

UNIVERSIDADE NOVA DE LISBOA
UNINOVA



**GROUP OF
ROBOTICS AND CIM**

**SUMMARY OF ACTIVITIES
1999**

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1. ORGANIZATION

1.1 Affiliation

From the institutional point of view, the group of Robotics and CIM is part of both the New University of Lisbon (UNL), Faculty of Sciences and Technology, and UNINNOVA - Institute for the Development of New Technologies.

At UNL the group is integrated in the Department of Electrical Engineering. At UNINNOVA the group is integrated in the Center for Intelligent Robotics.

The activities described in this report were carried on in the two institutions.

1.2 Members

Research team:

- ◆ Prof. Luis M. Camarinha-Matos – Group Coordinator cam@uninova.pt
www.uninova.pt/~cam
- ◆ José Barata Oliveira – Assistant jab@uninova.pt
- ◆ Tiago Cardoso – Trainee Assistant tomfc@uninova.pt
- ◆ Fernando Martinelli – PhD Student fjm@uninova.pt
- ◆ Celson P. Lima – PhD Student cpl@uninova.pt
- ◆ Walter Vieira – PhD Student wv@uninova.pt
- ◆ Luis Octavio Castollo – PhD Student lgc@uninova.pt
- ◆ Carlos Simões – Research student (till Mar 99) cas@uninova.pt
- ◆ Nuno Alves – Research student (till May 99) nma@uninova.pt
- ◆ Rosa Oliveira – Research student / secretary rfo@uninova.pt
- ◆ Hugo Daciano – Research student
- ◆ Paulo Compadrinho – Research student
- ◆ Luciana Trigo – Research student (since Oct 99)

Teaching team:

- ◆ Prof. Luis M. Camarinha-Matos – Group Coordinator cam@uninova.pt
www.uninova.pt/~cam
- ◆ Prof. Walter Colombo – Auxiliary Professor wc@uninova.pt
- ◆ José Barata Oliveira – Assistant jab@uninova.pt
- ◆ Tiago Cardoso – Trainee Assistant tomfc@uninova.pt
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1.3 Contact

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2. RESEARCH ACTIVITIES

2.1 Research Topics

Current research activities include:

- Virtual Enterprises and Electronic Commerce
- Machine Learning in Intelligent Supervision
- Multi-Agent Systems in Manufacturing and Elderly Care
- Manufacturing Information Systems and Integration
- Agile Scheduling
- Manufacturing Systems Re-engineering
- Remote Learning

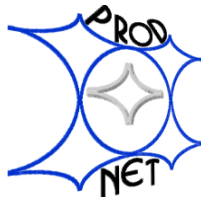
2.2 Projects

Esprit PRODNET II

Production Planning and Management in an Extended Enterprise

Oct 96 – Oct 99

Technical Coordinator.



www.uninova.pt/~prodnet

PRODNET-II aims to design and develop an open platform and the adequate IT protocols and mechanisms to support Virtual Industrial Enterprises (VE). PRODNET is focused mainly on Small and Medium size Enterprises (SMEs) in order to support them with means to inter-operate with several value chain networks. The architecture will employ the new emerging standards and advanced technologies in communication, cooperative information management, and distributed decision making.

Group's role:

- Technical coordination of the project.
- Workflow-based coordination architecture for VE.
- Partners search and selection in a VE
- Project management.

Partners:

▸ CSIN Lda., Portugal ▸ UNL – Universidade Nova de Lisboa, Portugal ▸ ESTEC Lda, Portugal ▸ Lichen Informatique Ltd., France ▸ UvA – University of Amsterdam, The Netherlands
▸ ProSTEP GmbH, Germany ▸ UFSC – Universidade Federal de Santa Catarina, Brazil ▸ MIRALAGO Lda, Portugal
▸ HERTEN Ltda, Brazil ▸ UNINOVA – Instituto de Desenvolvimento de Novas Tecnologias, Portugal

Esprit ESCN
European STEP Centres Network

Nov 97 – Oct 99



<http://www.uninova.pt/~escn/>

The strategic objective of ESCN project is to establish and execute a STEP/PDT Training and Technology Transfer (TTT) program, a necessary building block to make STEP a sustainable competitive advantage for European Industry.

Group's role:

-STEP training and Technology Transfer in Portugal.

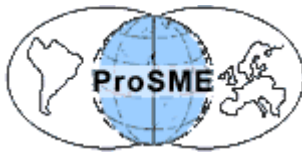
Partners:

▸ PROSTEP - PROSTEP – Produktdatentechnologie, Germany
▸ GOSET - Association GOSET, France ▸ IVF - The Swedish Institute of Production Engineering Research , Sweden
▸ SINTEF - Industrial Management , Norway ▸ TNO - TNO Building And Construction Research, The Netherlands
▸ UNINOVA - Instituto de Desenvolvimento de Novas Tecnologias, Portugal

INCO-DC ProSME

Easy-to-Use Procedures for Quality Management tailored for SMEs

Feb 98-Jan 2001



<http://www.atb-bremen.de/projects/prosme/Projects/project-en.htm>

- -To develop/enhance IT tool(s) to support the introduction and maintenance process of QM at SMEs,
- to develop method(s) and tool(s) for efficient process improvement, as a critical aspect of TQM, in a flexible manufacturing environment as a typical problem for SMEs when introducing QM systems,
- -To test and evaluate the methods and IT tool(s) in a demonstrator in the specific SME environment in DC.
-

Group's role:

-Quality-related information exchange in a Virtual Enterprise environment.

Partners:

▸ ATB - Institut für angewandte Systemtechnik Bremen GmbH, Germany ▸ IPK, Berlin, Germany ▸ UNL – Universidade Nova de Lisboa ▸ UFRGS - Universidade Federal do Rio Grande do Sul, Brazil ▸ GLOBO INOX Equipamentos Industriais Ltda. ▸ UNICEN Universidad Nacional del Centro de la Provincia de Buenos Aires, Argentina.

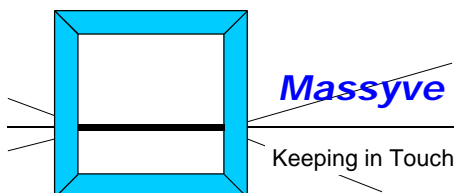
The main objectives of the ProSME project are:
-To develop/enhance innovative method(s) for the cost-effective introduction/optimisation of QM-Systems in manufacturing SMEs, in reference to relevant ISO standards, and by this to achieve a high quality and efficient manufacturing system which will result in better process control and process sustainability, higher precision and faster operation,

INCO-DC KIT MASSYVE

Multi-Agent Agile Manufacturing Scheduling Systems in Virtual Enterprise Industry

Oct 97 – Dec 2000

Prime Contractor



<http://centaurus.dee.fct.unl.pt/~massyve/>

MASSYVE is a Keep-In-Touch (KIT) initiative in the framework of the INCO-DC programme. According to the KIT philosophy, MASSYVE was designed to facilitate and promote the scientific and technological interactions between a member of UFSC (Brazil), who

has realized his PhD in the EU, and three other European partners.

The topic of this co-operative action is centered on the application of the Multi-Agent Systems paradigm to Agile Scheduling in Manufacturing Systems.

Group's role:

- Project coordination.
- Multi-agent systems in scheduling.

Leonardo PostPressSIM

Computer aided training system for bookbinding, finishing and mailing areas

1995-Mar 1999

<http://www.vtt.fi/tte/samba/projects/postpres.sim/>

PostPressSIM will bring innovative multimedia and low cost three dimensional factory simulation to the education of complicated after-printing-processes. The system will be suitable for schools and companies and for different levels of basic skills.

The knowledge and know-how of different partners will be combined into a new educational system.

For educational needs of different groups on the sector of printing industry three dimensional virtual reality simulation system for different products and

PRAXIS MAGMEC

Sensores de campo magnético para posicionamento e monitorização de corrente em Mecatrónica

Jun 97-May 2000

E-LEARN

Remote training via Internet

1998-1999

-Virtual Enterprise architecture.

Partners:

- UNL – Universidade Nova de Lisboa, Portugal
- UFSC – Universidade Federal de Santa Catarina, Florianopolis, Brazil
- UvA – University of Amsterdam, The Netherlands
- CSIN Lda., Portugal

production lines and six supporting multimedia modules will be developed and tested in the project. The educational multimedia modules will be 1. Newspaper mailing systems, 2. Magazine and folder finishing machines, 3. Book binding, 4. Packaging Fundamentals and 5. Packaging Materials. Also a multimedia and virtual reality simulation demo system will be developed.

Group's role:

- Simulation of manufacturing processes.

Partners:

- AEL, Uuden Tekniikan Instituutti, Finland
- Bergische Universität Gesamthochschule Wuppertal, Germany
- CyberCube Oy, Finland
- DGH, Den Grafiske Højskole, Denmark
- EVITECH, Espoo-Vantaa Institute of Technology, Finland
- GI, Grafisk Institutt, Norway
- UIAH, University of Industrial Arts Helsinki, Finland
- UNAB, Utbildning-Näringsliv i Botkyrka, Sweden
- UNINOVA, Instituto de Desenvolvimento de Novas, Portugal

The purpose of this project is to develop precise position detection systems (e.g. > 10000 parts/rev. in case of encoders) and current sensors to monitor motor load (better than 1% of range) based in the new technologies of linear magnetic field sensors made of giant-magneto-resistive materials.

Group's role:

- Design mechatronics' applications for the new magnetic sensor.
- Develop application prototype.

Partners:

- INESC – Lisboa, Portugal
- UNINOVA, Portugal

The purpose of this project is to investigate the use of WWW-based technologies for remote training. In the first phase, the aim is to develop a training course for MS-WORD, suitable for secretaries of the public administration services.

Group's role:

- Design systems architecture
- Implement Internet-based training system for MS-WORD.

Partners:

▸ UNINOVA, Portugal ▸ INA, Portugal

PRAXIS TELECARE

A Multiagent Telesupervision System Elderly Care

Jun 99-May 2001

<http://www.uninova.pt/~telecare>

The purpose of this project is to develop a framework for telesupervision of elderly people living alone, using a multi-agent approach including both stationary and mobile agents.

Robots for quality monitoring

Jan – Sep 99

The purpose of this project was the development of an automatic system to test the autoradio's front panel (blenda) buttons and their information signals. A robot and a vision system was used to test the buttons and the information signals, respectively. The all system was integrated in the assembly line.

Group's role: Development of the integration aspects (PLC, Robot and Vision System) and the part related with the button 's test (Electrical ciecuit, Robot Programming, PLC programming).

Group's role:

- Intelligent Supervision Systems in Robotics.
- Shop-floor re-engineering.

2.3 Networks

ALFA AIR

Automatique Industrielle Robuste

1996-1999

Partners:

▸ INSA-LAAS Toulouse, France ▸ UNL – Universidade Nova de Lisboa, Portugal ▸ Univ. Zaragoza, Spain, ▸ Univ. Oulu, Finland ▸ Univ. Magdebourg, Germany ▸ Univ. Paul Sabatier, France ▸ Univ. Andes, Colombia, ▸ UFSC, Brazil ▸ Univ. Buenos Aires ▸ Univ. Simon Bolivar, Venezuela.

This is a European – Latin American cooperation network focused on education in Automation and Robotics.

Esprit ICIMS-NOE

Network of Excellence in Intelligent Control and Integrated Manufacturing Systems

1994-1999

A network of more than 350 academic and industrial nodes.

Leonardo ACOMAS-TN

1997-1999

Large European network on education in Manufacturing and Intelligent Control.

COMME AGATHE

Communication Multi-Agents por l' Atelier (Cooperation MCT – French Embassy) (Jan 1999-Dec 2003)

3. PUBLICATIONS 1999

3.1 Journals

Multi-agent-based agile scheduling, R. Rabelo, L.M. Camarinha-Matos, H. Afsarmanesh, *Journal of Robotics and Autonomous Systems* (Elsevier), Vol. 27, N. 1-2, April 1999, pp. 15-28.

Intelligent mobile agents in elderly care, L.M. Camarinha-Matos, W. Vieira, *Journal of Robotics and Autonomous Systems* (Elsevier), Vol. 27, N. 1-2, April 1999, pp. 59-75.

Hierarchical coordination in Virtual Enterprise Infrastructures, L.M. Camarinha-Matos, H. Afsarmanesh, C. Lima, To appear in *Journal of Intelligent and Robotic Systems*, special issue on Intelligent Manufacturing Systems, Nov-Dec 1999.

Application of machine learning in water distribution networks assisted by domain experts, L.M. Camarinha-Matos, F. Martinelli, To appear in *Journal of Intelligent and Robotic Systems*, special issue on Intelligent Manufacturing Systems, Nov-Dec 1999.

Model-based Approach for a Hierarchical Supervision of Automated Production Systems, Feldmann, K.; Colombo, A. W., *Annals of the German Academic Society for Production Engineering (WGP)*, Research and Development in Germany, Vol. VI, Nr. 2, October 1999.

Monitoring of Flexible Production Systems Using High-Level Petri Nets, Feldmann, K.; Colombo, A. W., *Control Engineering Practice (CEP), Int. Journal of IFAC*, vol. 7, num. 12, pp. 1449-1466. Pergamon Press Int. December 1999.

3.2 Conferences

National:

Empresas Virtuais: Novos desafios na gestão da produção, L. M. Camarinha-Matos, *Actas das 4^{as} Jornadas de Engenharia de Produção – A gestão industrial na viragem do milénio*, Invited talk, pp. 13-16, Universidade do Minho, Guimarães, 20-21 Apr 1999.

Agentes móveis na operação remota, W. Vieira, L.M. Camarinha-Matos, *Proceedings of JETC'99 – Jornadas de Engenharia de Telecomunicações e Computadores*, pp. V.3-v8, 27-29 Oct 99, ISEL, Lisboa, Portugal.

Remote Supervision of CIM-Systems using Hybrid Simulation (Control Software Technology), Colombo, A. W., Invited paper / Tutorial in *the Proc. of the Jornadas de Engenharia de Telecomunicações e Computadores (JETC'99)*. Lisboa, Portugal, October 27-29, 1999.

Controlo de Sistemas Distribuidos usando Redes de Petri de Alto Nivel e Agentes Móveis, Nuno Santos; Colombo, A. W., *Proc. of the Jornadas de Engenharia de Telecomunicações e Computadores (JETC'99)*. Lisboa, Portugal, October 27-29, 1999.

Desenho e Controlo de Sistemas de Manufatura usando Simulação baseada em Redes de Petri, Paulo Compadrinho; Rui Gonçalves; Colombo, A. W., *Proc. of the Jornadas de Engenharia de Telecomunicações e Computadores (JETC'99)*. Lisboa, Portugal, October 27-29, 1999.

International:

An approach for design, optimization and implementation of flexible production systems integrating discrete-event and 3D-kinematics simulations, A. W. Colombo, L.M. Camarinha-Matos, J. Barata, *Proceedings of the European Simulation Multiconference ESM'99*, Warsaw, Poland, Jun 1999, SCS Press, Vol. I, pp.461-467, ISBN 1-56555-171-0.

Simulation environment to support the life cycle of book production systems, J. Barata, L.M. Camarinha-Matos, *Proceedings of the European Simulation Multiconference ESM'99*, Warsaw, Poland, Jun 1999, SCS Press, Vol. II, pp. 287-291, ISBN 1-56555-172-9.

A Hybrid Simulation-Based Approach for Design and Implementation of Flexible Production Systems, Feldmann, K.; Krimi, S.; Colombo, A. W., *Proc. of the Int. Conference on Modeling and Simulation (IASTED/MS '99)*, pp. 508-512. Philadelphia, Pennsylvania, U.S.A, May 5-8, 1999.

Integração de um sensor com magneto-resistência gigante em células flexíveis de montagem, J. Barata, L.M. Camarinha-Matos, P. Freitas, *Actas das 6.as Jornadas Luso-Espanholas de Engenharia Electrotécnica*, Vol. 4, pp.489-496, ISBN 972-595-095-X, 7-9 Jul 1999, Lisboa, Portugal.

Execution monitoring in adaptive mobile agents, W. Vieira, L.M. Camarinha-Matos, *Proceedings of CIA'99 - Third International Workshop on Cooperative Information Agents*, Lecture Notes in Artificial Intelligence 1652 (Springer), ISBN 3-540-66325-8, pp. 220-231, 31 Jul – 2 Aug 1999, Uppsala, Suecia.

Flexible coordination and information sharing for virtual enterprises in PRODNET, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of APMS'99 – IFIP Int. Conf. on Global Production Management (K. Mertins, O. Krause, B. Schallock – Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8605-1, pp. 67-75, Sept 99, Berlin, Germany.

Partners search and quality related information exchange in a virtual enterprise, L.M. Camarinha-Matos, H. Afsarmanesh, T. Cardoso, *Proceedings of APMS'99 – IFIP Int. Conf. on Global Production Management (K. Mertins, O. Krause, B. Schallock – Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8605-1, pp. 76-84, Sept 99, Berlin, Germany.

The virtual enterprise concept, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 3-14, Oct 99, Porto, Portugal.

Tendencies and general requirements for virtual enterprises, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 15-30, Oct 99, Porto, Portugal.

Coordination and configuration requirements in a virtual enterprise, L.M. Camarinha-Matos, C. Lima, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 49-64, Oct 99, Porto, Portugal.

The PRODNET goals and approach, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 97-108, Oct 99, Porto, Portugal.

The PRODNET architecture, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 109-126, Oct 99, Porto, Portugal.

PRODNET coordination module, L.M. Camarinha-Matos, C. Lima, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 147-166, Oct 99, Porto, Portugal.

Production planning and control in a virtual enterprise, L.M. Camarinha-Matos, V. S. Silva, R. Rabelo, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 219-232, Oct 99, Porto, Portugal.

Selection of partners for a virtual enterprise, L.M. Camarinha-Matos, T. Cardoso, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 3259-278, Oct 99, Porto, Portugal.

The PRODNET demonstrator, L.M. Camarinha-Matos, H. Afsarmanesh, C. Antunes, J. F. Clavier, C. Garita, P. Gibon, A. Klen, H. Lenz, C. Lima, J. Mota, A. L. Osório, R. Rabelo, H. Ribeiro, A. Schreiber, L. M. Spinosa, Y. Ugur, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 279-290, Oct 99, Porto, Portugal.

Infrastructures for VE: A summary of achievements, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 483-490, Oct 99, Porto, Portugal.

Further developments in virtual enterprises, L.M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE'99 - IFIP Int. Conf. on Infrastructures for Virtual Enterprises (L.M. Camarinha-Matos, H. Afsarmanesh– Eds.)*, Kluwer Academic Publishers, ISBN 0-7923-8639-6, pp. 491-496, Oct 99, Porto, Portugal.

MAAPL: A language for adaptive mobile agents with execution monitoring, L.M. Camarinha-Matos, W. Vieira, *Proceedings of INES'99, 3rd IEEE International Conference on Intelligent Engineering Systems*, pp. 171-176, ISBN 80-88964-25-3, Poprad, High Tatras, Stará Lesná, Slovakia, Nov. 1-3, 1999.

Applying federated databases to inter-organizational multi-agent scheduling, R. Rabelo, H. Afsarmanesh, L.M. Camarinha-Matos, *Proceedings of MAS'99 – IFAC Workshop on Multi-Agent Systems*, 2-4 Dec. 99, Vienna, Austria.

3.3 Book chapter

Prozessnahe-Simulation: Simulationsbasierte Entwicklung und Implementierung von Steuerungssoftware für flexible Produktionssysteme, Feldmann, K.; Colombo, A. W., In "Simulationsbasierte Planungssysteme für Organisation und Produktion". K. Feldmann and G. Reinhardt (Eds.). Cap. 5-5.1. Springer Verlag Berlin-Heidelberg. 1999.

3.4 Book edition

Infrastructures for Virtual Enterprises – Networking industrial enterprises, (L.M. Camarinha-Matos, H. Afsarmanesh – Editores), Kluwer Academic Publishers, ISBN 0-7923-8639-6, Oct. 1999.

3.5 Journals Edition

Journal Robotics and Autonomous Systems (Elsevier), Special issue on Multi-Agent Systems Applications, Vol. 27, N. 1-2, 30 April 99. Guest editors: L.M. Camarinha-Matos, H. Afsarmanesh, V. Marik.

Journal of Intelligent and Robotic Systems (Kluwer Academic), Special issue on Intelligent Manufacturing Systems, Vol. 26, Issue 3/4, Nov 1999, ISBN 0921-0296. Guest editors: L.M. Camarinha-Matos, H. Afsarmanesh.

4. EVENTS

4.1 Organization

4.1.1 Chairs

PRO-VE'99 – IFIP / PRODNET Working Conference on Infrastructures for Virtual Enterprises, Porto, Portugal, 27-28 Oct 1999
L.M. Camarinha-Matos: Chairman of the International Program Committee and Organizing Committee.

4.1.2 Participation in the Program Committee

L.M. Camarinha-Matos:

- ICE'99 – 5th International Conference on Concurrent Enterprising, The Hague, Netherlands, 15-17 Mar 99.
- 32nd ISATA – International Symposium on Automotive Technology and Automation, Vienna, Austria, 14-18 Jun 99.
- CSCC'99 - IMACS/IEEE Multiconference, 3rd International Conference on Systems, Athens, Greece, 4-8 Jul 99.
- 6.as Jornadas Hispano-Lusas de Engenharia Eléctrica, Lisboa, Portugal, 7-9 Jul 1999.
- DEXA'99 – 10th International Conference and Workshop on Database and Expert Systems Applications, 30 Aug – 3 Sept 1999, Florence, Italy.
- JETC'99 – Jornadas de Engenharia de Telecomunicações e Computadores, ISEL, Lisboa, Portugal, 27-29 Oct 1999.
- RPIC'99: 8th Workshop on Information Processing and Control, Buenos Aires, Argentina.
- INES'99 - 3rd IEEE International Conference on Intelligent Engineering Systems, Poprad, High Tatras, Stará Lesná, Slovakia, November 1-3, 1999.
- MAS'99 - 1st International IFAC Workshop on MULTI-AGENT SYSTEMS IN PRODUCTION, December 2-4, 1999; Vienna – Austria

José Barata:

- PDT Days'99 – 8th Symposium on Product Data Technology Europe, Stavanger, Norway, 13 - 16 Apr 1999.

4.1.3 Participation in the Organizing Committee

José Barata:

- 6.as Jornadas Hispano-Lusas de Engenharia Eléctrica, Lisboa, Portugal, 7-9 Jul 1999.

Celson Lima, Rosa Oliveira, Tiago Cardoso:

PRO-VE'99 – IFIP / PRODNET Working Conference on Infrastructures for Virtual Enterprises, Porto, Portugal, 27-28 Oct 1999

4.2 Participation in Conferences

- *ACRD – Annual Cluster Review Day on Distributed Engineering and Trading*, 15 Mar 99, The Hague, The Netherlands.
-L.M. Camarinha-Matos
- *ICE'99 – 5th International Conference on Concurrent Enterprising*, 15-17 Mar 99, The Hague, The Netherlands.
- L.M. Camarinha-Matos
- *6.as Jornadas Hispano-Lusas de Engenharia Eléctrica*, Lisboa, Portugal, 7-9 Jul. 1999.
-L.M. Camarinha-Matos, J. Barata
- *Workshop As Tecnologias de Informação Portuguesas e o Mercado Brasileiro*, 14-16 Jul 1999, S. Paulo, Brasil.
-L.M. Camarinha-Matos
- *PDT Days '99 - 8th Symposium on Product Data Technology Europe*, Stavanger, Norway, 13 - 16 Apr 1999.
-J. Barata
- *INES'99 - 3rd IEEE International Conference on Intelligent Engineering Systems*, Poprad, High Tatras, Stará Lesná, Slovakia, November 1-3, 1999.
- W. Vieira
- *APMS'99 – 7th IFIP International Conference on Advanced Production Management Systems*, 6-10 Set 1999, Berlin, Germany.
-L.M. Camarinha-Matos
- *ESM'99- 13th European Simulation Multiconference*, Warsaw, Poland, 1-4 Jun 1999
-J. Barata
- *PRO-VE'99 – IFIP/PRODNET Working Conference on Infrastructures for Industrial Virtual Enterprises*, 27-28 Oct 1999, Porto, Portugal.
-L.M. Camarinha-Matos, C. Lima, T. Cardoso, R. Oliveira
- *Baltic Workshop on Curricula Development for Higher Education in Multimedia and Media Technology*, Royal Institute of Technology, Tallinn, Estonia, 3-4th May 1999.
-J. Barata.

4.3 Participation in Seminars

- O UNINOVA e a Formação em Sistemas Avançados de Automação, José Barata, *Seminário "Ensino e Formação em CIM, Robótica e Automação Industrial - A situação Portuguesa"*, Europarque, Portugal, 25 Fev 1999.
- Prodnnet II status overview , L.M. Camarinha-Matos, *Annual Cluster Review Day (ACRD) – “Distributed Engineering and Trading”*, a convite, 15 March 1999, The Hague, the Netherlands.
- Novel Business Models in Global Design, Engineering and Trading, L.M. Camarinha-Matos, *Annual Cluster Review Day (ACRD) – “Distributed Engineering and Trading”*, a convite, 15 Mar 1999, The Hague, The Netherlands.
- Virtual enterprises and PRODNET results for Portuguese SMEs, L.M. Camarinha-Matos, *Seminar on Introduction of STEP / PDM in SMEs*, UNINOVA, Monte Caparica, Portugal, 11 Mar 1999.
- Introduction to Modelling and STEP, J. Barata, *Seminar on Introduction of STEP / PDM in SMEs*, UNINOVA, Monte Caparica, Portugal, 11 Mar 1999.
- Introduction to Modelling and STEP, J. Barata, *Seminar "Introduction to Product Data Technology and STEP"*, *ESCN PDT & STEP Training Day - PDT Europe 99*, Stavanger, Norway, 14th Apr 1999.
- A Importância da Engenharia Electrotécnica na Robótica e CIM, José Barata, *Seminar "Dia da Engenharia Electrotécnica"*, Escola Superior de Tecnologia e de Gestão do Instituto Politécnico de Bragança, Bragança, Portugal, 21 Apr 1999.

- Towards de Digital World – An Engineering Perspective, J. Barata, *Lesson/Seminar for the Multimedia Program* of the Department of Education of the Stockholm University entitled, Tumba-Stockholm, Sweden, 4th May 1999.
- PDM-STEP, José Barata, *Seminar "STEP Basics"*, IVF, Goteborg, Sweden, 18th May 1999.
- Gestão da Produção em empresas virtuais, a convite, L.M. Camarinha-Matos, *Workshop As Tecnologias de Informação Portuguesas e o Mercado Brasileiro*, S. Paulo, 14-16 Jul 99.

4. OTHER ACTIVITIES

5.1 Academic management

L.M. Camarinha-Matos:

- Member of the Scientific Council of FCT/UNL.
- Member of the Council of the Electrical Engineering Department.
- Branch counselor of the IEEE Student Branch at UNL.
- Member of the “International Scientific Advisory Board” of INESC-Porto

W. Colombo:

- Member of the Council of the Electrical Engineering Department.

J. Barata Oliveira:

- Member of the Council of the Electrical Engineering Department.

5.2 Project proposals evaluation

L.M. Camarinha-Matos:

- Program IST Fellowships to Japan, European Commission.
- "Reviewer" of the Esprit DELPHI and CHAMAN projects.
- Program PEDIP (PRODIBETA), INETI.
- Program “Investigación Científica y Tecnológica”, Agencia Nacional de Promoción Científica y Tecnológica, Argentina.
- Program “Iniciativa Comunitária PME (IC-PME)”, Agência de Inovação.
- Program PROTEM-CC, fase III, do CNPq, Brazil.

5.3 Evaluation boards of academic exams

L.M. Camarinha-Matos:

PhD Thesis defense:

- Member of the evaluation board (main examiner) for the PhD exam of Marcos Augusto Hochuli Shmeil [Multi-agent Systems in modeling of contractual relationships among organizations], FEUP, Porto, 30 Jun 1999.

MSc Thesis defense:

- Main examiner for the MSc of José Augusto Pinho Silva [Application of executable models in coordination of telework activities], University of Porto, FEUP, 4 Mar 99.

Selection of candidates for Associate Professor position:

- Member of the selection committee for an Associate Professor position for Industrial Management, of University of Minho, 12 Jan 1999.

- Member of the selection committee for a Coordinating Professor position for Information Systems, Electrical Engineering Department, ISEL, Polytechnic Institute of Lisbon, 2-3 Dec 99.
- Member of the selection committee for a Coordinating Professor position for Communication Systems, Electrical Engineering Department, ISEL, Polytechnic Institute of Lisbon, 2-3 Dec 99.

5.4 Membership in professional associations

L.M. Camarinha-Matos:

- IFIP TC5 (national representative), WG5.3
- IEEE Robotics & Automation, Systems, Man & Cybernetics
- APPIA – Portuguese association for Artificial Intelligence
- API – Portuguese Informatics Association
- Portuguese Association of Engineers

J. Barata Oliveira:

- IEEE
- ACM
- AAAI
- ASME

5.5 Teaching activities

The group was responsible for the following teaching activities:

Electrical Engineering Course (UNL):

- Data Modeling in Engineering
- Real Time Systems
- Robotics
- Intelligent Supervision
- Multimedia Information Systems
- Robotics Systems and CIM
- Telerobotics and Autonomous Systems
- Project of Robotics and CIM

MSc in Computer Science (UNL):

- Computer Integrated Manufacturing

Life-long training activities (National Institute for Administration):

- Basic programming
- Advanced Programming
- Systems Programming
- IT infrastructures engineering

5.6 Other activities

Micro-Rato '99, 18th May 1999, University of Aveiro, Portugal

- J. Barata: member of the context evaluation panel.