

Latvian Center of the McLeod Institute for Simulation Sciences

Latvian Center of M&S Net

Annual Report for Academic Year 2012/2013

The Latvian MISS and M&S Net Centers operate on the basis of the Department of Modeling and Simulation of Riga Technical University. They use the departmental facilities (including 32 Pentium desk-top PCs, 12 notebooks, 5 laser printers and a photo printer, 5 beamers) and premises.

Web site: <http://www.itl.rtu.lv/mik/index.php?id=34>

Postal Address: Latvian MISS and M&S Net Centers
Dept. of Modelling and Simulation
Riga Technical University
Kalku street 1, LV-1658, Riga
LATVIA

LC MISS Center Director: Prof. Yuri Merkuryev, merkur@itl.rtu.lv
LC MISS Center Deputy Director: Prof. Galina Merkuryeva, gm@itl.rtu.lv
LC M&S Net Director: Prof. Galina Merkuryeva, gm@itl.rtu.lv

Main directions of activities:

- simulation of logistics systems
- simulation of service systems
- simulation of manufacturing systems
- simulation-based optimization
- simulation-based metamodeling
- simulation-based training
- simulation-based supply chain management
- simulation methodology
- education in systems modeling and simulation
- education in discrete-event simulation
- logistics information systems
- information technology management
- modeling of management information systems

Simulation software:

- discrete-event: ARENA, PROMODEL, SIMUL8, EXTEND
- continuous: STELLA, MATLAB

Specialized simulation tools:

- simulation of supply chains: SIMFLEX

Theses presented in the simulation area:

- 8 Bachelor theses
- 6 Master theses.

PhD theses presented in the simulation area:

1. Olesja Vecherinska. “Simulation-based analysis of supply chain planning methods optimality under uncertainty”.
Promoter – Prof., Dr.habil.sc.ing., DSc Galina Merkuryeva
2. Jelena Pecherska. “A combined approach to the simulation of material flow handling systems”.
Promoter – Prof., Dr.habil.sc.ing., DSc Galina Merkuryeva

Courses taught:

1. For B.Sc. program in Information Technology:
 - Basics of Systems Modeling and Simulation - mandatory
 - Simulation Software Tools - mandatory
 - Simulation Business Games - optional
2. For M.Sc. program in Information Technology:
 - Methodology of Discrete-Event Simulation - mandatory
 - Object-Oriented Modeling - optional
3. For B.Sc. program in Economics:
 - Simulation of Logistics Systems – mandatory
4. For M.Sc. program in Economics:
 - Systems Modeling – mandatory
5. For M.Sc. program in Mechanical Engineering:
 - Modeling of Transport Processes - mandatory
6. For Ph.D. program in Information Technology:
 - Statistical Methods in Systems Simulation - optional
 - Methodology of Complex Systems Simulation - optional

Research projects:

1. Research grant from the Latvian Council of Science: „*Simulation-based optimization using computational intelligence*”
2. Project Nr. ELRI-184 INFROM “Integrated Intelligent Platform for Monitoring the Cross-Border Natural-Technological Systems “ of the Estonia – Latvia – Russia Cross Border Cooperation Programme within European Neighbourhood and Partnership Instrument 2007-2013

Cooperation with European simulation centers:

1. Staff exchange:
 - With Magdeburg Otto-von-Guericke University, Department of Logistics: In November, 2011 Prof. Juri Tolujew from Magdeburg Otto-von-Guericke University delivered a lecture in Riga in logistics simulation.

Cooperation with other MISS centers:

2. With Genoa (Italy) and Spanish MISS Centers:
 - Organization of the annual HMS (Harbour, Maritime & Multimodal Logistics Modelling and Simulation) international conference:
 - HMS 2012 was held in Vienna, Austria in September, 2012

- HMS 2012 will be held in Athens, Greece in September, 2013
3. With Genoa (Italy) MISS Center:
 - Organization of the SCM MEMTS 2013 international conference that was held in Sankt-Petersburg, Russia in July, 2013.

Publications in English:

1. Sergey V. Kokorin, Semyon A. Potrasaev, Boris V. Sokolov, Viacheslav A. Zelentsov, Yuri A. Merkurjev. Integrated Planning of Active Mobile Objects Control System with Allowance of Uncertainty Factors. *Proceedings. 26th European Conference on Modelling and Simulation, ECMS 2012. May 29th – June 1st, 2012, Koblenz, Germany. Edited by: Klaus G. Troitzsch, Michael Möhring, Ulf Lotzmann.* ECMS, 2012. P. 115-120.

2. Agostino Bruzzone, Yuri Merkurjev. New Challenges in Supply Chain Management Simulation: Competitiveness vs. Sustainability. *Proceedings, Sixth Asia International Conference on Mathematical Modelling and Computer Simulation, AMS 2012. Kuala Lumpur, Malaysia, 28 May 2012, Bali, Indonesia, 31 May, 2012.* IEEE Computer Society, 2012. P. xviii-xxi.

3. Yuri Merkurjev, Jana Bikovska. Business Simulation Game Development for Education and Training in Supply Chain Management. *Proceedings, Sixth Asia International Conference on Mathematical Modelling and Computer Simulation, AMS 2012. Kuala Lumpur, Malaysia, 28 May 2012, Bali, Indonesia, 31 May, 2012.* IEEE Computer Society, 2012. P. 179-184.

4. Merkurjev Y., Okhtilev M., Sokolov B., Zelentsov V. Intelligent Technology for Space and Ground Based Monitoring of Natural Objects in Cross-Border EU-Russia Territory. *IGARSS 2012, IEEE International Geoscience and Remote Sensing Symposium. Remote Sensing for a Dynamic Earth. Preliminary Symposium Proceeding. 22-27 July 2012, Munich, International Congress Centre.* IEEE, 2012. P. 2759-2762.

5. Yuri A. Merkurjev, Boris V. Sokolov, Galina V. Merkurjeva. Integrated Intelligent Platform for Monitoring the Cross-Border Natural-Technological Systems. *The 14th International Conference on Harbor, Maritime & Multimodal Logistics Modelling and Simulation, HMS 2012. September 19-21, 2012, Vienna, Austria. Edited by Agostino G. Bruzzone, Manfred Gronalt, Yury Merkurjev, Miquel Angel Piera, Wayne Talley.* P. 7-10.

6. Boris V. Sokolov, Vyacheslav A. Zelentsov, Rafael M. Yusupov, Yuri A. Merkurjev. Information Fusion Multiple-Models Quality Definition and Estimation. *The 14th International Conference on Harbor, Maritime & Multimodal Logistics Modelling and Simulation, HMS 2012. September 19-21, 2012, Vienna, Austria. Edited by Agostino G. Bruzzone, Manfred Gronalt, Yury Merkurjev, Miquel Angel Piera, Wayne Talley.* P. 102-111.

7. B.V.Sokolov, S.A.Potryasaev, V.A.Zelentsov, D.A.Ivanov, Yu.A.Merkurjev. Methodology and Technique of Structure-Functional Synthesis and Development Management for Disaster-Tolerant Transport-Logistic and Information Systems. *Proceedings. The 7th German-Russian Logistics Workshop “Flexibility and Adaptability of Global Supply Chains”, DR-LOG2012.* Edited by: Dmitry Ivanov, Boris Sokolov, Joachim Kaschel. DR-LOG, May 16-19, 2012, Saint Petersburg, Russia. P. 216-223.

8. Yuri Merkurjev. Modelling and Simulation of Complex Systems: Methodology and Practice. An Overview. *Information Technology and Management Science.* 2012, Vol. 15, p. 32-44.

9. Kaspars Cabs, Arnis Lektauers, Yuri Merkuryev. A Methodology for Automated Geosimulation Model Generation. *Applied Information and Communication Technologies, AICT 2013. Proceedings of the 6-th International Scientific Conference. Jelgava, Latvia, April 25-26, 2013.* P. 78-84.

10. Peter Mensah, Yuri Merkuryev. The Role of ICT in the Supply Chain Resilience. *Applied Information and Communication Technologies, AICT 2013. Proceedings of the 6-th International Scientific Conference. Jelgava, Latvia, April 25-26, 2013.* P. 129-135.

11. Lektauers A., A. Romanov., Y. Merkuryev, G. Merkuryeva. Integrated Technological Framework for Remote Sensing and Monitoring of Natural-Technological Systems. *Proceedings of XIV International Forum „Modern Information Society Formation Problems, Perspectives, Innovation Approaches”.* Saint-Petersburg, Russia, 2-6 June 2013. Vol. 2, p. 96-98.

12. Merkuryev Yu. A., G. V. Merkuryeva, B. V. Sokolov. INFROM Project: Integrated Intelligent Platform Development for Monitoring Cross-Border Natural-Technological Systems. *Proceedings of XIV International Forum „Modern Information Society Formation Problems, Perspectives, Innovation Approaches”.* Saint-Petersburg, Russia, 2-6 June 2013. Vol. 2, p. 114-116.

Prof. Yuri Merkuryev

*Director of the Latvian MISS Center
Riga Technical University
1, Kalku Street
LV-1658 Riga, Latvia
Phone +371-67089514
Mob. phone +371-29454253
Fax +371-67089513
E-mail: merkur@itl.rtu.lv*

Prof. Galina Merkuryeva

*Director of the Latvian M&S Net Center
Riga Technical University
1, Kalku Street
LV-1658 Riga, Latvia
Phone +371-67089514
Mob. phone +371-26428694
Fax +371-67089513
E-mail: gm@itl.rtu.lv*

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