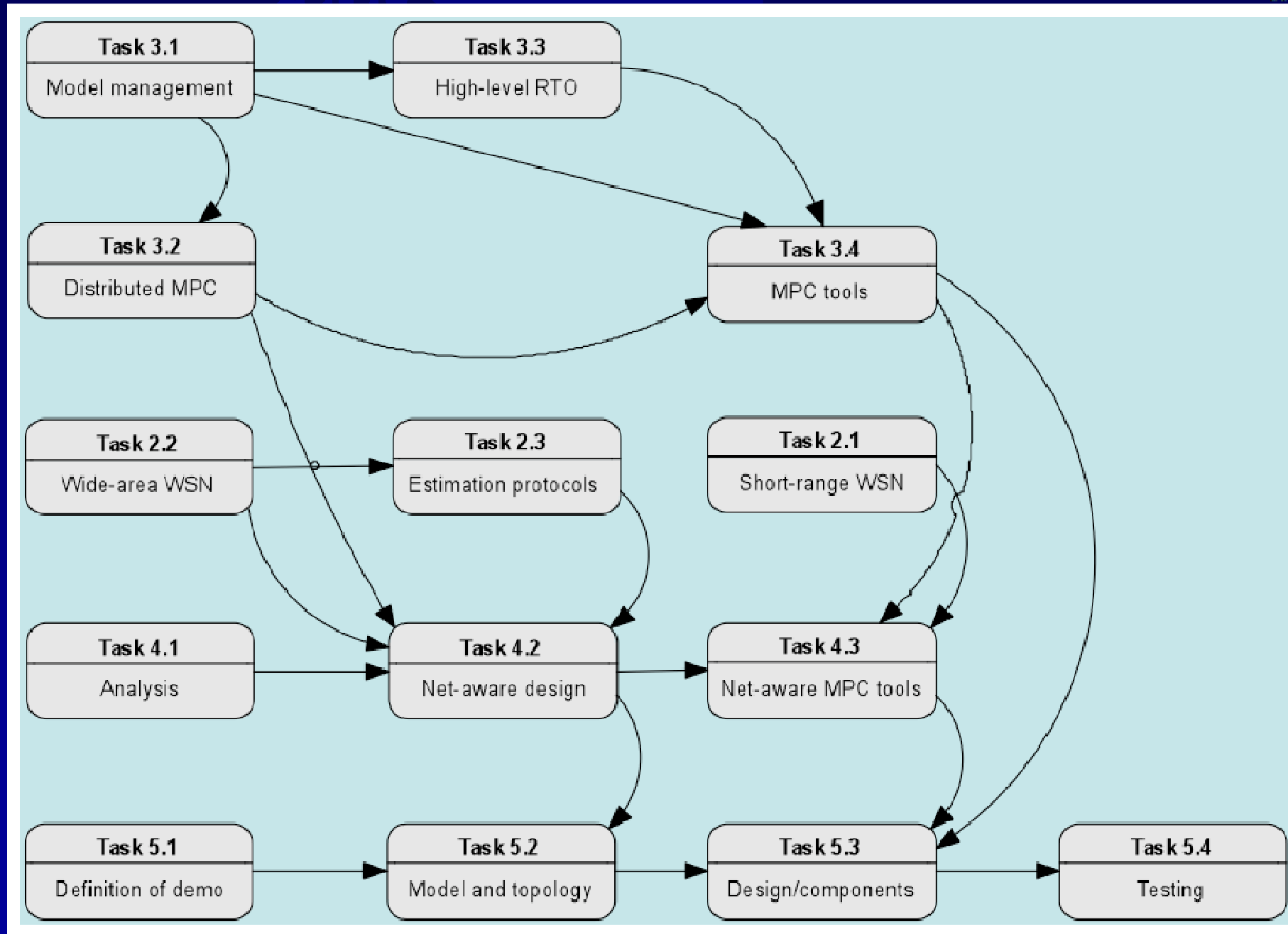


WIDE Toolbox for networked control systems design in MATLAB

WIDE - Workpackages



WIDE - Tasks



WIDE – Expected Results

- Distributed/hierarchical/networked **control methodologies** for large-scale systems
- A **Matlab/Simulink toolbox** for design and simulation of networked control systems
- Show ability of **WSNs** to collect distributed data for **feedback control**, beyond pure wide-area monitoring.
- The general tools will open new avenues for networked distributed control into **several application domains** (water networks, gas/oil distribution, environmental systems, power networks, etc.)
- **New market opportunities** for providers of industrial process control and WSN solutions