



**GROUP OF
ROBOTICS AND CIM**

**SUMMARY OF ACTIVITIES
2000**

TABLE OF CONTENTS

1. ORGANIZATION	3
1.1 Affiliation.....	3
1.2 Members	3
1.3 Contact.....	3
2. RESEARCH ACTIVITIES	4
2.1 Research Topics.....	4
2.2 Projects.....	4
2.3 Networks	7
2.4 Recently finished projects.....	7
3. PUBLICATIONS 2000	8
3.1 Journals.....	8
3.2 Conferences	8
3.3 Book edition	9
3.4 MSc. Thesis.....	9
3.5 PhD. Thesis.....	10
4. EVENTS	11
4.1 Organization.....	11
4.2 Participation in Conferences.....	12
4.3 Presentations in Seminars and Panels.....	13
5. OTHER ACTIVITIES	14
5.1 Academic management.....	14
5.2 Project proposals evaluation.....	14
5.3 Evaluation boards of academic exams.....	14
5.4 Membership in professional associations.....	15
5.5 Teaching activities.....	15
5.6 Other activities.....	16
5.7 Visitors	16

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 UNINOVA - Institute for the Development of New Technologies.

At UNL the group is integrated in the Department of Electrical Engineering. At UNINOVA 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
- ◆ Prof. Walter Colombo – Auxiliary Professor wc@uninova.pt
- ◆ 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
- ◆ João Rosas – Trainee Assistant jrosas@uninova.pt
- ◆ António Abreu – PhD Student ajfa@mail.fct.unl.pt
- ◆ Rosa Oliveira – Research student / secretary rfo@uninova.pt

1.3 Contact

Prof. Luis M. Camarinha-Matos
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Quinta da Torre - 2825 Monte Caparica
PORTUGAL
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URL: www.uninova.pt/cri/GRCIM

2. RESEARCH ACTIVITIES

2.1 Research Topics

Current research activities include:

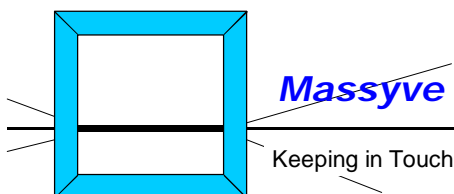
- Virtual Enterprises and Electronic Commerce
- Machine Learning in Intelligent Supervision
- Multi-Agent Systems in Manufacturing and Elderly Care
- Remote supervision in distributed systems
- Manufacturing Information Systems and Integration
- Manufacturing Systems Re-engineering
- Simulation Interoperability and Digital Factory
- Factory Automation with Formal Methods (High-Level Petri Nets)
- Remote Learning

2.2 Projects

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.
- 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

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/proj-en.htm>

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,
- -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.

IST FETISH-ETF

Federated European Tourism Information System Harmonization

Jan 2000-Dec 2001

The purpose of this project is to develop methodologies to allow tourism organizations and enterprises to register their services in federations of services under a virtual enterprise perspective.

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-Mar 2000

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.

Group's role:

-Design and development of support system for distributed business process modeling and management.

-Support for creation and registration of value added services based on the services available on the federation.

Partners:

▸ Ibit, Spain ▸ T6, Italy ▸ University of Amsterdam, Netherlands ▸ Forth, Greece ▸ SUN, Spain ▸ ICEP, Portugal ▸ IASI, Italy ▸ 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>

IFIP COVE

CO-operation infrastructure for Virtual Enterprises and electronic business

Jul 2000 – Jun 2002

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

The purpose of this project is to assess research results and practices in virtual enterprises and electronic business, leading to the design of common reference models, cooperation infrastructures, and prospects for further collaborative developments. It will be based on the creation and operation of a

SUSI-CIM

Supervision of CIM-Systems using Simulation

Oct 1999-Nov 2001

Project being negotiated:

IST TeleCARE

A Multi-Agent Tele-Supervision System for Elderly Care

Duration: 3 years

The project aims to design and develop a framework for tele-supervision following a federated multi-agent approach, including both stationary and mobile agents, and applied to assist elderly people.

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.

cluster / forum of participants and projects active in the field, covering a world-wide representation, which will facilitate the exchange and refinement of knowledge and project results on new ways of working in networks of independent but cooperative nodes.

Group's role:

- Project coordination
- Creation and maintenance of web site
- Contribution to reference models definition.

Partners:

- UNINOVA, Portugal
- 18 Partners from 12 countries.

SUSI-CIM aims to design, develop and set into operation a hybrid simulation-based platform, i.e., High-Level Petri net-based discrete-event simulation and 3D-kinematics simulation, to support: (i) Intelligent Supervision of Production Systems in the Computer Integrated Manufacturing field, and (ii) the development of a "Digital Factory".

Role of the group:

- Project coordination
- Architecture design
- Design and development of the multi-agent and mobile agent system

Partners

- UNINOVA, Portugal ▸ University of Amsterdam, Netherlands
- Roundrose Associates Ltd, UK
- Synkronix Ltd., UK ▸ SKILL, Spain
- Camara de Comercio de Navarra, Spain.

2.3 Networks

IST CE-NET II

Concurrent Enterprise Network of Excellence

2000-2002

The prime aim of this second phase of the CE-NET is to establish and further develop a well co-ordinated and effective support infrastructure throughout Europe in order to share and exchange the latest developments in the CE domain.

Partners: 38 members from Europe

COMME AGATHE

Communication Multi-Agents por l' Atelier
(Cooperation MCT – French Embassy)

(Jan 1999-Dec 2003)

Partners: ▶ IUT de Saint Denis, France ▶ CCP/IDIT, Portugal ▶ UNL, Portugal

2.4 Recently finished projects

-Esprit PRODNET II - Production Planning and Management in an Extended Enterprise

Sep 1996-Oct 1999. www.uninova.pt/~prodnet

-Esprit WATERNET - Knowledge Capture for Advanced Supervision of Water Distribution Networks

Jun 1996-May 1998.

-INCO SCM+ - Beyond Supply Chain Management in Food Industry

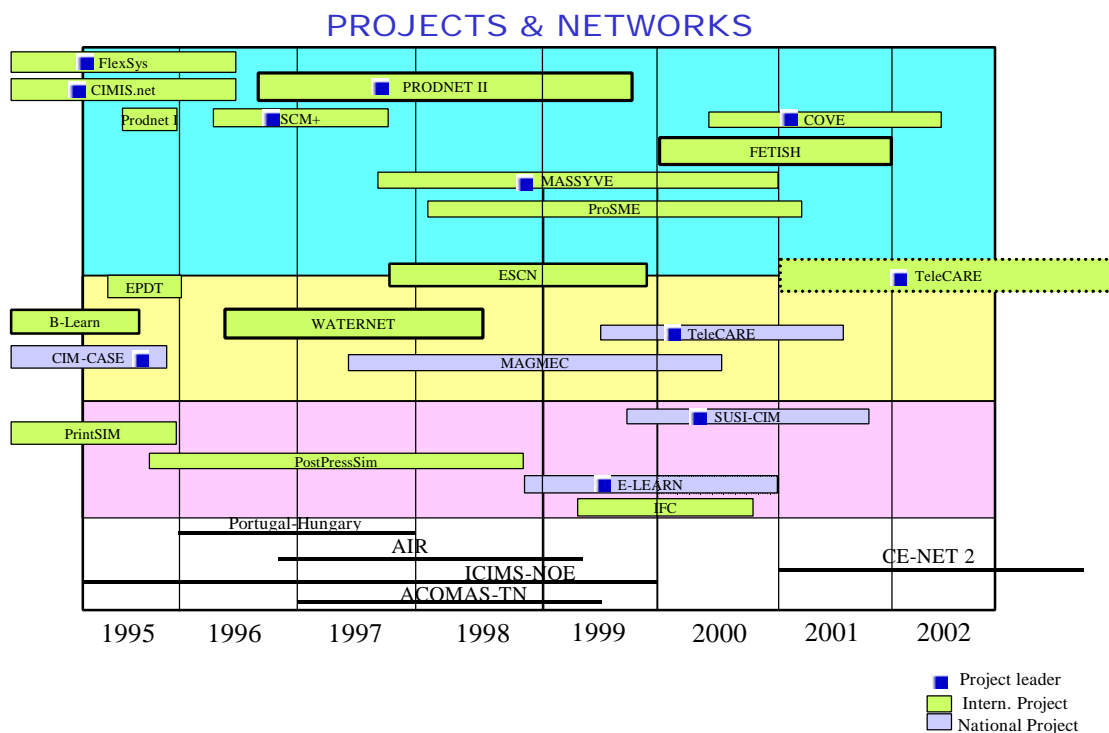
Apr 1996 – Sep 1997. www.uninova.pt/~scm

-Esprit ESCN - European STEP Centres Network

Nov 1997 – Oct 1999. www.uninova.pt/~escn/

-TSER IFC - Further training funds as an impulse for new models of life long training - Integrated Funding Concept

Mar 1999 – Jun 2000



3. PUBLICATIONS 2000

3.1 Journals

- Towards an execution system for distributed business processes in a virtual enterprise, L. M. Camarinha-Matos, C. Lima, *Lecture Notes in Computer Science N. 1823*, Springer, ISSN 0302-9743, May 2000, pp.149-162.
- Empresas virtuais, organizações virtuais e comércio electrónico, L. M. Camarinha-Matos, **invited paper**, *Revista SENSUS*, N. 1, pp 40-43, 2000.

3.2 Conferences

National:

- Integration of Error Detection and Diagnosis Functions into a High-Level Petri Net-based Formal Specifications of Supervisory Control Systems, A. W. Colombo, *Proc. of the 4th Portuguese Conference on Automatic Control (CONTROLO 2000)*, Guimarães, Portugal, 4-6 Oct 2000.

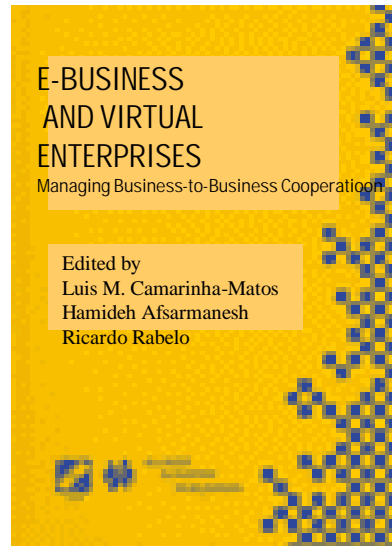
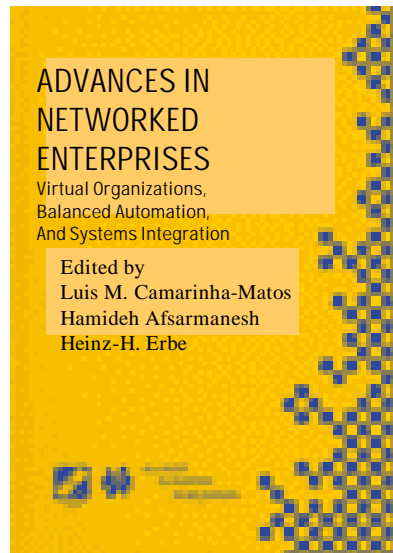
International:

- Future smart organizations: A virtual tourism enterprise, H. Afsarmanesh, L. M. Camarinha-Matos, *Proceedings of WISE 2000 – 1st ACM/IEEE International Conference on Web Information Systems Engineering*, Vol. 1 (Main Program), pp 440-445, Hong Kong, 19-20 June 2000.
- Frameworks for agile virtual enterprises, L. M. Camarinha-Matos, H. Afsarmanesh, *Proceedings (Preprints) of MIM 2000 – IFAC Symposium on Manufacturing Modeling, Management and Supervision*, pp 84-89, Patras, Greece, 12-14 Jul 2000.
- Trends in virtual enterprise infrastructures, L. M. Camarinha-Matos, *Proceedings of WCC2000/ITBM 2000 – IFIP World Computer Congress /International Conference on Information Technology for Business Management*, **Invited talk**, Beijing, China, 21-25 Aug 2000.
- Supporting business process management and coordination in a virtual enterprise, L. M. Camarinha-Matos, C. Lima, *Proceedings of BASYS 2000 – 4th IEEE/IFIP International Conference on Information Technology for Balanced Automation Systems in Manufacturing and Transportation*, Berlin, Germany, 27-29 Sep 2000.
- Adaptive mobile agents: Enhanced flexibility in Internet-based remote operation, W. Vieira, L. M. Camarinha-Matos, *Proceedings of BASYS 2000 – 4th IEEE/IFIP International Conference on Information Technology for Balanced Automation Systems in Manufacturing and Transportation*, Berlin, Germany, 27-29 Sep 2000.
- Mobile agents approach to virtual laboratories: Enabling real-time remote operation over networks with large time-delays and poor availability, L.M. Camarinha-Matos, W. Vieira, O. Castolo, *Proceedings of IFAC Symposium on Artificial Intelligence in Real-Time Control*, Budapest, Hungary, 2-4 Oct 2000.
- Shop-floor reengineering to support agility in virtual enterprise environments, J. Barata, L. M. Camarinha-Matos, *Proceedings of PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-6 Dec 2000.

- Supporting agility in virtual enterprises, L.M. Camarinha-Matos, H. Afsarmanesh, R. Rabelo, *Proceedings of PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-6 Dec 2000.
- A systematic approach to IPR definition in cooperative projects, L. M. Camarinha-Matos, H. Afsarmanesh, *Proceedings of PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-6 Dec 2000.
- Agent-based brokerage for virtual enterprise creation in the moulds industry, R. Rabelo, L. M. Camarinha-Matos, R. Vallejos, *Proceedings of PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-6 Dec 2000.
- Federated multi-agent scheduling in virtual enterprises, R. Rabelo, H. Afsarmanesh, L. M. Camarinha-Matos, *Proceedings of PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-6 Dec 2000.
- Integration of High-Level Petri Net-based Formal Methods for the Supervision of Flexible Production Systems, A. W. Colombo, Invited Lecture/Tutorial at the *1st OnLine Symposium for Electronics Engineers*, TechOnLine, USA (to be presented per Internet on February 20th 2001, 16:00 GMT).

3.4 Book edition

- Advances in Networked Enterprises – Virtual Organizations, Balanced Automation, and Systems Integration, (L.M. Camarinha-Matos, H. Afsarmanesh, H.-H. Erbe – Editores), Kluwer Academic Publishers, ISBN 0-7923-7958-6, Set 2000.
- E-Business and Virtual Enterprises – Managing Business-to-Business Cooperation, (L.M. Camarinha-Matos, H. Afsarmanesh, R. Rabelo – Editores), Kluwer Academic Publishers, ISBN 0-7923-7205-0, Out 2000.



3.5 MSc. Thesis

- MARS: Mobile Agents for Remote Supervision, Rui Melo, FCT/UNL, 13 Jan 2000. Supervisor: L.M. Camarinha-Matos (UNL) and H. Afsarmanesh (University of Amsterdam).
- Ferramenta de suporte ao projecto conceptual, João Almeida Rosas, University of Minho, 13 Oct 2000. Supervisor: Prof. Goran Putnik (University of Minho).

3.5 PhD. Thesis

- Contribuição para uma metodologia de aplicação de Aprendizagem Automática em Ambientes Industriais, Fernando Martinelli, submitted to FCT/UNL in Sep 2000 (waiting for public defense). Supervisor: L.M. Camarinha-Matos.
- Agentes Móveis Adaptáveis para Operação Remota, Walter Vieira, submitted to FCT/UNL in Oct 2000 (waiting for public defense). Supervisor: L.M. Camarinha-Matos.

4. EVENTS

4.1 Organization

4.1.1 Chairs

- *BASYS 2000 – 4th IEEE/IFIP International Conference on Information Technology for Balanced Automation Systems in Production and Transport*, Berlin, Germany, 27-29 Sep 2000.
L.M. Camarinha-Matos: Chairman of the International Program Committee.
- *PRO-VE 2000 – 2nd IFIP / MASSYVE Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brasil, 4-5 Dec 2000.
L.M. Camarinha-Matos: Chairman of the International Program Committee.
- *Panel on Virtual Enterprises*, associated to IFIP WCC2000/ITBM 2000 Conference, Beijing, China, 23 Aug 2000.
L.M. Camarinha-Matos: Co-chairman.
- *Panel on Future challenges in Virtual Enterprise Infrastructures*, associated to PRO-VE 2000 – 2nd IFIP / MASSYVE Working Conference on Infrastructures for Virtual Enterprises, Florianopolis, Brasil, 4-5 Dec 2000.
L.M. Camarinha-Matos: Chairman.
- *Panel on Cooperation EU-Brazil*, associated to PRO-VE 2000 – 2nd IFIP / MASSYVE Working Conference on Infrastructures for Virtual Enterprises, Florianopolis, Brasil, 4-5 Dec 2000.
L.M. Camarinha-Matos: Co-chairman.

4.1.2 Participation in the Program Committee

L.M. Camarinha-Matos:

- HPCN Europe 2000 – 8th International Conference on High Performance Computing and Networking Europe, Track on Web-based Cooperative Applications, 8-10 May, Amsterdam, The Netherlands.
- Workshop on Agents in Industry (associated to 4th International Conference on Autonomous Agents 2000), Barcelona, Spain, 3 Jun 2000.
- ISIAC 2000 - International Symposium on Intelligent Automation and Control, Wailea, Maui, Hawaii, 11-16 Jun 2000.
- ICE 2000 – 6th International Conference on Concurrent Enterprising, Toulouse, France, 28-30 Jun 2000.
- CSCC 2000 - IMACS/IEEE Multiconference, 4th International Conference on Systems, Vouliagmeni/Athens, Greece, 10-15 Jul 2000.
- MIM 2000 – IFAC Symposium on Manufacturing, Modeling, Management and Control, Rio, Greece, 12-14 Jul 2000.
- ITBM 2000 (WCC 2000) – IFIP International Conference on Information Technology for Business Management, IFIP World Computer Congress, Beijing, China, 21-25 Aug 2000.

- DEXA 2000-11th International Conference and Workshop on Database and Expert Systems Applications, 4-6 Sep 2000, Greenwich, UK.
- HoloMAS 2000 - Workshop on Industrial Applications of Holonic and Multi-Agent Systems, 6-8 Sep 2000, Greenwich, UK.
- INES 2000 - 4th IEEE International Conference on Intelligent Engineering Systems, 17-19 Sep 2000, Portorož, Slovenia.
- IECON 2000 - IEEE International Conference on Industrial Electronics, Control and Instrumentation, 22-28 Oct 2000, Nagoya, Japan.
- DIISM 2000 – 4th International Conference on Design of Information Infrastructure Systems for Manufacturing, 15-17 Nov 2000, Australia.

José Barata:

- Product Data Technology Europe 2000 (PDT'00), 9th Symposium - 2nd-5th May 2000 ESTEC, Noordwijk, The Netherlands.

4.1.3 Participation in the Organizing Committee

- *PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brazil, 4-6 Dec 2000.
-Rosa Oliveira
- *3rd Workshop UM-UNL on Theoretical Problems on Manufacturing Systems Design and Control*, Centro de Engenharia de Sistemas de Produção – CESP, Universidade do Minho, Escola de Engenharia Guimarães, 10 Nov 2000.
- A. W. Colombo

4.2 Participation in Conferences

- *HPCN Europe 2000 – 8th International Conference on High Performance Computing and Networking Europe*, 8-10 May, Amsterdam, The Netherlands.
-L.M. Camarinha-Matos
- *MIM 2000 – IFAC Symposium on Manufacturing, Modeling, Management and Control*, Rio, Greece, 12-14 Jul 2000.
-L.M. Camarinha-Matos
- *WISE 2000 – 1st ACM/IEEE International Conference on Web Information Systems Engineering*, Hong Kong, 19-20 June 2000.
-L.M. Camarinha-Matos
- *ITBM 2000 (WCC 2000) – IFIP International Conference on Information Technology for Business Management, IFIP World Computer Congress*, Beijing, China, 21-25 Aug 2000.
-L.M. Camarinha-Matos
- *BASYS 2000 – 4th IEEE/IFIP International Conference on Information Technology for Balanced Automation Systems in Manufacturing and Transportation*, Berlin, Germany, 27-29 Sep 2000.
-L.M. Camarinha-Matos
- *AIRTC 2000 - IFAC Symposium on Artificial Intelligence in Real-Time Control*, Budapest, Hungary, 2-4 Oct 2000.
-L. O. Castolo
- *CONTROLO'2000 – 4th Portuguese Conference on Automatic*, 4-6 Oct 00, Guimarães, Portugal.
- A. W. Colombo
- *e-Manufacturing Seminar*, Santa Maria da Feira, Portugal, 29 Nov 2000.
-L.M. Camarinha-Matos
-Rosa Oliveira
- *PRO-VE 2000 – 2nd IFIP Working Conference on Infrastructures for Virtual Enterprises*, Florianopolis, Brazil, 4-6 Dec 2000.
-L.M. Camarinha-Matos
-J. Barata

4.3 Presentations in Seminars and Panels

- Virtual enterprises and remote supervision – L.M. Camarinha-Matos, invited talk, *Workshop on Virtual Laboratories*, associated to HPCN Europe 2000, Amsterdam 9 May 2000.
- Generic Methodology to Introduce Operational Quality Information Systems – José Barata, Awareness Session on Tools & Methodologies for Quality - The ProSME project Approach” at SENAI - Serviço Nacional de Apoio à Indústria. Porto Alegre, Brazil, 17 May 2000.
- Metodologia para a Re-engenharia de Sistemas de Produção: Factores para uma Implementação de Sucesso – José Barata, Seminar organised at the Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil, 19 May 2000.
- Information Systems to Help Production Systems - An Integration Approach - José Barata, invited Lesson to the Mechanical Engineering Course of the Pontificia Universidade Católica - PUC, Porto Alegre, Brazil, 23 May 2000.
- Trends in Virtual Enterprise Infrastructures – L.M. Camarinha-Matos, *Panel on Virtual Enterprises, IFIP WCC2000/ITBM 2000 Conference*, Beijing, China, 23 Aug 2000.
- Interoperability challenges within a virtual organization scenario – L.M. Camarinha-Matos, invited talk, *Workshop on Interoperability of Enterprise Software*, European Commission, Brussels, 5 Oct 2000.
- The Flexible Manufacturing Laboratory of UNINOVA – José Barata, TOD-CME Conference on Technical and Organisational Development in Complex Manufacturing Environments, UNINOVA, Monte da Caparica, Portugal, 18 Oct 2000.
- Virtual enterprises, invited talk– L.M. Camarinha-Matos, Invited talk, *Seminar on e-Manufacturing*, Santa Maria da Feira, Portugal, 29 Nov 2000.
- From Functional Analysis to Logistic and Supervision of Production, A. Walter Colombo, *Actas of the 3rd Workshop UM-UNL on Theoretical Problems on Manufacturing Systems Design and Control*, Centro de Engenharia de Sistemas de Produção – CESP, Universidade do Minho, Escola de Engenharia Guimarães, 10 Nov 2000.
- Petri Net-based Simulation of Discrete-Event Dynamic Systems, A. Walter Colombo, *Actas of the 3rd Workshop UM-UNL on Theoretical Problems on Manufacturing Systems Design and Control*, Centro de Engenharia de Sistemas de Produção – CESP, Universidade do Minho, Escola de Engenharia Guimarães, 10 Nov 2000.
- Generic Methodology to Introduce Operational Quality Information Systems – José Barata, Awareness Session on “Tools & Methodologies for Quality - The ProSME project approach “ at SADIO - Sociedad Argentina de Informática e Investigación Operativa. Buenos Aires, Argentina 28 Nov 2000.

5. 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 Scientific Council of FCT/UNL.
- 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, European Commission.
- "Reviewer" of the Esprit DELPHI and CHAMAN projects.
- “Reviewer” of the project IST SOL-EU-NET, European Commission.
- Program “Investigación Científica y Tecnológica”, Agencia Nacional de Promoción Científica y Tecnológica, Argentina.

A. W. Colombo:

- Program “Investigación Científica y Tecnológica”, Agencia Nacional de Promoción Científica y Tecnológica, Argentina.

José Barata:

- Evaluator for the ARCHIMEDES PRIZE 2000. EU Fifth framework, Improving Human Research Potential and the Socio-Economic Knowledge.

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 Américo Lopes de Azevedo [Decision support in the negotiation of orders in networks of enterprises], University of Porto, 17 Mar 2000.

- Member of the evaluation board for the PhD exam of Elsa Maria Pires Henriques [Modelo de optimização do corte por arranque de aparas para o planeamento integrado do processo e da produção], IST, 4 May 2000.

MSc Thesis defense:

- Member of the evaluation board (main examiner) for the MSc thesis of Mário Paulo Teixeira Pinto [Os sistemas de gestão de fluxo de trabalho na coordenação de processos de empresa estendida de construção civil], University of Porto, 11 Jan. 2000.
- Chairman of the evaluation board for the MSc thesis of Rui Melo [MARS: Mobile Agents for Remote Supervision], FCT/UNL, 13 Jan 2000.
- Member of the evaluation board (main examiner) for the MSc thesis of Anabela Carvalho Alves [Metodologia para a concepção de sistemas de produção orientados ao produto], Universidade do Minho, 16 Mar 2000.
- Member of the evaluation board for the MSc thesis of Luis Octávio González Castolo, FCT/UNL, April 2000.
- Member of the evaluation board for the MSc thesis of Nuno António Afonso Cunha Oliveira [Suporte à Cooperação no Âmbito da Engenharia Concorrente sobre a Internet], FCT/UNL, 26 Jun 2000.
- Member of the evaluation board for the MSc thesis of Miguel Jorge Boavida [Ambiente de Desenvolvimento para Arquitecturas de Comportamentos], FCT/UNL, 6 Jul 2000.
- Member of the evaluation board for the MSc thesis of João Rosas [Ferramenta de Suporte ao projecto conceptual], University of Minho, 13 Oct 2000.

Selection of candidates for Coordinating Professor position:

L.M. Camarinha-Matos:

- Member of the selection committee for a Coordinating Professor position for Computer Science, Electrical Engineering Department, ISEL, Polytechnic Institute of Lisbon.

5.4 Membership in professional associations

L.M. Camarinha-Matos:

- IFIP TC5 (national representative), WG5.3, WG5.7.
- IEEE Robotics & Automation, Systems, Man & Cybernetics
- APPIA – Portuguese association for Artificial Intelligence
- API – Portuguese Informatics Association
- Portuguese Association of Engineers

A. W. Colombo:

- IEEE Robotics & Automation, Systems, Man & Cybernetics.
- Gesellschaft für Informatik.

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 '00, May 2000, University of Aveiro, Portugal
-A. W. Colombo: member of the context evaluation panel.

5.7 Visitors

- Prof. Carlos Bremer, University of São Paulo, Brazil
- Prof. Goran Putnik, University of Minho, Portugal
- Prof. Hamideh Afsarmanesh, University of Amsterdam, The Netherlands
- Prof. João Amato, University of São Paulo, Brazil
- Luciane M. Ortega, University of São Paulo, Brazil
- Luciana B. Trigo, Federal University of Santa Catarina, Brazil
- Prof. Ricardo J. Rabelo, Federal University of Santa Catarina, Brazil
- Elisabeth Butenuth, Butenuth Technologie Marketing GmbH, Germany