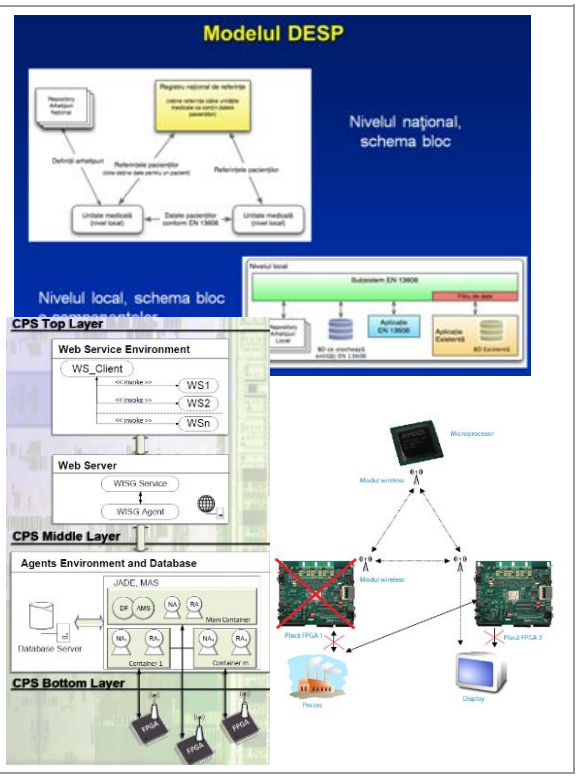
DEPENDABLE SYSTEMS

Contact details

Name	**Dependable Systems**
Acronym	**DeSy**
Logo	DeSy
Site	http://desy.utcluj.ro http://research.utcluj.ro/tl_files/research/Research%20Domain/Systems%20Engineering/2_Miclea.pdf
Address	26-28 G. Baritiu Str., 400027, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automation and Computer Science** **Automation Department**
Telephone	+40 264 401427
Fax	+40 264 594835
Director	Prof. Dr. Eng. Liviu Miclea
e-mail	Liviu.Miclea@aut.utcluj.ro



Areas of expertise

Dependability. Security.
- Development of intelligent techniques for dependability (availability, reliability, safety, integrity and maintainability), security (confidentially) and testing of information systems;
- Analysis, design, implementation and testing of information systems with dependability properties used in various fields (e.g. critical infrastructure - energy, water, environment, transport; medicine).

Cyber – Physical Systems (CPSs).
- Development of abstractions, architectures and tools to allow implementation of reliable CPSs made from unsafe components and resistant CPSs at cyber or physical attacks;
- Development of the semantic basics for heterogeneous models composition and for modelling languages that describe various physical processes of a CPS and their associated logic.

Intelligent Systems.
- Analyse, design, implementation and testing of intelligent real-time control and monitoring systems using artificial intelligence techniques (intelligent agents, fuzzy logic, data mining, etc.).

Team

Prof. Eng. Liviu Miclea, PhD; Prof. Eng. Honoriu Vălean, PhD; Assoc. Prof. Eng. Enyedi Szilard, PhD; Lecturer Eng. Ovidiu Stan, PhD; Assist. Prof. Eng. Teodora Sanislav, PhD; Assist. Prof. Eng. Laura Vegh, PhD
PhD students: Assist. Prof. Eng. Iulia Ștefan, Andrei Scurtu, Eng. Alexandru Popescu, Eng. Rareș Coste, Tudor Pop, Cosmin Pojar, Eng. Bianca Zaharie, Eng. Andrei Petrut

Representative projects

F2S, "SCADA Federation, Collaborative Instrument for Water Management – Somes River Pilot Application", National PN2- Partnerships project, http://193.226.5.107/f2s/pagina/, (2014-2017)
"Cluj-Napoca: Next Generation Brained City - Software design for service monitoring at the level of the medical network, through innovative solution integration", Sectoral Operational Programme "Increase of Economic Competitiveness" (POSCCE) project, http://clujit.ro/ro/#Next Generation Brained City, (2014-2015)
ProSEco, "Collaborative environment for design of AmI enhanced product-services integrating highly personalised innovative functions with minimal ecological footprint along life cycle and of their production processes based on collaborative environments", European FP7 project, http://cordis.europa.eu/projects/rcn/109191_en.html, (2013-2017)
CyCloSe, "Designing Cloud-based Self-healing Cyber-Physical Systems", Romania–Italy Bilateral Cooperation with Politecnico di Torino, (2013-2014)

DESP, "Electronic Healthcare Record", National PN2- Partnerships project, http://www.desp.ro/wiki/index.php/English, (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. I. Ştefan, G. Moiş, S. Enyedi, L. Miclea, Chapter "A Load Balancing Algorithm for Multi Agent Systems", Book *Service Orientation in Holonic and Multi Agent Manufacturing Control, Studies in Computational Intelligence*, Vol. 402, 2012, pp.103-114
2. T. Sanislav, G. Mois, L. Miclea, "An Approach to Model Dependability of Cyber-Physical Systems", *Microprocessors and Microsystems*, ISSN: 0141-9331, 2015, published online
3. M. Neagu, L. Miclea, S. Manich, "Improving security in cache memory by power efficient scrambling technique", *IET Computers & Digital Techniques*, Vol. 9, Issue 6, 2015, pp. 283-292
4. O. Matei, P.C. Pop, H. Vălean, "Optical character recognition in real environments using neural networks and k-nearest neighbor", *Applied Intelligence*, Vol. 39, No. 4, 2013, pp. 739-748
5. T. Sanislav, L. Miclea, "Cyber-Physical Systems - Concept, Challenges and Research Areas", *Journal of Control Engineering and Applied Informatics*, Vol.14, No. 2, 2012, pp. 28-33
6. D. I. Goţa, H. Lund, L. Miclea, "Romanian energy system model and a nuclear reduction strategy", *Energy Journal*, Vol. 36, No. 11, 2011, pp. 6413–6419
7. I. D. Păun, D. G. Sauciuc, N. O. Iosif, O. Stan, A. Perşe, C. Dehelean, L. Miclea, "Local HER Management Based on openEHR and EN13606", *Journal of Medical Systems*, Vol. 35, Issue 4, 2011, pp. 585-590
8. L. Vegh, L. Miclea, "A Simple Scheme for Security and Access Control in Cyber-Physical Systems", *Proceedings of the IEEE 20th International Conference on Control Systems and Computer Science CSCS 2015*, May 27-29, 2015, Bucharest, Romania, pp. 294-299
9. T. Sanislav, G. Mois, L. Miclea, "A New Approach towards Increasing Cyber-Physical Systems Dependability", *Proceedings of the IEEE 16th International Carpathian Control Conference (ICCC)*, May, 27-30, 2015, Szilvásvárad, Hungary, pp. 443-447
10. O. Stan, L. Miclea, A. Centea, "Eye-Gaze Tracking Method Driven by Raspberry PI Applicable in Automotive Traffic Safety", *Proceedings of the 2014 IEEE Second International Conference on Artificial Intelligence Modelling and Simulation*, November, 18-20, 2014, Madrid, Spain, pp. 126-130

Patents:

1. L. Miclea, D. Goţa, H. Lund, D. Connolly, "Method for generation of the necessary energy distributions of hourly thermal plants based on the outside temperature", no. A/10019/2012 / July 17, 2012
2. J. Figueras, L. Miclea, G. Moiş, "Method for the dynamic voltage scaling in an arithmetic-logic unit based on on-line error detection", no. OSIM: A/10028/2011 / July 11, 2011
3. L. Miclea, D. Sauciuc, O. Stan, I. Păun, C. Dehelean, S. Enyedi, I. Ştefan, "National electronic healthcare record and its creation method", no. A/10033/2010 / November 26, 2010

The offer addressed to the economic environment

Research & development	Abstractions definition, architectures design and tools implementation to achieve the development of highly dependable and secure CPSs; Expansion of artificial intelligence techniques in order to implement some modelling and control applications. Analysis, design, implementation and validation of dependable CPSs used in water resources management, electrical power generation and transport; Analysis, design, implementation and validation of information systems applied in various fields; Application of artificial intelligence techniques in energy production, medicine, food quality control.
Consulting	Consulting, research, design, development of dependable information systems and intelligent systems for industrial and scientific environment.
Applied engineering services	Computer testing services; Programming and software and hardware consultancy services; Intelligent systems design and implementation services.
Training	**Dependable basics**: availability, reliability, safety, integrity and maintainability; **CPS basics**: hardware and software architecture, physical devices development and programming, decision support, historical databases design and management, historical data pre- and post-processing; **Software testing techniques**: functional testing, structural testing, use of software testing frameworks; **Artificial intelligence techniques**: intelligent agents, multi-agent systems, data mining.