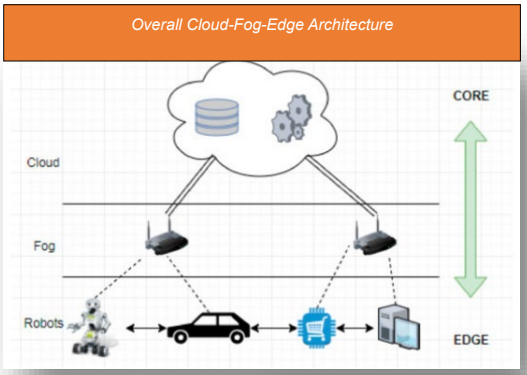
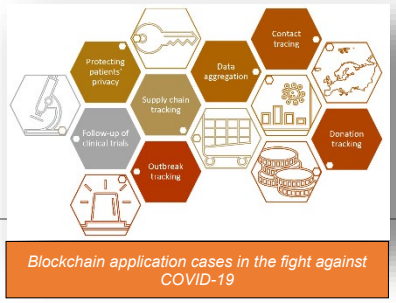
DEPENDABLE SYSTEMS - DeSy

Contact details

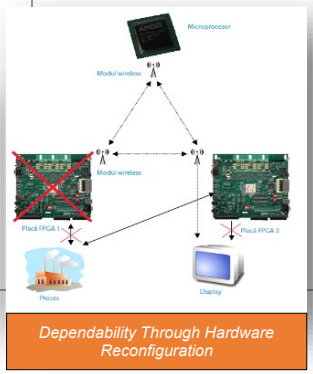
Name	Dependable Systems
Acronym	**DeSy**
Logo	DeSy
Site	http://desy.utcluj.ro
Address	26-28 G. Baritiu Str., 400027, Cluj-Napoca, Romania
Faculty Department	**Faculty of Automation and Computer Science Automation Department**
Telephone	+40 264 401427
Fax	+40 264 594835
Director	Prof. Eng. Liviu Miclea, PhD
E-mail	Liviu.Miclea@aut.utcluj.ro

Block schemas elaborated by the DESY group, over time

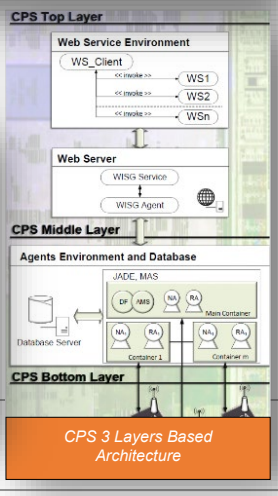




Blockchain application cases in the fight against COVID-19



Dependability Through Hardware Reconfiguration



CPS 3 Layers Based Architecture

Areas of expertise

Dependability. Security ►Development of intelligent techniques for dependability (availability, reliability, safety, security, 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 **a**bstractions, models, architectures and tools to allow implementation of reliable CPSs (including areas as cloud- fog-edge architectures) 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** ► Analyses, design, implementation and testing of intelligent real-time control and monitoring systems using artificial intelligence techniques (intelligent agents, fuzzy logic, machine learning, decision support systems, deep neural networks, etc.).

Team

Prof. Eng. Liviu MICLEA, PhD; Prof. Eng. Honoriu VĂLEAN, PhD; Prof. Eng. Silviu FOLEA, PhD; Assoc. Prof Eng. ENYEDI Szilard, PhD; Assoc. Prof. Eng. Ovidiu STAN, PhD; Lecturer Eng. Iulia ȘTEFAN, PhD; Assist. Prof. Eng. Dan GOTA, PhD; Lecturer Eng. Adela POP, PhD; Lecturer. Eng. Alexandra FANCA, PhD; Assist. Eng. Cosmina Corches, PhD; Assist. Eng. Marius MISAROȘ, Assist. Eng. Claudiu Domuta, PhD. ► **PhD students** Eng. Ionut Cătălin DONCA, Eng. Andrei-Mihai VĂDAN, Vlad BUCUR, Eng. Andrei SCURTU, Eng. Rareș COSTE, Tudor POP

Representative projects

The most representative projects in the last 10 years

► 2021- 2023 - **The Innovative European University of Technology (Inno-EUt+)**, a HEI Initiative project aiming to enhance the innovation and entrepreneurial capacity of a new European University Alliance, the European University of Technology (EUt+) ►2018-2020 - **ROBIN – "Robots and Society: Cognitive Systems for Personal Robots and Autonomous Vehicles",** PCCDI2018 ►2014-2017 - **F2S, "SCADA Federation, Collaborative Instrument for Water Management – Somes River Pilot Application"**, National PN2-Partnerships project, http://193.226.5.107/f2s/pagina/, ►2013-2016 - "**Use of commercial drones for autonomous maintenance services in railways**", cooperation with Siemens company►2014-2015 **- "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, ►2013-2017 - **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, ►2013-2014 - **CyCloSe, "Designing Cloud-based Self-healing Cyber-Physical Systems**", Ro–It Bilateral Cooperation with Politecnico di Torino.

Significant results

The most representative publications of the past 5 years

►A. Pop, A. Fanca, D. Gota, H. Valean**, Monitoring and Prediction of Indoor Air Quality for Enhanced Occupational Health,** Intelligent Automation & Soft Computing, Vol.35, No.1, pp. 925-940, 2023, DOI:10.32604/iasc.2023.025069, ISSN: 2326-005X, published june. 2022**, https://www.techscience. com/iasc/v35n1/48113** ►Donca, Ionut-Catalin, Ovidiu Petru Stan, Marius Misaros, Dan Gota, and Liviu Miclea. "**Method for Continuous Integration and Deployment Using a Pipeline Generator for Agile Software Projects**" Sensors 22, no. 12: 4637. https://doi.org/10.3390/s22124637 ►Alexandru G Berciu, Eva H Dulf, Iulia A Stefan, "**Flexible Augmented Reality-Based Health Solution for Medication Weight Establishment",** 2022, Processes, vol. 10, issue 2, page 219, Special Issue Empowering Pharma4.0: Continuous Monitoring and Optimization of Pharmaceutical Processes, ►A. Ciobotariu, D. Gota, A. Pop, O. Stan, A. Fanca, C. Domuta, H. Valean, L. Miclea. Demographic Attributes Classification via Convolutional Neural Networks: A Proposed Solution. Proc. of 2022 International Conference on Electrical, Computer and Energy Technologies (ICECET), 2022, Prague,pp. 1-6, Czech Republic, ISBN:978-1-6654-7087-2, DOI: 10.1109/ICECET55527.2022.9872818 ►Cosmina Corches, Mihai Daraban, Liviu Miclea, "**Availability of a RFID Object Identification System in IoT Environment**", Sensors, ISSN 1424-8220, special issue "Smart Sensors for Remotely Operated Robots", Vol 21, Issue 18, article number: 6226, DOI: 10.3390/s21186220, Published: SEP 2021, ►H. Patel, D.S. Rajput, O. P. Stan, L. C. Miclea, "**A New Fuzzy Adaptive Algorithm to Classify Imbalanced Data**", CMC-Computers, Materials & Continua, ISSN / eISSN: 1546-2218 / 1546-2226, Special Issue: Emerging Applications of Artificial Intelligence, Machine learning and Data Science, Vol.70, No.1, pp. 73-89, 2022, DOI:10.32604/cmc.2022. 017114, Accepted: APR 2021►Cristina Muresan, Isabela Birs *, Eva Dulf, Dana Copot, Liviu Miclea, "**A Review of Recent Advances in Fractional Order Sensing and Filtering Techniques**", Sensors, ISSN 1424-8220, special issue: "Fractional Sensor Fusion and its Applications", vol. 21, Issue 17, article number: 5920, doi: 10.3390/s21175920, published SEP 2021►Stan, O.P.; Enyedi, S.; Corches, C.; Flonta, S.; Stefan, I.; Gota, D.; Miclea, L. **Edge environment** Sensors 2021, 21, 4714. ►C. Corches, M. Daraban, O. Stan, Szilárd Enyedi, L. Miclea**, Interconnection of Systems with Cloud-Fog-Edge architectures: Concept and Challenges**, Control Engineering And Applied Informatics, vol 23, issue 1, pp.60-71, 2021►I. Ştefan, L. Miclea and H. Vălean, "**Towards Testing Considerations Of Experimental Decision Support System Design**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020, pp. 1-6, doi: 10.1109/ AQTR49680.2020.9129954, ►I. Muntean, G. D. Mois, S. C. Folea, "**Development and Analysis of a Low-Cost IoT Sensor for Urban Environmental Monitoring**", International Journal of Computers Communications & Control, Vol. 16, No. 5, doi:10.15837/ijccc.2021.5.4260, 2021.https://univagora.ro/jour/index.php/ijccc/article/view/4260►Gota, DI , Puscasiu, A, Fanca, A, Valean, H Miclea, L, **Human-Computer Interaction using hand gestures**, 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), 2020,pp. 195-199, ►A. Scurtu, C. Dehelean, S. Enyedi and L. Miclea, "**Using Cognitive Services within CPS/SCADA Systems Federations - Concepts, Research Areas and Challenges**," 2020 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2020, pp. 1-4, doi: 10.1109/AQTR49680.2020.9129910►V. Bucur, O. Stan, L. Miclea, „**Data Loss Prevention and Data Protection in Cloud Environments based on Authentication Tokens**", 2019 22nd International Conference on Control Systems and Computer Science (CSCS), Bucharest, Romania May 28-30, 2019, pp. 720-725, DOI: 10.1109/CSCS. 2019.00128►O. Stan, L. Miclea, „**New Era for Technology in Healthcare Powered by GDPR and Blockchain**", 6th International Conference on Advancements of Medicine and Health Care through Technology (MediTech), Cluj Napoca, ROMANIA, OCT 17-20, 2018, Book Series: IFMBE Proceedings, Volume: 71, Pages: 311-317, ►Stefan, I.; Enyedi, Sz.; Scurtu, A.; et al., **Using the WaterML Standard Information Model, in a SCADA Federation Web Service**, Control Engineering And Applied Informatics Volume: 20, Issue: 1, Pages: 119-127, 2018►Bucur, V., Dehelean, C., Miclea, L., „**Object storage in the cloud and multi-cloud: State of the art and the research challenges**", 2018 IEEE International Conference on Automation, Quality and Testing, Robotics, AQTR 2018 - THETA 21st Edition, Proceedings, pp. 1-6 ► S. Enyedi, "**Electric cars — Challenges and trends,"** 2018 IEEE International Conference on Automation, Quality and Testing, Robotics (AQTR), Cluj-Napoca, Romania, 2018, pp. 1-8, doi: 10.1109/AQTR. 2018.8402776. ►T. Sanislav, G. Mois, L. Miclea, "**An Approach to Model Dependability of Cyber-Physical Systems**", *Microprocessors and Microsystems*, vol. 41, pp. 67-76, March 2016, ISSN: 0141-9331, DOI: 10.1016/j.micpro.2015.11.021 ► S. Folea, G. Moiş, C. Muresan, L. Miclea, R. De Keyser, M. Cirstea, **A Portable Implementation on Industrial Devices of a Predictive Controller Using Graphical Programming**, IEEE Transactions on Industrial Informatics, April 2016, Q1 Automation & Control Systems)

Patents

► 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: 130282/30.03.2018 ► L. Miclea, Szilard Enyedi, I. Stefan, O. Stan, I. Stoian, D. Capatina, O. Ghiran, M. Matreata, G. Bolos, R. Jucan, Z. Kope, A. Moldovan, "**Method of interoperability of data from SCADA-type systems through the constitution of a federated structure**", no. OSIM A/10061/2017.

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, cloud-fog-edge infrastructure; ►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, machine learning.

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