



Hungary-Romania
Cross-Border Co-operation
Programme 2007-2013

Two countries, one goal, joint success!

European Union
European Regional Development Fund



“Realization of Hungarian-Romanian R&D Laboratory for the Development of
Major Projects in Polluted Terrain Cleaning”

HURO/0802/100

MICROMODEL - DATA ACQUISITION AND SIMULATION SYSTEMS



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OUTLINE

- 1. System configuration**
- 2. Data acquisition section**
- 3. Process simulation section**
- 4. Conclusions**

1. SYSTEM CONFIGURATION

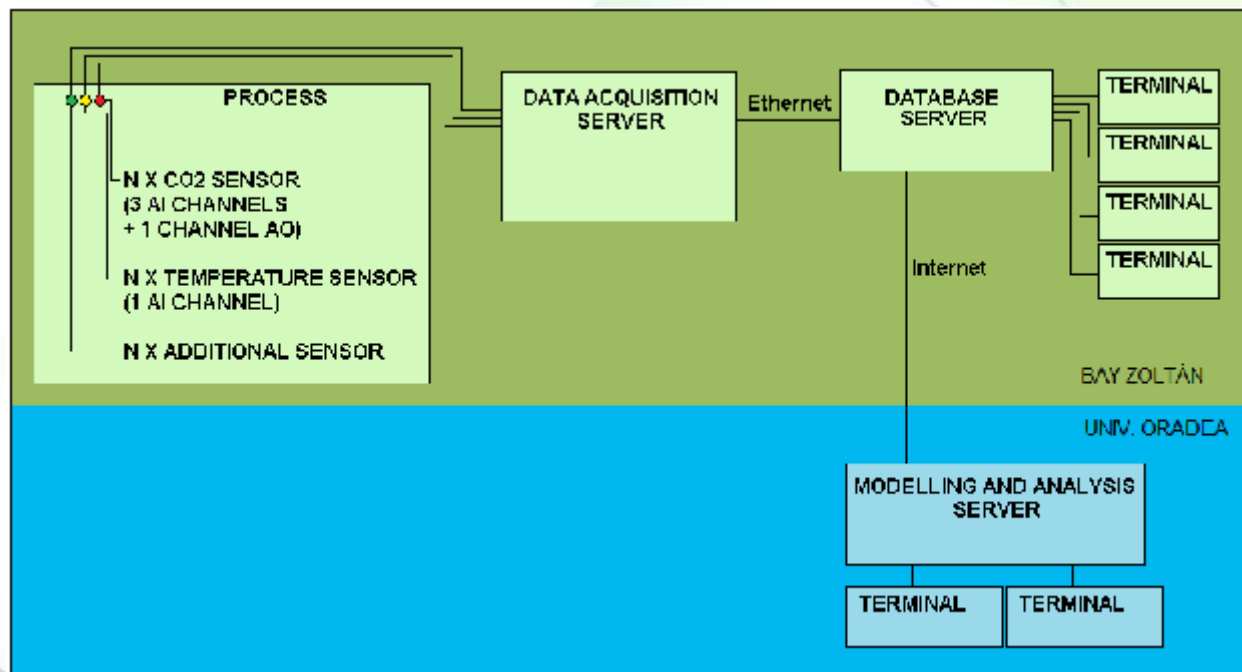
To sustain future research projects:

A. Different model development approaches:

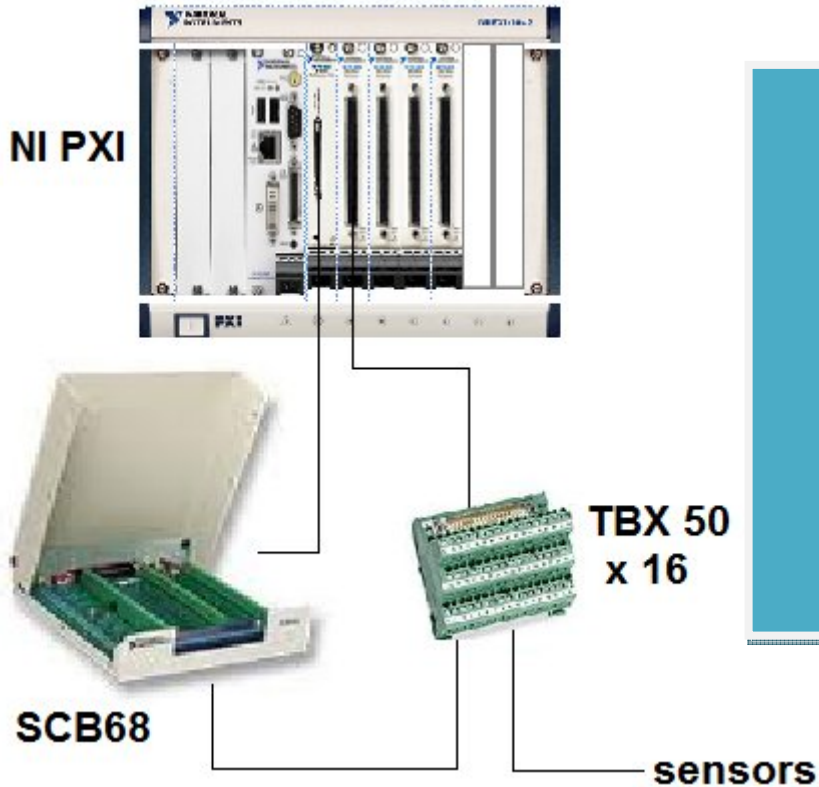
- Previous knowledge guided experiments:
 - Building the model based on previous studies
 - Testing and adjusting the initial model
 - Validating the model based on acquired data
- Acquiring data and extrapolating the model:
 - Data acquisition and selection of statistically significant data
 - Searching model candidates for the selected data patterns
 - Validating the model based on acquired data

B. Different data acquisition needs:

- flexible and expandable data acquisition hardware
- open software architectures and programming techniques, data portability



2. DATA ACQUISITION SECTION

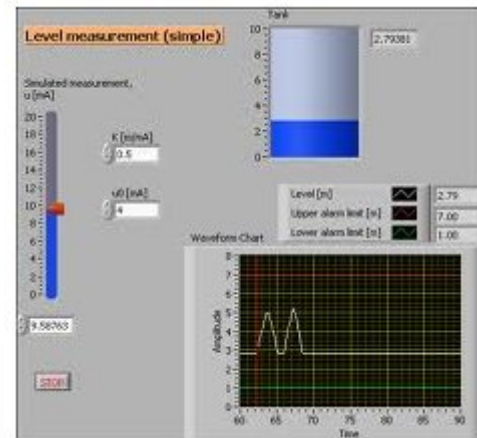


1. NI PXI-8102 Celeron T3100 1.9 GHz Controller, Windows 7 32-Bit For NI PXI Embedded Controllers
2. NI PXI-6221 (16 Analog Inputs, 24 Digital I/O, 2 Analog Outputs)
3. NI PXI-2575 196 ch Multiplexer

Data acquisition software: Labview.



www.ni.com

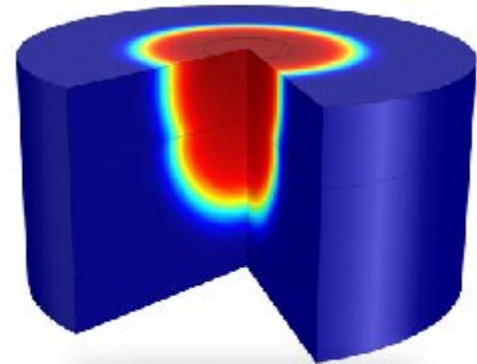


3. PROCESS SIMULATION SECTION

COMSOL - Subsurface Flow Modelling

Water ponded in a ring on the ground moves into a relatively dry soil column and carries a chemical with it. As it moves through the variably saturated soil column, the chemical attaches to solid particles, slowing the solute transport relative to the water.

In addition, the chemical concentrations decay from biodegradation in both the liquid and the solid phase.

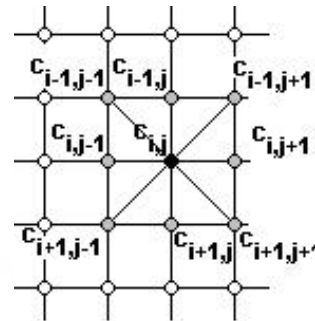


<http://www.comsol.com/products/4.3/#subsurfaceflow>

Modeling of bacterial behaviour and evolution

MATLAB

- A. Statistical computing
- B. Curve fitting
- C. Partial Differential Equations
- D. Genetic Algorithms
- E. Parallel Computing
 - a. Neural networks
 - b. Cellular Automata
- F. Fuzzy logic

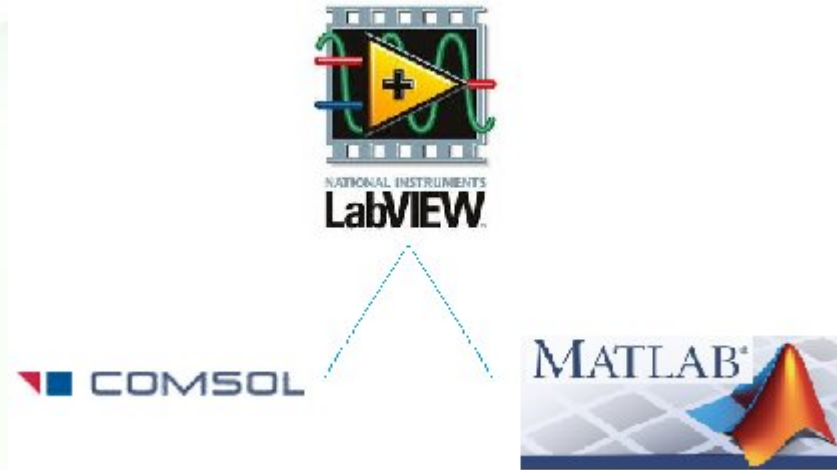


www.mathworks.com

4. CONCLUSIONS

Software solution advantages:

1. Flexible software development
2. Automated data transfer
3. Code compatibility



Thank You for Your attention!