UNIVERSIDADE NOVA DE LISBOA
Faculty of Sciences and Technology

UNINOVA
Institute for the Development of New Technologies

CoDIS

COLLABORATIVE NETWORKS AND DISTRIBUTED INDUSTRIAL SYSTEMS GROUP

SUMMARY OF ACTIVITIES
2009

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1. ORGANIZATION

1.1 Affiliation

From the institutional point of view, the Collaborative Networks and Integrated Manufacturing unit 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 unit is integrated in the Department of Electrical Engineering. At UNINOVA the unit is integrated in the Center for Technologies and Systems (CTS).

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

1.2 Members

Research team:

- Prof. Dr. Luis M. Camarinha-Matos – Group Coordinator — cam@uninova.pt, www.uninova.pt/~cam
- Dr. José Barata Oliveira – Assistant Professor — jab@uninova.pt
- Dr. António Abreu –Adjunct Professor — ajfa@dem.isel.ipl.pt
- João Rosas – Assistant & PhD student — jrosas@uninova.pt
- Tiago Cardoso – Assistant & PhD student — tomfc@uninova.pt
- Patricia Macedo – PhD Student — pmacedo@est.ips.pt
- Regina Frei – PhD Student — Regina.Frei@uninova.pt
- Filipa Ferrada – Engineer, PhD student — faf@uninova.pt
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- Luís Ribeiro – PhD student — ldr@uninova.pt

1.3 Contact

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2. RESEARCH ACTIVITIES

2.1 Research Topics

Current research activities include the following main topics:

- Collaborative Networks
  - Virtual enterprises / Virtual organizations
  - Virtual communities
  - VO Breeding environments
- Intelligent Manufacturing Systems
- Manufacturing Information Systems and Integration

Characterization of the research area. The CoDIS group focuses its research activities on the understanding (*principles and models*) and support (*methods, tools, and technologies*) for collaborative networks and distributed architectures and systems applied to industry and services.

A large number of new organizational forms have emerged during the last years as a result of the challenges faced by industry, services and the society in general, and are enabled and even boosted by the advances in the ICT. Dynamic and highly integrated supply chains, extended enterprise, virtual enterprises, virtual organizations, virtual organizations breeding environments, professional virtual communities, value constellations, and collaborative virtual laboratories, represent examples of such trend. As such enterprises as well as other organizations and professionals seek complementarities and join their activities in order to participate in a wide variety of competitive business opportunities, for example in new markets or to reach scientific excellence for innovative developments. Similar trends can be identified within the non-profit/social-oriented contexts, e.g., in incident/crisis management, time banks, elderly care networks, etc.). Simultaneously at the shop-floor level a convergent phenomenon is observed. More and more manufacturing systems are composed of autonomous (progressively more intelligent) components / resources, interconnected by computer networks (a truly ubiquitous computing and sensing environment) forming "coalitions" that need to be easily re-configured as driven by the needs of flexibility and agility. The traditional paradigm of control systems is giving pace to other mechanisms (e.g. coordination, negotiation, fuzzy reasoning, contracting) that are characteristic of collaborative networks, as seen in the most innovative recent proposals for advanced manufacturing systems architectures. Therefore, the new discipline of **Collaborative Networks (CN)** provides a uniform paradigm to address such complex and highly dynamic systems.

CoDIS aims at contributing to important research questions in this area, for which novel approaches, models, and mechanisms are being designed and developed, namely:

- *Questions related to the theoretical foundation for CN:*
  - TQ1: What are the base principles and mechanisms of collaboration?
    And some further questions related to the CNs:
    - What is a suitable holistic reference model for CN?
    - What is a suitable taxonomic characterization of the variety of CN forms?
    - Can we elaborate more formal models for an area that although promising, since in its infancy, has a quite ad-hoc nature?
  - TQ2: What is a proper value system and benefits model for CN?
  - TQ3: Which approach to CN can improve the agility and ease the re-configurability in manufacturing systems?
- *Questions related to the applied research in CN:*
  - AQ1: Which system architecture for tool-independent technological ICT infrastructures for CN?
  - AQ2: Which pilot demonstrations provide good representatives for creating scientific and industrial impact in this area?

Research strategy. In pursuing its objectives, CoDIS adopts the following approach:

- Combine the identified and acquired real-world requirements (from the applied and experimental perspective) with the theoretical conceptualization. This is reflected in:
  - Development / experimentation of CN in advanced application scenarios for diverse domains;
  - Seeking contributions from "adjacent" disciplines to systematize and formalize the base knowledge on CN.

- Active engagement with the international community of researchers in this area in order to:
  - Jointly achieve the necessary critical mass (not available in any single institution given the wide scope and highly multidisciplinary nature of CN) to address such complex domain;
  - Pursue a unification of approaches towards common reference models and wider recognition of CN as a new scientific discipline.
  - Elaborate strategic research roadmaps.

Newly pursued challenges. Current research of CoDIS focuses on:

- Pursuing the development of a reference model for collaborative networks and contributions to define a sounder theoretical foundation for the area.
- Development of a theoretical and formal basis for value systems in collaborative networks, leading to a better understanding of the mechanisms of value creation in collaborative networks (combining axiomatic set theory and soft computing methods).
- Develop soft computing methods for risk analysis and management in collaborative networks.
- Creation of a theoretical framework to exploit emergence, artificial life (swarm algorithms), self-organization, complexity/non-linear dynamics, and chaos theory in Evolvable Production Systems.
- Pursuing a unified collaborative networks based approach for manufacturing systems, both at (agile) shop-floor and inter-organizational levels, following a balanced automation systems approach (combining agile self-organizing systems with anthropocentric systems).
- Applying the collaborative networks paradigm to other domains, e.g. active ageing, transportation systems, the management of energy production and distribution networks.

2.2 Projects

IST EUPASS

Evolvable Ultra-Precision Assembly Systems
IP

EUPASS
Evolvable Ultra-Precision Assembly SystemS

www.eupass.org

Uninova's funding: 350 000 euros

EUPASS is a 6th framework Integrated Project on reconfigurable microassembly systems.
The EUPASS project aims to develop affordable, cost effective and sustainable ultra-precision manufacturing solutions by offering rapidly deployable ultra-precision assembly services on demand.

Group's role:

- Identification of the key industrial needs in precision assembly in the short, medium and long-term.
- Development of a coherent vision for the successful development & application of precision assembly technologies within the EUPASS frame. Disseminate via Roadmap.
- Participation in the design of the overall EUPASS system architecture (assembly module platform), including multidisciplinary standardized interfaces, communication and decentralised control.
- Development of the control system for the individual modules.

Partners:

Philips (NL), UNINOVA (PT), KTH (SE) TUT (FI) Feintool (CH), FHSO (CH), EPFL (CH), Bosch (DE), Festo (DE), IEF Werner (DE), FhG (DE), FZ Karlsruhe (DE), Beckhoff (DE), VDI-VDE (DE), Electrolux (IT), Masmec (IT), ITIA (IT), TQC (UK), UNOTT (UK), UFC, Flexlink (SE).

ICT FP7 ePAL

extending Professional Active Life

(Feb 2008- Apr 2010)
Funded under FP7 of European Commission.
Grant Nº 215289
Uninova's Funding: 297 325 euros

http://www.epal.eu.com/

ePAL aims to explore innovative ways to best facilitate the development of the active ageing process and to ensure an improved transition for the elderly citizen as they cope with the onset of age. In order to find appropriate ways towards this goal, a strategic RTD roadmap is being developed focused on innovative solutions and ensuring a balanced post-retirement life-style.

The ePAL vision - addressing new levels of quality of life - is that of an effective transformation of the current situation regarding retirement and the barriers to active ageing in Europe by introducing new approaches and ways to create actively contributing professional communities in society, which provides the elderly citizen with a supporting framework for leveraging their talents and expertise and creates value for the benefit of the Europe's economy. Moreover, such a framework would also support a balanced transition towards retirement.

Group's role:

- Coordination and management of the project.
- Coordination of the baseline definition and roadmap integration.
- Contribution to the roadmapping methodology, vision definition, gap analysis and implementation models.

Partners:

Uninova (PT), Skill Estrategia (ES), University of Amsterdam (NL), WhiteLoop Ltd (UK), SECOT (ES).

NMP FP7 Self-Learning

Reliable Self-Learning Production Systems Based on Context Aware Services
NMP-2008-228857
1st Nov 2009 / 31st Oct 2012

The strategic objective is to strengthen EU leadership in production technologies in the global marketplace by developing innovative self-learning solutions to enable tight integration of control & maintenance of production systems.
The project will develop highly reliable and secure service-based self-learning solutions aiming at that integration. The Methodology addressing organisational aspects of such a radical change in production systems, within extended enterprise concept, applying lean principles will be elaborated. Approaches based on SOA principles, using distributed networked embedded services in device space, are the most appropriate for implementation of such self-learning solutions.

Partners:

FASTEMS OY AB, KUKA Systems, BOSCH Rexroth, Tampereen Teknillinen Yliopisto, X/OPEN Company Ltd, UNINOVA.

New project approved (to start in 2010):

ICT FP7 BRAID

Bridging Research in Ageing and ICT Development

(Mar 2010 – Feb 2012)
Funded under FP7 of European Commission.
Grant Nº 2484852
Uninova's Funding: 108 236 euros

BRAID will develop a **comprehensive RTD roadmap** for active ageing by consolidating existing roadmaps and by describing and launching a stakeholder co-ordination and consultation mechanism. It will characterise key research challenges and produce a vision for a comprehensive approach in supporting the well-being and socio-economic integration of increasing numbers of senior citizens in Europe.

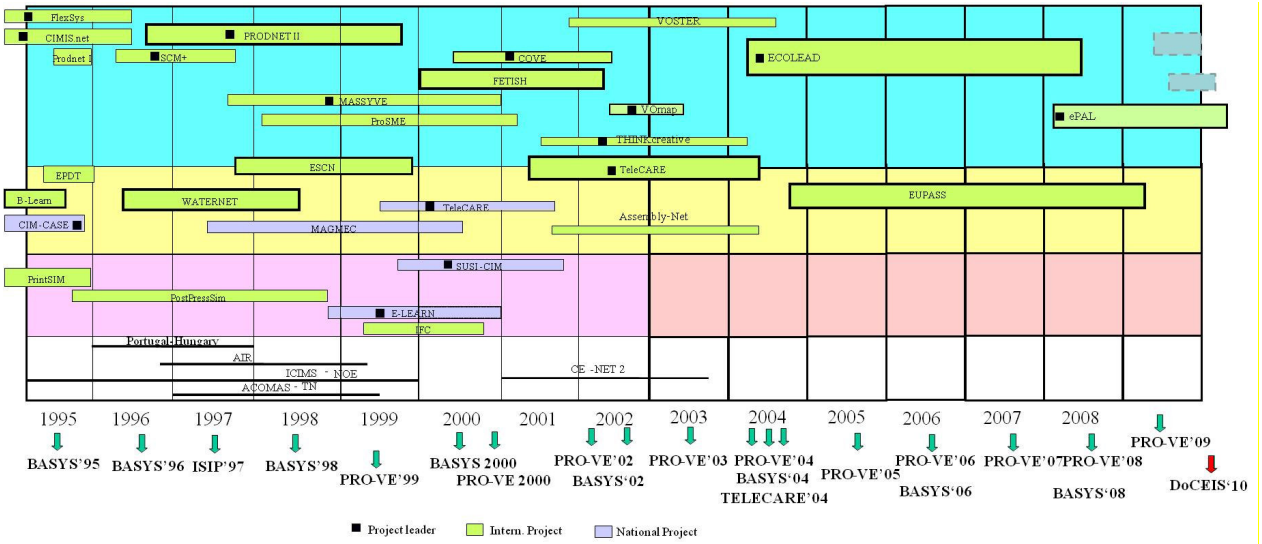
Partners:

Queen's University (UK), CSSC (IT), Trilateral Research & Consulting (UK), Global Security Inc (UK), University of Tasmania (AU), UNINOVA (PT), Universiteit van Amsterdam (NL), Dundalk Institute of Technology (UK), VDI/VDE Innovation + Technik Gmbh (DE).

2.3 Past projects

- ICT ECOLEAD - European Collaborative Networked Organizations Leadership Initiative, FP6 Integrated Project (Apr 2004- Jun 2008). http://ecolead.vtt.fi/
- IST TeleCARE - A Multiagent Telesupervision System for Elderly Care (June 2001 – June 2004). www.uninova.pt/~telecare
- IST THINKcreative - Thinking network of experts on emerging smart organizations (Jul 2001 – Mar 2004). www.uninova.pt/~thinkcreative.
- IST VOSTER - Virtual Organizations Cluster (Dec 2001 – July 2004). http://cic.vtt.fi/projects/voster/public.html .
- GROWTH ASSEMBLY NET (1 Oct 2001 – 31 Aug 2004). www.assembly-net.org.
- 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).
- INCO MASSYVE – Multi-Agent Agile Manufacturing Scheduling Systems in Virtual Enterprise Industry (Oct 1997 – Dec 2000).
- PRAXIS MAGMEC – Sensores de campo magnético para posicionamento e monitorização de corrente em Mecatrónica (Jun 1997 – Mai 2000).
- E-LEARN – Remote learning through Internet (Nov 1998-Dec 2000).
- INCO-DC ProSME - Easy-to-Use Procedures for Quality Management tailored for SMEs (Feb 98-Jan 2001)
- PRAXIS TeleCARE - A Multi-Agent Tele-Supervision System for Elderly Care (Jun 1999-Nov 2001)
- IST FETISH-ETF - Federated European Tourism Information System Harmonization (Jan 2000-Apr 2002)
- IFIP COVE - CO-operation infrastructure for Virtual Enterprises and electronic business (Jul 2000 – Jun 2002. www.uninova.pt/~cove
- IST VOmap - Roadmap design for collaborative virtual organizations in dynamic business ecosystems (Jul 2003 – Jun 2003). www.uninova.pt/~vomap
- IST CE-NET II - Concurrent Enterprise Network of Excellence (Jan 2001 – Aug 2003). www.ce-net.org

Activities in perspective:



The group was one of the key founders of the following international conference series:

- BASYS – IFIP/IEEE International Conference on IT for Balanced Automation Systems
- PRO-VE – IFIP Working Conference on Virtual Enterprises

Steering Committee chairman of both conferences series: L.M. Camarinha-Matos

3. PUBLICATIONS 2009

3.1 Journals

1. Camarinha-Matos, L.M.; Afsarmanesh, H.; Galeano, N.; Molina. A. (2009). Collaborative Networked Organizations - Concepts and practice in Manufacturing Enterprises. *Journal of Computers & Industrial Engineering, vol. 57 (2009), pp 46–60.* <DOI:10.1016/j.cie.2008.11.024> ***ISI Web of Science***
2. Afsarmanesh, H.; Camarinha-Matos, L.M. (2009). On the classification and management of Virtual Organisation Breeding Environments. *International Journal of Information Technology & Management,* Vol. 8, No. 3. <DOI: 10.1504/IJITM.2009.024604>
3. Rosas, J.; Camarinha-Matos, L.M. (2009). An approach to assess collaboration readiness. *International Journal of Production Research, Vol 47, Issue 17, pp 4711 – 4735.* <DOI: 10.1080/00207540902847298> ***ISI Web of Science***
4. Camarinha-Matos, L.M.; Oliveira, A.I.; Sesana, M.; Galeano, N.; Demsar, D.; Baldo, F.; Jarimo, T. (2009). A framework for computer-assisted creation of dynamic virtual organizations. *International Journal of Production Research, Vol 47, Issue 17, pp 4661 – 4690.* <DOI: 10.1080/00207540902847272> ***ISI Web of Science***
5. Abreu, A.; Macedo, P.; Camarinha-Matos, L.M. (2009). Elements of a methodology to assess the alignment of core-values in collaborative networks. *International Journal of Production Research, Vol 47, Issue 17, pp 4907 – 4934.* <DOI: 10.1080/00207540902847447> ***ISI Web of Science***
6. Camarinha-Matos, L.M. (2009). Collaborative Networked Organizations: Status and Trends in Manufacturing. *Annual Reviews in Control, Vol. 33, Issue 2, pp 199–208, 2009.* <DOI: 10.1016/j.arcontrol.2009.05.006> ***ISI Web of Science***
7. Afsarmanesh, H.; Camarinha-Matos, L.M. (2009). On Management of 2nd Generation Virtual Organizations Breeding Environments. *Annual Reviews in Control, Vol. 33, Issue 2, pp 209–219, 2009.* <DOI: 10.1016/j.arcontrol.2009.05.007> ***ISI Web of Science***
8. Ribeiro, L., Barata, J. and Colombo, Armando. (2009). Supporting Agile Supply Chains Using a Service-Oriented Shop Floor. *Engineering Applications of Artificial Intelligence*, *Vol 22, Number 6*, pp 950-960. < DOI: 10.1016/j.engappai.2008.10.023> ***ISI Web of Science***
9. Cândido, G., Barata, J. and Colombo, Armando. (2009). SOA in Reconfigurable Supply Chains: A Research Roadmap. *Engineering Applications of Artificial Intelligence, Vol 22, Number 6*, pp 939-949. < DOI: 10.1016/j.engappai.2008.10.020> ***ISI Web of Science***

3.2 Conferences (with peer reviewing)

1. Camarinha-Matos, L.M.; Afsarmanesh, H. (2009). Collaborative mechanisms for a new perspective on active ageing. *Proceedings of DEST 2009 – IEEE Int Conf on Digital Ecosystems and Technologies (**Best Paper Award**), 31 May – 3 Jun 2009, Istanbul, Turkey.* ***IEEE Explorer***
2. Afsarmanesh, H.; Camarinha-Matos, L.M. (2009). Management of Information Supporting Collaborative Networks. *Proceedings of DEXA'09 - 20th International Conference on Database and Expert Systems Applications (**Keynote**), 31 Aug- 4 Sep 2009, Linz, Austria. Lecture Notes in Computer Science 5690, pp 1-6.* <DOI: 10.1007/978-3-642-03573-9_1> ***ISI Web of Science***
3. Rosas, J.; Macedo, P.; Camarinha-Matos, L.M. (2009). An Organization's Extended (Soft) Competencies Model. *Proceedings of PRO-VE'09, 7-9 Oct 09, Thessaloniki, Greece, Leveraging knowledge for innovation in Collaborative Networks*, Springer, pp. 247-258. <DOI: 10.1007/978-3-642-04568-4_26> ***ISI Web of Science***
4. Camarinha-Matos, L.M.; Afsarmanesh, H. (2009). The Need for a Strategic R&D Roadmap for Active Ageing. *Proceedings of PRO-VE'09, 7-9 Oct 09, Thessaloniki, Greece, Leveraging knowledge for innovation in Collaborative Networks*, Springer, pp. 669-680. <DOI: 10.1007/978-3-642-04568-4_69> ***ISI Web of Science***
5. Afsarmanesh, H.; Camarinha-Matos, L.M.; Msanjila, S. (2009). A Well-conceived Vision for Extending Professional Life of Seniors. *Proceedings of PRO-VE'09, 7-9 Oct 09, Thessaloniki,*

Greece, Leveraging knowledge for innovation in Collaborative Networks, Springer, pp. 681-692. <DOI: 10.1007/978-3-642-04568-4_70> ***ISI Web of Science***

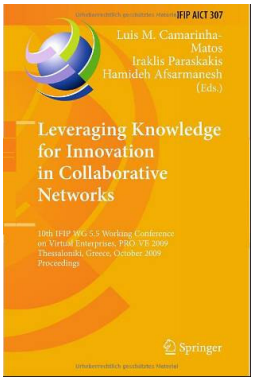
6. Cura, A.; Camarinha-Matos, L.M.; Ferrada, F.; Cura, P. (2009). New Organizational Forms to Extend the Professional Active Life. *Proceedings of PRO-VE'09, 7-9 Oct 09, Thessaloniki, Greece, Leveraging knowledge for innovation in Collaborative Networks*, Springer, pp. 707-718. <DOI: 10.1007/978-3-642-04568-4_72> ***ISI Web of Science***
7. Camarinha-Matos, L.M. (2009). Collaborative networks contribution to sustainable development. *Proceedings of SWIIS 2009 – IFAC Workshop on Supplementary Ways for Improving International Stability (**invited**)*, Bucharest, Romania, 28-30 Oct 2009.
8. Santana, P., Guedes, M., Correia, L. and Barata J. (2009). "Saliency-Based Obstacle Detection and Ground-Plane Estimation for Off-Road Vehicles," in *Computer Vision Systems - 7th International Conference, ICVS 2009*, (Fritz, M., Schiele, B. and Piater, J.H., Eds.), Vol. 5815/2009, (Berlin Heidelberg: Springer-Verlag), pp 275-284.
9. Neves P. and Barata, J. (2009) "Evolvable Production Systems - Approach towards Economical and Ecological Production Systems," in *ISAM 2009 - IEEE International Symposium on Assembly and Manufacturing* (Suwon - Korea: IEEE Xplore), pp 189-194. ***ISI Web of Science***
10. Ribeiro, L., Barata, J. and Sousa, P. (2009) "An Algorithm for Management of Automotive Buffers with Drawers," in *ISAM 2009 - IEEE International Symposium on Assembly and Manufacturing* (Suwon - Korea: IEEE Xplore), pp 71-76. ***ISI Web of Science***
11. Ribeiro, L., Barata, J., Cândido, G. and Onori, M. (2009) "Evolvable Production Systems: An Integrated View on Recent Developments " in *Proceedings of the 6th CIRP-Sponsored International Conference on Digital Enterprise Technology*, (Huang, G.Q, Mak, K.L., and. Maropoulos, P.G., Eds.) Vol. 66/2010, (Berlin / Heidelberg: Springer), pp 841-854.
12. Frei, R., Ferreira, B., Di Marzo Serugendo, G. and Barata, J. (2009) "An Architecture for Self-Managing Evolvable Assembly Systems," in *SMC 2009 - IEEE International Conference on Systems, Man and Cybernetics* (San Antonio - TX - USA: IEEE Xplore), pp 2707-2712. ***ISI Web of Science***
13. Cândido, G., Jammes, F., Barata, J. and Colombo, A.W. (2009) "Generic Management Services for DPWS-enabled Devices," in *IECON 2009 - 35th Annual Conference of the IEEE Industrial Electronics Society* (Porto - Portugal: IEEE Xplore), pp 3967-3972. ***ISI Web of Science***
14. Ribeiro, L., Barata, J., Leitão, P. and Silverio, N. (2009) "Maintenance Management and Operational Support As Services In Reconfigurable Manufacturing Systems," in *INCOM 2009 - 13th IFAC Symposium on Information Control Problems in Manufacturing* (Moscow - Russia: IFAC-PapersOnLine), pp 1769-1774.
15. Onori, M. and Barata, J. (2009). "Evolvable Production Systems: Mechatronic Production Equipment with Process-Based Distributed Control," in *SYROCO 2009 - 9th IFAC Symposium on Robot Control* (Gifu - Japan: IFAC-PapersOnLine).

3.3 Book chapters

1. Afsarmanesh, H.; Ermilova, E.; Msanjila, S.; Camarinha-Matos, L.M.; (2009). Modeling and Management of Information Systems Supporting Functional Dimension of Collaborative Networks. In: Transaction on Large-Scale Data- and Knowledge- Centered Systems I, LNCS 5740, pp 1-37. <DOI: 10.1007/978-3-642-03722-1_1>

3.4 Book edition

1. Leveraging Knowledge for Innovation in Collaborative Networks, (L.M. Camarinha-Matos, I. Paraskakis, H. Afsarmanesh, Editors), IFIP AICT 307, Springer, 2009. <DOI: 978-3-642-04567-7>



3.5 MSc Thesis

1. Auxiliary Mechanisms for Telerobotics, Carlos Pedro Maia da Costa Cândido, FCT-Universidade Nova de Lisboa, Feb 2009. Supervisor: José Barata, Co-Supervisor: Luís Correia.
2. DPWS Middleware to Support Agent-Based Manufacturing Control and Simulation, Rui Rodrigues Milagaia, FCT-Universidade Nova de Lisboa, March 2009. Supervisor: José Barata.
3. DSAAR: Distributed Software Architecture for Autonomous Robots, Vasco Pedro dos Anjos e Santos, FCT-Universidade Nova de Lisboa, March 2009. Supervisor: José Barata, Co-Supervisor: Luís Correia.
4. Human-Robot Teamwork: A Knowledge-Based Solution, Mário Jorge Rodrigues da Silva Nunes Salgueiro, FCT-Universidade Nova de Lisboa, June 2009. Supervisor: José Barata.
5. Bio-Inspired Autonomy for Autonomous DPWS-Compliant Automation Components, José Eduardo Bruno de Sousa, FCT-Universidade Nova de Lisboa, July 2009. Supervisor: José Barata.
6. Self organization and Complexity Theory to Support Evolvable Production Systems, Bruno Domingos Ferreira, FCT-Universidade Nova de Lisboa, July 2009. Supervisor: José Barata.
7. Collaborative Environment to Support a Professional Community, Pedro Miguel Salsinha Neves, FCT-Universidade Nova de Lisboa, November 2009. Supervisor: José Barata.

4. EVENTS

4.1 Organization

The following events were (co-)organized by the group in 2009:

- Collaboration in the Organizing Committee of PRO-VE'09 - 10th IFIP Working Conference on Infrastructures for Virtual Enterprises, Thessaloniki, Greece, 7-9 Oct 2009.
- ePAL Workshop / Consensus Building Event on Roadmap for extending Professional Active Life, 17 Jun 2009, Porto, Portugal.
- Special track on Collaborative Networks for Active Ageing, PRO-VE'09 conference, Thessaloniki, Greece, 7 Oct 2009.

4.2 Chairing

Luis M. Camarinha-Matos:

- Steering Committee and Program Committee Chairman of PRO-VE'09 - 10th IFIP Working Conference on Infrastructures for Virtual Enterprises, Thessaloniki, Greece, 7-9 Oct 2009.

José Barata

- Tutorial Co-chair for IECON'09 – 35th Annual Conference of the IEEE Industrial Electronics Society. 3-5 Nov 2009, Porto, Portugal.

4.3 Participation in Scientific / Program Committees

Luis M. Camarinha-Matos:

- ISSS 2009 - First International Symposium on Services Science, 23-25 Mar 2009, Leipzig, Germany.
- ABIS09 – 3rd International Conference on Adaptive Business Information Systems, Leipzig, Germany, 23-25 Mar 2009.
- CSCWD2009 - 13th International Conference on Computer Supported Cooperative Work in Design, Santiago, Chile, April 22-24, 2009.
- ICEIS 2009 - 11th International Conference on Enterprise Information Systems, 6 – 10 May 2009, Milan, Italy.
- CTS 2009 - International Symposium on Collaborative Technologies and Systems, 18-22 May 2009, Baltimore, Maryland, USA. [advisory committee]

- INCOM 2009 – 13th IFAC Symposium on Information Control Problems in Manufacturing, Moscow, Russia, 3-5 Jun 2009.
- ICE 2009 - 15th International Conference on Concurrent Enterprising, Sophia-Leiden, Netherlands, 22-24 Jun 2009.
- ICINCO 2009 - 6th International Conference on Informatics in Control, Automation and Robotics, Milan, Italy, 2-5 July 2009.
- SAINT 2009 - 9th IEEE/IPSJ Symposium on Applications and the Internet, Seattle, USA, 20 - 24 July 2009.
- DEXA 2009 - 20th International Conference on Database and Expert Systems Applications, Linz, Austria, August 31 - September 04, 2009.
- HoloMAS 2009 – 4th International Conference on Industrial Applications of Holonic and Multi-Agent Systems, Linz, Austria, August 31 - September 04, 2009.
- Net09 - 1st International Workshop on Technologies for the Networked Enterprise, Linz, Austria, August 31 - September 04, 2009.
- PRO-VE'09 - 10th IFIP Working Conference on Infrastructures for Virtual Enterprises, Thessaloniki, Greece, 7-9 Oct 2009 (Chairman).
- EPIA 2009 – 14th Portuguese Conference on Artificial Intelligence, Aveiro, Portugal,12-15 Oct 2009.
- SWIIS2009 - IFAC Workshop on Supplementary Ways for Improving International Stability, Bucharest, Romania, 28-30 Oct 2009.
- EI2N'2009 - 4rd International Workshop on Enterprise Integration, Interoperability and Networking, November 3nd-4rd, 2009, Vilamoura, Portugal.
- ICEGOV2009 – 3rd International Conference on Theory and Practice of Electronic Governance, 10-13 Nov 2009, Bogota, Colombia.
- FAVO 2009 – 2nd Workshop on Formal Aspects of Virtual Organisations, 26 Nov 2009, Eindhoven, the Netherlands.

José Barata:

- HOLOMAS'09 – 4th International Conference on Industrial Applications of Holonic and Multi-Agent Systems, 31 Aug to 2 Sep 2009, Linz - Austria.
- ETFA 2009 – 14th IEEE International Conference on Emerging Technologies and Factory Automation, Mallorca - Spain, 22-26 Sep (Track 6 – Intelligent Robots and Systems).
- ISAM 2009 – IEEE International Symposium in Assembly and Manufacturing, Seoul, Korea, 17-20 November 2009.
- ESM 2009 – European Simulation and Modelling Conference 2009 – Track Web Based Simulation, Leicester – UK, 26-28 October 2009.
- ICELIE 2009 – 3rd IEEE International Conference on E-Learning in Industrial Electronics, Porto, Portugal, 3-5 November 2009.

António Abreu:

- PRO-VE'09 - 10th IFIP Working Conference on Infrastructures for Virtual Enterprises, Thessaloniki, Greece, 7-9 Oct 2009.
- CIB W102 (2009) – 5th Conference on Information and Knowledge Management, 17-19, Jun 2009, Rio de Janeiro, Brazil.

4.4 Participation in Conferences and Events

Group members participated in the following events:

- DEXA 2009 - 20th International Conference on Database and Expert Systems Applications, Linz, Austria, August 31 - September 04, 2009.
  - L.M. Camarinha-Matos
- PRO-VE'09 - 10th IFIP Working Conference on Infrastructures for Virtual Enterprises, Thessaloniki, Greece, 7-9 Oct 2009.
  - L.M. Camarinha-Matos, J. Rosas, F. Ferrada
- SWIIS 2009 – IFAC Workshop on Suplementary Ways for Improving International Stability, Bucharest, Romania, 28-30 Oct 2009.
  - L.M. Camarinha-Matos
- INCOM 2009 - 13th IFAC/IFIP/IFORS/IEEE/IMS Symposium on Information Control Problems in Manufacturing, Moscow - Russia, 3-5 June 2009.
  - J. Barata
- CIM 2009 - 12th International Scientific Conference on Production Engineering and High Speed Machining. Biograd - Croatia, June 17-20 2009.
  - J. Barata
- IECON 2009 - 35th Annual Conference of the IEEE Industrial Electronics Society. Porto - Portugal, November 3-5 2009.
  - J. Barata
- ISAM 2009 - IEEE International Symposium on Assembly and Manufacturing, Suwon, Korea, November 17-20.
  - L. Ribeiro

4.5 Presentations in Seminars and Panels

In addition to the conference presentations mentioned above, the following talk (without paper) was given:

- Camarinha-Matos, L.M. - From Advanced Robotics to the new discipline of Collaborative Networks, Politehnica University of Bucharest, Romania, 30 Oct 2009 (on the occasion of the Doctor Honoris Causa award).
- Barata, J. - Multi-agent Robotic Based Assembly System. CIM 2009 – 12th International Scientific Conference on Production Engineering and High Speed Machining. Invited Talk. Biograd - Croatia, Jun 18th 2009.

5. OTHER ACTIVITIES

5.1 Academic management

L.M. Camarinha-Matos:

- Coordinator of the PhD Program on Electrical and Computer Engineering.
- Member of the Scientific Council of FCT/UNL (till Jul 2009).
- Coordinator of the Computing Engineering Section of the Electrical Engineering Department (since Nov 2009).
- Member of the Council of the Electrical Engineering Department.
- Branch counselor of the IEEE Student Branch at UNL.

J. Barata:

- Member of the Scientific Council of FCT/UNL (till Jul 2009).
- Member of the Council of the Electrical Engineering Department.
- Member of the Scientific Commission of the PhD Program on Electrical and Computer Engineering.

5.2 Projects, project proposals and other actions evaluation

J. Barata:

- Evaluator of the Seventh EU Framework Programme for Research and Technological Development (FP7), Marie Curie Intra-European Fellowships (EIF), Incoming International Fellowships (IIF) and Outgoing International Fellowships (OIF) schemes.
- SIME Program - "Identificação Automática de Matrículas" and "IDNatural", SIME nº 00 \ 13450. Mar 2009 (national).
- Evaluator for QREN program (national).
- ImagineCup 2009 – Cairo, Egypt; 3-8 July 2009.

T. Cardoso:

- ImagineCup 2009 – Cairo, Egypt; 3-8 July 2009.

5.3 Evaluation boards of academic exams

L.M. Camarinha-Matos:

- Member of the evaluation committee for a Coordinator Professor position for Control Systems, Automation and Biologic Treatment Processes, Polytechynic Institute of Setubal, 6, 9 Feb 2009.
- Member of the evaluation committee (main evaluator for the CV) for the Habilitation exam on Computer Engineering (Doctor Pedro A. M. Antunes), Faculty of Sciences, University of Lisbon, 19-20 Jan 2009.

- Member of the defense committee for the PhD of Simon Samwel Msanjila [On Inter-Organizational Trust Engineering in Networked Collaborations – Modeling and management of rational trust], University of Amsterdam, **Netherlands**, 29 Sep 2009.

- Main evaluator of the PhD of José António Almeida Crispim [Partner Selection in Virtual Enterprises], Instituto Faculty of Engineering, University of Porto, 4 Nov 2009.

- President of the defense committee for the MSc of Filipe Carvalho Moutinho [Geração automática de controladores FPGA integrando animação gráfica], FCT/UNL, 26 Mar 2009.
- President of the defense committee for the MSc of Mário Jorge R. S. N. Salgueiro [Human-Robot teamwork: A knowledge-based solution], FCT/UNL, 30 Jun 2009.

J. Barata:

- Member of the defense committee for the PhD of Marcus Bjelkemyr [of Systems Characteristics In Production Systems Engineering], KTH – Stockholm, **Sweden**, 10th June 2009.

- Member of the defense committee for the MSc of Carlos Pedro Maia da Costa Cândido [Auxiliary Mechanisms for Telerobotics], FCT-UNL, 19th February 2009.
- Member of the defense committee for the MSc of Rui Rodrigues Milagaia [Middleware to Support Agent-Based Manufacturing Control and Simulation, FCT-UNL, 10th March 2009.
- President of the defense committee for the MSc of Vasco Pedro dos Anjos e Santos [DSAAR: Distributed Software Architecture for Autonomous Robots], FCT-UNL, 13th March 2009.
- Member of the defense committee for the MSc of Mário Jorge Rodrigues da Silva Nunes Salgueiro [Human Robot Teamwork: A Knowledge-Based Solution], FCT-UNL, 30th June 2009.
- President of the defense committee for the MSc of Bruno Miguel Pereira de Almeida [Integração de Ambientes Industriais Colaborativos Através da Visualização Orientada pelos Modelos], FCT-UNL, 14th July 2009.
- President of the defense committee for the MSc of José Eduardo Bruno de Sousa [Bio-Inspired Anatomy for Autonomous DPWS-Compliant Automation Components], FCT-UNL, 27th July 2009.
- President of the defense committee for the MSc of Bruno Domingos Ferreira [Self-Organisation and Complexity Theory to Support Evolvable Production Systems], FCT-UNL, 28th July 2009.
- President of the defense committee for the MSc of Pedro Miguel Salsinha Neves [Collaborative Environment to Support a Professional Community], FCT-UNL, 6th November 2009.
- Member of the defense committee for the MSc of Ricardo Filipe Arsénio Viana Fernandes [Projecto de Controladores Digitais de Posição de Braço Robótico], FCT-UNL, 19th November 2009.
- Member of the defense committee for the MSc of Abílio Manuel Figueira de Abreu [Detecção de Incêndios Nocturnos através de Processamento Digital de Imagens], FCT-UNL, 14th December 2009.

A. Abreu:

- Main evaluator of the MSc (pre-Bologna) of Rui Pinto Ferreira [Development of multi-criteria collaborative decision model for performance management in networks of organisations], FEUP- University of Porto.
- Main evaluator of the MSc (pre-Bologna) of Jorge Manuel das Neves Silva [Gestão de informação de desempenho em redes colaborativas de organizações], FEUP- University of Porto.

5.4 Membership in professional associations

L. M. Camarinha-Matos:
- IFIP TC5 (national representative), WG5.5 (founder), WG6.11, WG5.7.
- IEEE Computer Society, Industrial Electronics Society
- APPIA – Portuguese Association for Artificial Intelligence
- Portuguese Association of Engineers ("Ordem dos Engenheiros")

- IFAC TC 4.4 Cost Oriented Automation
- INSTICC – Institute for Systems and Information Technologies, Control and Communications (honorary member).
- SOCOLNET – Society of Collaborative Networks (chairman and founder).
- Sub-committee on Collaborative Networks of IEEE Technical Committee on Industrial Agents (chairman, till Nov 2009).
- APDSI – Associação para a Promoção e Desenvolvimento da Sociedade de Informação.
- "Centre for Business Information, Organisation and Process Management (BIOPoM)" of University of Westminster, UK (external member).

J. Barata Oliveira:
- IEEE – Industrial Electronics Society, Systems Man & Cybernetics
  - Member of TC-EEIT – Technical Committee on Education in Engineering and Industrial Technologies of the Industrial Electronics Society.
  - Member of TC-IA – Technical Committee on Industrial Agents of the Industrial Electronics Society. Co-chair of the subcommittee on Intelligent Supervision.
  - Member of TC-SOCDS – Technical Committee on Self-Organisation and Complex Distributed Systems of the Systems, Man, & Cybernetics Society.
- SOCOLNET – Society of Collaborative Networks (treasurer)
- IFAC TC 4.4 Cost Oriented Automation
- IFAC TC 5.1 Manufacturing Plant Control

A. Abreu:
- Portuguese Association of Engineers ("Ordem dos Engenheiros")
- SOCOLNET – Society of Collaborative Networks

J. Rosas:
- SOCOLNET – Society of Collaborative Networks

T. Cardoso:
- SOCOLNET – Society of Collaborative Networks (secretary)
- IEEE
- ACM

F. Ferrada:
- SOCOLNET – Society of Collaborative Networks

A. I. Oliveira:
- SOCOLNET – Society of Collaborative Networks

P. Macedo:
- SOCOLNET – Society of Collaborative Networks

5.5 Teaching activities

The group was responsible for the following teaching activities:

Electrical and Computers Engineering Master Course (UNL):
-Data Modeling in Engineering
-Real Time Systems
-Robotics
-Intelligent Supervision
-Systems Integration
-Multimedia Information Systems
-Virtual Enterprises
-Telerobotics and Autonomous Systems
-Project of Robotics and CIM.

PhD course on Electrical and Computers Engineering (UNL):

- Scientific Research Methodologies and Techniques
- Doctoral Conference
- Entrepreneurship Methods
- Advanced Topics in Robotics and Integrated Manufacturing
- Advanced Topics in Collaborative Networks
- Advanced Topics in Industry Information Systems

The group had a particularly intense contribution to the launching and coordination of the new **PhD Program** on Electrical and Computer Engineering following the Bologna guidelines.
For further details: http://www-deec.dee.fct.unl.pt/

Teaching abroad:
L.M. Camarinha-Matos - "Collaborative Networks", for the MSc programme on "Ingeniería Avanzada de Producción, Logística y Cadena de Suministro", Polytechnic University of Valencia, Spain, Apr 2009.

5.6 Visitors

The group received the visit of the following researchers:

- Dr Walter Colombo, Schneider Electric, 2.1 to 3.1
- Prof. Giovanna Serugendo, Burbeck College, University of London, 20.4 to 24.4
- Prof. Bojan Jerbic - Faculty of Mechanical Engineering and Naval Architecture, Zagreb, Croatia, 19.10 to 21.10
- Prof. Mauro Onori - Royal Institute of Technology 4.11 to 6.11
- Dr. Ulrich Gengenbach, Karlsruhe Institute of Technology, 6.11
- Prof. Benoit Iung - Nancy University 22.12 to 23.12
- Prof. Marco Macchi - Politecncico de Milano 22.12 to 23.12

5.7 Coordination of SOCOLNET

The group is coordinating the International Society of Collaborative Networks (SOCOLNET), which started activities in Nov 2005.

www.socolnet.org

SOCOLNET is an international technical and scientific association, not for profit, that aims at promoting and stimulating scientific research, education, technological development, scientific and technical interactions among researchers in the area of Collaborative Networks, including virtual organizations, virtual enterprises, virtual communities, virtual laboratories, and related areas.

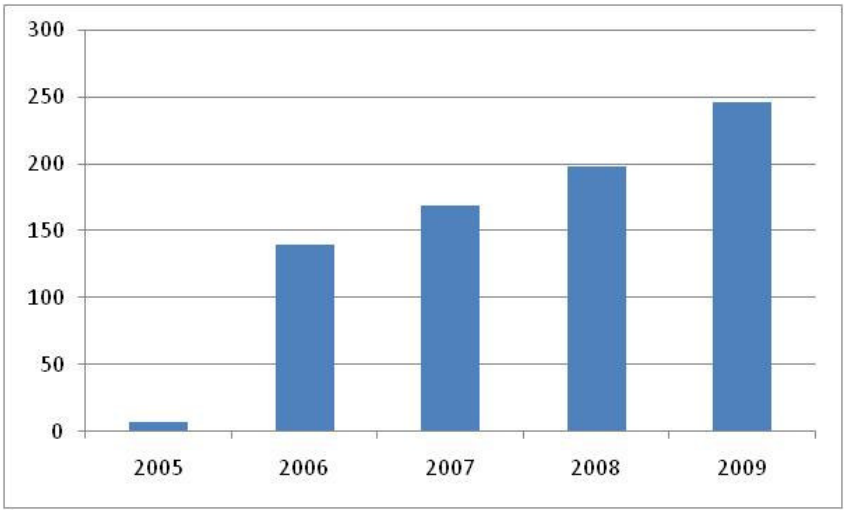
During the 5th General Assembly held in Thessaloniki, Greece, 9 Oct 2009, members of CoDIS were re-elected for the Board of the association for the next 3 years (2nd mandate):

- L. M. Camarinha-Matos – President
- J. Barata – Treasurer
- T. Cardoso - Secretary

Also A. Abreu was re-elected as member of the Treasure Audit Board.

Currently the society has 246 members from 42 countries.

Evolution of SOCOLNET membership:



During 2009, three issues of the SOCOLNET Newsletter were edited by CoDIS members.

5.8 Awards

Doctor Honoris Causa

On 30th October 2009, Prof. Luis M. Camarinha-Matos, President of SOCOLNET, was awarded the degree of Doctor *Honoris Causa* by the POLITEHNICA University of Bucharest.

With more than 190 years of existence, PUB is the oldest and the largest technical university in Romania.

This very prestigious academic degree was granted to Prof. Camarinha-Matos in recognition of his scientific and didactic achievements in the following domains:

- Advanced robotic systems
- Computer integrated manufacturing and engineering
- Virtual enterprises / virtual organizations
- Collaborative networks to support next generation of dynamical systems of sustainable enterprises.

PRO-VE'09 Recognition of Excellence Award

During the opening session of the 10th Anniversary of PRO-VE'09, the Steering Committee members presented a special award to Prof. Luis M. Camarinha-Matos in recognition "*for his incessant enthusiasm, dedication, professionalism, scientific rigor, and vision, in appreciation of his contributions to the success of this conference series, and to hold him as an inspiration for all others*".

Best Paper Award – DEST'09

The paper:

> Camarinha-Matos, L.M.; Afsarmanesh, H. (2009). Collaborative mechanisms for a new perspective on active ageing.

presented at DEST 2009 – IEEE International Conference on Digital Ecosystems and Technologies, 31 May – 3 Jun 2009, Istanbul, Turkey, got the Best Paper Award of the conference.