
# McLeod Institute of Simulation Sciences

***Center of Marseilles***

***MISS-LSIS***

***France***

*Annual Report of the McLeod Institute of Simulation Sciences*
*at Marseille*
*LSIS: « Laboratoire des Sciences de L'Information et des Systèmes »*


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## Preamble

With the establishment of the McLeod Institute of Simulation Sciences, LSIS Marseille creates a center of excellence in computer simulation. Through the creation of the Institute the LSIS Marseille recognizes a unique opportunity to develop a widely recognized institute engaging in state the art simulation research and instructional activities by virtue of a critical mass of exceptional faculty available to contribute to this effort. The establishment of the Institute provides a mechanism through which faculty from various disciplines and their students and associates can bring their talents to bear in the general area of computer simulation or can seek help with the application of simulation to new areas.

## Brief Presentation of LSIS

Set up in January 2002 as a Mixed Research Unit (UMR CNRS 6168), LSIS employs 180 researchers and doctoral students from the 3 Universities of Aix-Marseille, the École Nationale Supérieure des Arts et Métiers (ENSAM) and the CNRS (the French national centre of scientific research). Thanks to the composition of its workforce, the research activities at the Laboratory cover several areas of IT and automation.

The Laboratory consists of 5 research teams:

- **COSI: Control and Simulation** (design of knowledge-based systems - modelling and simulation - industrial automation).
- **IMS: Engineering, Mechanics, Systems** (integrated and cooperative design and engineering - machines and intelligent systems).
- **InCA: Inference, Constraints and Applications** (logical representation of knowledge and simulation of reasoning in IT systems - automatic demonstration and constraint satisfaction).
- **INCOD: Distributed Information and Knowledge** (design, cooperation, integration of component-based information systems, multi-agent simultion - security and cognition).
- **LXAO: Computer-aided Modelling, Design and Reconstruction** (modelling and control of forms - segmentation and recognition of forms - coherence of geometrical models).

The LSIS thus fully subscribes to information and communication sciences and technologies. If the mission of the Laboratory is to develop fundamental and theoretical research into IT and automation, its preliminary activities are inseparable from research carried out at the request of the socio-economic world (involving production systems, transport, medical imaging, computer-aided design and manufacturing, mechanical engineering and geomatics as key applications).

At LSIS the main purpose of this research is firstly to come up with new basic concepts to develop models of real systems and secondly, to define analysis and design methods for artificial systems. Such research culminates in the definition of methods and tools designed to increase the flexibility, reactivity and reliability of companies offering goods or services. Besides such single-discipline activities, a number of interdisciplinary projects are underway,

with researchers and laboratories working in fields relating to the human and social sciences or life sciences.

From the 2002-2003 academic year the development of international relationships has attracted several doctoral students from abroad (numerous new theses on a co-tutorship basis, new agreements with countries of North and South America, Eastern Europe, Northern Africa and Asia).

The LSIS is also a driving force behind training through research, due to its intense involvement in numerous university courses, in particular, at three engineering colleges: École Nationale Supérieure des Arts et Métiers at Aix-en-Provence (ENSAM), École Supérieure d'Ingénieurs de Luminy (ESIL) and Polytech'Marseille. Such involvement in the training of engineers and professional education naturally endows the Laboratory with a culture of transfer to the industrial sector, something that makes it easier for its doctoral students to find a place in the world of work, for example.

## *Members*

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|---|---|
| **ANDRIEN Karine** | PhD student |
| **BELLEMARE Marc-Emmanuel** | Ass. Prof. |
| **BOUCELMA Omar** | Prof. |
| **BOUCHE Philippe** | PhD student |
| **BULOT Rémy** | Prof. |
| **CAUSSANEL Jean** | Ass. Prof. |
| **CHANE Frédéric** | Ing. |
| **CHAMBELLAND Jean-Christophe** | PhD student |
| **CHARBONNEAU Philippe** | Ing. |
| **CLOUCHOUX Cédric** | PhD student |
| **COULON Olivier** | researcher |
| **DANIEL Marc** | Prof. |
| **ESPINASSE Bernard** | Prof. |
| **ESSID Mehdi** | PhD student |
| **FRYDMAN Claudia** | Prof. |
| **GIAMBIASI Norbert** | Prof. |
| **HAMRI Maâmar El-Amine** | PhD student |
| **LAUGIER Franck** | Ing. |
| **LE GOC Marc** | Ass. Prof |
| **LOSCHMANN Ronald** | Ass. Prof |
| **MAVROMATIS Sébastien** | Ass. Prof. |
| **MERCANTINI Jean-Marc** | Ass. Prof. |
| **MUSTAFA Alaa** | PhD student |
| **NAAMANE Aziz** | Ass. Prof. |
| **NOURA Hassan** | Prof. |
| **OULADSINE Mustapha** | Prof. |
| **OUNNAR Fouzia** | Ass. Prof. |
| **PAILLET Jean-Luc** | Ass. Prof. |
| **PUJO Patrick** | Ass. Prof. |
| **RAFFIN Romain** | Ass. Prof. |
| **RAMADOUR Philippe** | Ass. Prof. |
| **REMY Eric** | Ass. Prof. |
| **RICHARD Sébastien** | PhD student |
| **SANTONI Charles** | Ass. Prof. |
| **SEQUEIRA Jean** | Prof. |

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|---|---|
| **SERMENT Julien** | PhD student |
| **TORRES Lucile** | Ass. Prof. |
| **TRANVOUEZ Erwan** | Ass. Prof. |
| **ZACHAREWICZ Grégory** | PhD student |
| **ZANNI Cécilia** | Dr. |

## Research activities & Projects

### *a- Medical Imaging*

Our works deal with 3D medical imaging, in collaboration with industrial partners and with medical specialists. Our goal is to be able to provide supports for diagnosis and surgical planning (virtual endoscopy, CAD/CAM for surgery, …)

### *b- Scientific Visualization and Simulation*

We focus on the concept of "Augmented Reality" but we are also highly involved in an "Interactive Immersion" program (Virtual Reality) in the frame of the IFR Marey Institute, with the development of a simulator to analyze team sport strategies (Simulfoot: 3D representation and analysis of sport scenes)

*From Images to Simulation, using Geometrical and Animation Models for the Understanding of Complex 3D Scenes*

### *c- Image Synthesis and Virtual Sculpture*

The goal of this research axis is to provide a "Virtual Sculpture" environment for artists so that they can interact with a model without any direct links with the machine. This project especially needs the design of ergonomic simulation tools.

### *d- Diagnosis of Dynamical Systems*

Our objectives are the study and the development of techniques for diagnosis and control of dynamic complex systems. The research activities deal with model-based and knowledge-based diagnosis and with fault-tolerant control techniques. Theoretical and practical aspects of these topics are developed.

**Model based approaches**

The objective is to develop control and diagnosis methods for industrial processes in order to

optimize their operation in an environment with disturbances. The analysis and the synthesis of the continuous dynamic systems constitute our investigation fields. We have developed many techniques for diagnosis and control of linear and nonlinear systems by using either neural networks or the Lyapunov approach. Our privileged applications are directed towards the vehicles and more particularly the motorization and dynamics.

Work in progress

Inter-teams Projects are in progress and co-supervision of Phd-Theses are considered within each project:

- study and development of fault detection and isolation methods for the electric components of a helicopter and analysis of their performances (in collaboration with Eurocopter).
- Design of an aid for diagnosis system and vehicle driving (in collaboration with IMRA/TOYOTA).
- In this project we deal with the following problems:
- Diagnosis of the rotors of helicopters: analysis of the vibratory signatures by neural networks. (Project with Eurocopter).
- Neural networks for diagnosis: application to the predictive analysis of failures in very high speed pins. The industrial partners concerned by this work are: PCI (Process Conception Ingénierie), and RENAULT AUTOMATION COMAU.
- Aid for diagnosis aiming at improving the safety and optimizing the costs of maintenance (project with EUROCOPTER).

**Knowledge based approaches**

The ELP project (Event, Language and Probabilities for Discrete Event Perception) is relevant to alarm correlation, supervision, diagnostic techniques and knowledge acquisition for monitoring dynamic process like industrial production tools. The ELP framework considers a monitored process like a discrete event processing system that transforms the flow of sensor data in a discrete event flow (discrete event perception). Because the discrete event flow contains information about the process behavior, discovering this information can improve the knowledge about the process behavior. But this idea stumbles over to 2 basic questions: where is the information? And how to represent it? The ELP project tackles these questions through the “ELP Signature” concept, a representation of a faulty scenario in the ELP graphical language. An ELP signature is a graph of discrete event types connected with temporal constraints. The notion of discrete event type is used as a way to deal with the filtering problem of irrelevant discrete events. The ELP signatures are extracted from discrete events logs with an algorithm developed on the basis of Markov Chains and Poisson Process Theories. The pertinence of an ELP signature is validated from the analysis of the frequency of the discrete event sequence occurrences that satisfy the logical and the temporal constraints of the signature. To this aim, an ELP signature is operationnalized with DEVS automata so that a DEVS simulator is used in order to recognize the sequences occurrences that are compatible with the ELP signature. This ELP Framework is implemented in a Java environment called the “ELP Laboratory” that offers a set of tools dedicated to the ELP signature discovering process. This approach is currently used for designing the diagnosis function of the Sachem system of the Arcelor

**ST-MICROELECTRONICS Project**

The methods developed in the framework of a multi-annual contractual collaboration with the company STMicroelectronics are based on fault modelling and simulation with the aim of

providing tools for the fault diagnostic of a manufacturing production chain of electronic circuits.

The originality of the research activities dealing with this problem consists of integrating three levels of modelling:

- Knowledge based level,
- Discrete event systems
- Continuous systems

## *e- Generalization of the concept of discrete event models: G-DEVS*

Traditional discrete event abstractions approximates the input, output, and state trajectories of dynamical systems through piecewise constant segments. For processes that defy accurate modeling through piecewise constant segments, we have defined GDEVS, a Generalized Discrete Event Specification, wherein the trajectories are organized through piecewise polynomial segments. The utilization of arbitrary polynomial functions for segments promises higher accuracies in modeling continuous processes as discrete event abstractions. Different applications of the G-DEVS formalism have been realized (cell models, logic gates, bond graphs ….)

## *f- Agent Based Simulation for decision-making support*

Our research contributions cover methodological support to the design and development of agent based models as well as software engineering support by developing agent/simulation frameworks facilitating the building of Agent Based Decision Support systems. Identified application domains involve human influenced eco-systems, socio-technical systems as found in industrial engineering, and socio-economical systems. Our past and current research activities have covered:

- Multicriteria decision support methods and techniques for a group of decision-makers,
- Simulation of different repair solution strategies applied to workshop rescheduling,
- Simulation of management scenarii of human influenced ecosystems (supported by the SIMFONYC project with the DESMID an ecological and social science laboratory),
- Simulation of a supply chain activities recently reinforced by collaboration with the CENTOR (Quebec - Canada) laboratory specialised in networking organizations.

Results from these researches have shown that decision support systems by simulation involve: (i) Integration of the decision maker in the simulation process; (ii) Methodology for agent modelling of complex systems and (iii) Multiagent simulation framework reducing the design-to-implementation phase of agent model and integrating the simulation tool user needs.

The importance of this multidisciplinary research is confirmed by international congresses or workshops dedicated to agent-based simulation. Among these we can cite for example Agent Based-Simulation (ABS), created in 2000 in which we participate actively since 2002. We were also responsible of the agent-based simulation workshop of the ESS'01 international congress. We are also active nationally through our participation to the MIMOSA workgroup whose objective is to define and develop a generic agent-based simulation development framework.

## *g- "SIMPORT" project*

The objective of this project consists to specify and to realize a system of workflow management and simulation, which is suitable for intermodal transport of freight and refering to port activities. This project lies in modelling and simulating all the economic actors in a port. SIMPORT is a decision system (allowing the activity evaluation) and a prevision system (helping to investing planning) that gives economic informations about any actor of the freight intermodal transport.

The SIMPORT project is realized by the team of the common laboratory LSIS-TRANSSIM, it began in september 2003 for 18 months long. It is financed by the European community (FEDER - Fonds Social Européen).

## *h- IEPAL project*

IEPAL is a flexible educational program for engineering students interested in current and emerging advances in research and technology as applied to Logistics and Supply Chain Management. There is a growing demand for individuals who have theoretical fundamentals and practical expertise in new strategic technologies for logistics. In particular, an increasing number of enterprises are in need of people who can successfully integrate Modeling & Simulation, Networking, e-commerce in their supply chain management and logistics for enabling technologies that guarantee overall competitiveness. These rapid changes make it necessary to integrate fundamentals provided during engineering studies with fundamentals of these new techniques. In addition, there is a need to augment the study of logistic operations with practical exercises, industrial case studies and direct experience with real companies involved in globalization, providing students and faculty with a broader base of contacts and opportunities to initiate international working relationships. IEPAL will directly support these lofty ambitions. The aspirations of IEPAL are to integrate regular existing courses with specific intensive seminars that expose the student to real world challenges. Initially, the start-up phase of IEPAL will be based on seminars devoted both to undergraduates and graduate students as an addition to regular course work. After the first three-year experience the IEPAL goal is to review and integrate regular programs and be a reference for creating new courses that can become part of and strengthen the regular curriculum. The first year of the project is devoted to exchanges of faculty in order to prepare the detailed didactic materials, structures and procedures. In the second and third year student programs will become operative and the courses will begin using both remote teaching, company experiences and student mobility.
IEPAL involves six Universities (3 in Europe and 3 in USA) and two Consortiums (1 USA and 1 EU, each one representing over 150 companies interested in logistics).

| **Subject** | **Type** | **Description** | **Reference** | **Year** |
|---|---|---|---|---|
| Image processing | Project | Simulfoot: 3D representation and analysis of sport scenes | Marseille Center | 2004 |
| Workflow management and simulation | Project | Simport: specification and ralization of a system of workflow management and simulation, suitable for intermodal transport of freight and relative to port activities. | Marseille Center | 2004 |
| Simulation for education | Project | IEPAL: integration of regular existing courses in current and | Marseille Center | 2004 |

| Subject | Type | Description | Reference | Year |
|---|---|---|---|---|
| programs | | emerging advances in research and technology as applied to Logistics and Supply Chain Management with specific intensive seminars that expose the student to real world challenges | | |
| Modeling and Simulation of air terminals | Project | Engineering departments of the air bases. The goal of the project is to constitute a tool for simulation of flows of passenger, luggage, guides and freight in air terminals in order to evaluate their capacity | Marseille Center | 2004 |
| Simulation and fault diagnosis | Project | Simulation and fault diagnostic in the manufacturing of electronic circuits.<br>This project is led in collaboration with STMicroelectronics and funded by the Region Provence-Alpes-Côte d'Azur | Marseille Center | 2004 |
| Agent Based Supply Chain Simulation | Project | Proposal of a methodological, modelling and implementation framework for agent based simulation of socio-technical systems. Concepts are first tested and validated on Supply Chain organisations. This Research Work developed in collaboration with the CENTOR laboratory (Laval University, Quebec, CANADA). | Marseille Center | 2004 |
| Agent Based Simulation of human influenced ecosystems | Project | Propose an agent-based simulation framework enabling decisional, operational and physical behaviours in the case of the water management of the Camargue ecosystem (ex: negotiation process to define salinity level, realized through pumping facilities modifying in turn the ecosystem state). Project in collaboration with the DESMID-CNRS Laboratory, and the Camargue Ecological Protection Agency and financed by the PACA Regional Council (SIMFONHYC Project) | Marseille Center | 2004 |
| DEVS simulator for monitoring and fault diagnosis | Project | ELP: Event, Language and Probabilities for Discrete Event Perception) is relevant to alarm | Marseille Center | 2004 |

| Subject | Type | Description | Reference | Year |
|---|---|---|---|---|
| | | correlation, supervision, diagnostic techniques and knowledge acquisition for monitoring dynamic process like industrial production tools.<br>This project was conducted in collaboration with a steel company "ARECLOR". | | |

## International Cooperations & Exchanges (Sept. 2004- July 2005)

In the framework of international collaboration with other laboratories, the LSIS has welcomed recently invited researchers (one month or more) in the fields of modelling and simulation:

**Tuncer OREN,** Professor emeritus of computer science, University of Ottawa, Canada, Director of the McLeod Modeling and Simulation Network - M&SNet

**Selma LIMAM MANSAR,** Associate Professor, Department of Computing, Communications Technology and Mathematics London Metropolitan University

**Barbara CATANIA,** Professor, Università di Genova

**Maximiliano CRISTIA,** Professor, Universidad Nacional de Rosario, Argentine

**Laura CIOCOIU** (Senior IT Researcher), National Institute for Research and Development in Informatics, Bucharest, ROMANIA

**Yvan BEDARD,** Professor, Centre de Geomatique de l'Universite Laval, Quebec, Canada

**John BARRON,** Professor, Dept. of Computer Science, Univ. of Western Ontario, London, Ontario, Canada

**Gilles BITTENCOURT,** Professor, Departamento de Automaçao e Sistemas, Universidade Federal de Santa Catarina, Florianopolis SC Brasil

**Brahim CHAIB-DRAA,** Professor, Département d'Informatique et de Génie Logiciel, Université de Laval, Québec, Canada

**Nicola OLIVETTI,** Professor, Computer Science Department, Logic Programming and Automated Reasoning Group de l'Université de Turin (Italie)

**Stéphane BRESSAN,** School of Computing, National University of Singapore

**Sonia BERGAMASCHI,** Professor, Dipartimento di Ingegneria dell'Informazione - Facoltà di Ingegneria, Università di Modena e Reggio Emilia

**Priscilla ELFREY,** Kennedy Space Center, USA

**Sumit GHOSH,** Hattrick Endowed Chaired Professor of Information Systems Engineering - Department of Electrical & Computer Engineering - Stevens Institute of Technology, Hoboken, NJ 07030

**Bernard P. ZIEGLER,** Professor, ECE - Arizona center for integrative modeling and simulation - University of Arizona - Tuscon

**Zoé LACROIX,** Professor, Arizona State University, USA

**Chokri MECHMECHE,** Associate Professor, l'ESSTT de Tunis

**Gabriel A. WAINER,** Professor, Carlton University, Canada

**Hung VO TRUNG,** Professor,Université de Danang, Vietnam

**Nick SZIRBIK**, Professor, Department Information & Technology, Faculty of Technology Management - Eindhoven University of Technology, Netherland

**Paolo BRESCIANI,** SRA division, IRST - Istituto pre La Ricerca Scientifica e Tecnologica, Trento, Italy

**Gerd WAGNER,** Department Information & Technology, Faculty of Technology Management - Eindhoven University of Technology, Netherland

**Sergio JUNCO,** Professor, Departamento de Electrónica - FCEIyA – UNR (Universidad Nacional de Rosario) - ROSARIO – ARGENTINA

**Maria de Fatima QUEIROZ VIEIRA**, Researcher, Univ. de Paraiba - Brésil

**Fayçal BEN HMIDA,** Researcher, CEREP-ESSTT -Université de Tunis, Centre de Recherche en Productique (CEREP), Ecole Supérieure des Sciences et Techniques de Tunis (ESSTT)

**Larbi RADOUANE,** Professor, Faculté des sciences de Fès, Maroc

**Fernando J. BARROS,** Universidade de Coimbra, Dept. Eng. Informática, Coimbra, Portugal

**Christian MASCLE,** Professor, Ecole Polytechnique de Montréal, Canada

**Luca CONSOLE,** Professor,'Université de Turin, Italie

**Monica ROMERO,** Professor, Universidad Nacional de Rosario, Argentine

**Jin JIANG,** Professor, University of Western Ontario, Canada

**Rafic YOUNES,** Associate Professor, Lebanese University, Lebanon

**Leonid FRIDMAN,** University of Mexico, Mexico.

## Scientific Activities and Conferences

### *Organization or co-organization of conferences*

**MAJECSTIC'04 and 05** co-organization avec with Calais and Rennes Universities

**I3M 'International Mediterranean Modeling Multiconference' in** 2004 (Genova) and in 2005 (Marseille)

**Ecole Thématique Réalité Virtuelle et Sciences du Comportement,** Marseille, May 19/23 2003

**JNPC 2000 (Journées Nationales sur la Résolution Pratique de Problèmes NP Complets)**, Marseille July 2002,

**CSM 'Conceptual Modeling and Simulation'**, October 2004 in Genova and October 2005 (SCSI) in Marseille

**AVCS' International Conference on Advances in Vehicle Control and Safety'** (IFAC) Genova, October 2004, Invited session on Safety Driving Activities (JM. Mercantini).

**5th International Workshop « Agents Based Simulation », ABS'2004**, Organized by SCS-Europe, Lisbonne, May 2004 (B. Espinasse and H. Coelho).

**International Conference on Advances in Vehicle Control and Safety,** Invited session on Safety Driving Activities (JM. Mercantini).

**Workshop EWIS'02 (Efficient Web-based Information System),** at the OOIS'02 (Object-Oriented Information Systems) international conference, September 2002, Montpellier (O. Boucelma with Z. Lacroix).

**Panel « Scientific Data Integration »,** at the EDBT'02 (Extended Database Technology) international conference, March 2002, à Prague (O. Boucelma with Z. Lacroix).

**International Workshop « Multi-Agents Based Modelling and Simulation in Industry and Environment »,** with ESS'2001, supported by SCS-Europe, Marseilles, October 2001 (B. Espinasse – J.P. Muller).

## *Journal Editorial Comitees*

- Journal of intelligent and robotic systems, Kluver Academic Publishers (N. Giambiasi)
- SCS European Publishing House (N. Giambiasi)
- Transaction of Society for Computer Simulation International (SCSI, Etats-Unis) (N. Giambiasi)
- Journal for Defense Modeling and Simulation (SCSI, Etats-Unis) (N. Giambiasi - associated editor)
- Journal of Applied Non-classical Logic (P. Siegel),
- Revue d'Intelligence Artificielle (P. Siegel),
- Revue Internationale de Géomatique (R. Jeansoulin),
- "Psychology of Sport and Exercise" : Adrian Taylor - U. of Exeter (GB) (H. Ripoll)
- "International Journal of Applied Sports Sciences" : Burn-Jang Lim - KoreaSport Science Institute - Seoul (Korea) (H. Ripoll)
- "International Journal of Sport Psychology" Alberto. Cei - Scuola Superior del Desporte - Roma (Italy) (H. Ripoll)
- "International Journal of Sport and Exercise Psychology" : Gershon Tenenbaum : Florida State University (USA) (H. Ripoll)

## *Summary of International Collaborations*

We give here the main formal collaborations (officially agreed, contractualized...) of LSIS.

**Argentina**

- University of Sciences of Buenos Aires, 2 co-supervised PhD, reception of Professors for long stays at LSIS, several invitations of researchers of LSIS, common publications.
- University of Technology of Rosario, reception of Professors for long stays (up to 6 months), common publications, project of a common laboratory in final phase of assembly. Many argentine students (6 in 2004) in master courses at LSIS, new argentine PhD students (2 in 2004).

**Brazil**

- University of Paraíba French-Brazilian Project CAPES/COFECUB n° 291/99 (1999 - 2003) with the Department of Data processing, Prof B Lula Jr (E Chouraqui, JM. Mercantini, C Santoni). Exchange of PhD or post-doct students, post-Doc., seminars and publications.
- Federal Universidade of Santa Catarina Convention C.A.E.S./C.O.F.E.C.U.B., Florianopolis, Brazil (Professor N Edilson) (E Chouraqui).

**Bulgary**

- Bulgarian Academy of Science, thesis in Co-supervision: Kalchev Boyko (Sept. 2002)

**Canada**

- Polytechnic School of Montreal: Since 2001, team IMS collaborates with the Mechanical department of Engineering of the Polytechnic School of Montreal, with stays of researchers, in particular Professor Christian Mascle who came for 6 months to Aix-en-Provence, several journal articles and communications in international conferences jointly.
- University of Montreal: a common research project on the analysis of scenes 3d, a researcher of the team (Laurent Astart) in Post Doc during six months with Jean Miller (DIRO). Collaboration with Professor Mr. Ohayon of the University of Montreal, Research center in Psychiatry, Canada (E. Chouraqui).
- University Laval, Quebec : European project REVIGIS (2000-2004), project CPFQ (Min. Foreign Affairs: 2001-2004), project MRSTQ (Min. Seeks of Quebec: 2002-2005), two co-supervised PhD theses (Mr. Gervais supported in 2003, R. Devillers supported into 2004), one post-doctorant student(Mr. Mostafavi accomodated with the LSIS in 2004), two invited Professors (Pr. Bedard by U3, Pr. Edwards by U1), one month training courses at the University of Laval of Y. Lassoued (2001) and Mr. Khelfallah (2004), placed at the disposal of R. Jeansoulin in the Research center in Géomatique of U Laval (August 2000 - July 2001). R. Jeansoulin is a researcher associated with the CRG and Associate Professor with Faculty with Forestry and Géomatique (2001-2007).
- Faculty of Science of the Administration of the University Laval, Quebec Collaboration with the CENTOR (CENtre of research on Technology and the Organization Network) of. Thesis of Olivier Labarthe co-supervised (B Espinasse - B Montreuil (U Laval).
- University of Ottawa: Pr T Oren invited for 2 months with the LSIS in 2003 and 2004, publications common on modeling to discrete events of the human behavior.
- University of Carleton: G Wainer invited 1 month in 2003 and 2004. articles and common publications on simulation
- Shanghai Institute of Technology: a one semester master course whose courses are taught with the SIT, a U2 convention - SIT, an organized conference with Shanghai in October 2003 within this framework, a researcher (Gao Jun - Vice Senior of the Computer Department Science) which will come in team LXAO to the autumn 2004 to work on problems of retiming 2D-3D
- University of Ho Hai (Nanjing): a U2 convention - Ho Hai, exchanges of students and researchers envisaged, two joint projects (Biometrics and Simulation for the problems of flood)

**United States**

- Stevens Institute of Tehnology - N.Y., Pr. Sumit Ghosh, several articles of joint reviews, joint project lodged with the NSF
- NASA - Dr. P. Elfrey, training courses of PhD students of LSIS at NASA
- Auburn University, Pr. Levent Yilmaz, joint articles

**Italy**

- University of Genoa, creation of I3M and organization at Genoa in 2004 and in Marseilles in 2005. Creation of International Mediterranean & Latin American Council of Simulation Project European EUCLID CEPA-11 (PIOVRA)
- University of Turin, Prof Luca Console collaboration and invitation tothe LSIS in 2003 and 2004, and Project ATLAS (Vinci Program).

**Lebanon**

- PhD Thesis of Chadi Nohra Co-supervised by the Lebanese University and the LSIS of the University Paul Cézanne Aix-Marseilles III. The work deals with the fault diagnosis and the fault-tolerant control applied to a diesel engine.

**Morocco**

- PhD Thesis Co-supervision between the University Sidi Mohamed Ben Abdallah Faculty of Science Dhar El Mehrez Fès (Morocco), and the LSIS of the University Paul Cézanne Aix-Marseilles III, on the topic: Critical Fault tolerance on an automated system.
- Faculty of Science of Tanger, France-Morrocan STIC-INRIA Network "Software Engineering", since 2002. This network allows the financing of Moroccan doctorants Moroccan. LSIS receives, Mr. Mostafa Ezziyyani, PhD Student for 4 months/years
- Faculty of Science of Fes, Co-supervised PhD student: Hassan Laarabi

**Norway**

- Since 2003, supervison of a PhD thesis of a Norvegian student financed by a Pierre et Marie Curie scholarship.

**Portugal**

- University of Coimbra, Pr. F Barros, joint articles, Co-organization of a conference in Lisbon, Co-supervision of thesis next year.
- University of Aveiro Since the end of 2004, collaboration with the IEETA of the University of Aveiro within the framework of the project Simulfoot (U2-Aveiro convention to be signed soon).

**UNESCO (and NASA)**

- Image analysis obtained by "air photography" for the location of Mayas sites in Central America

## *International Projects since 2002*

**IEPAL : Intensive Educational Program in Advanced Logistics,**

http://www.liophant.org/iepal/directory.html.
Financed by the European Community and United States, EC/US Co-operation, DGEAC, FIPSE, US Department of Education. (2000-2004). This project, which belonged to the 13 retained out of the 300 proposals, gathers:

- 3 American universities: Boston College, Stevens Institute, Central University of Florida,
- 3 European universities: Genes (Italy), Magdeburg (Germany), Aix-Marseilles III (LSIS).
- 2 companies consortia (1 European and 1 American around NASA)

**ATLAS (Advanced Techniques for intermodal Logistics Academic Studies)**

Università italo-francese / Université franco-italienne, Programme"Vinci", Chapitre 2 : Scuole di Dottorato / Réseaux de formations Doctorales, http://www.universite-franco-italienne.org/main.htm.
The objective of this project is to form, with and for research, specialists in modeling and simulation of logistics of intermodal transport processes. Four Universities take part in this

project (Universita' degli Studi di Genova and Universita' degli Studi di Perugia, Université Blaise Pascal Clermont-Ferrand 2 and Aix Marseilles 3). Started in January 2003.

**PIOVRA (Poly-functional Intelligent Operational Virtual Reality Agents)**

Accepted by Eurofinder CEPA 11: Defence Modelling and Simulation Technologies. The objective of this project is to develop a new generation of CGF (Computer Generated Forces) which will be used for the drive and the planning of operations in an HLA federation. The participants in this project are: the Italian and French armies, the University of Genoa and the University of Aix Marseilles III (LSIS). Duration 18 months. Beginning: January 2005

**REV!GIS "Maintenance et Révision de la Connaissance Géographique Incertaine"**

http://www.lsis.org/REVIGIS/
IST Project of the 4° (SPIRIT) then 5° Framework Program of European R&D (IST-FET) which made possible to build a European consortium (5 different countries) and even international with a Canadian one. That is a set of 9 partners, and about ten directly implied professors, nearly ten associated professors, 4 post-doc students, 15 PhD theses (about half this number passed since the end of 2003, the other half will pass before the end of 2005). Duration of the project: June 1998 at June 1999 for phase FP4, and June 2000 at June 2004 for phase FP5. More than 150 publications in journals and conferences.

**ENHANCE**

From 1998 to 2002 team IMS took part in European program ENHANCE as a subcontractor of Eurocopter. The results of this program are presented on the site http://www.enhanceproject.com/. Collaboration with Eurocopter was concretized by a research contract prolonged by a CIFRE PhD thesis. The team works are related to "COSITE" which was devoted to the methods, steps and tools of distant collaborative work.
European Network AgentLink III: 2004-2007
This European network gathers European researchers interested by the use of the multi-agents systems in data processing and its applications. It is structured in working groups and LSIS takes part in groups AOSE (Agent Oriented Software Engineering) and IIA4WebEconomies (Intelligent Information Agent for WebEconomies).

**QualiGIS Project**

Project presented in December 2004 with the call "Research Network Training" of the Program "Marie-Curie, Human Resources Mobility": QualiGIS project, in accordance with works of REV!GIS project, under the coordination of ITC (Netherlands), implying the LSIS at the same time as the university of Provence and the univesity of Toulon (typically the Geomatic Pole of LSIS).

**AgentLink III : 2004-2007 EUropean Network**

Ce réseau européen regroupe les chercheurs européens intéressés par l'utilisation des systèmes multi-agents en informatique et ses applications. Il est structuré en groupes de travail et le LSIS participe aux groupes AOSE (Agent Oriented Software Engineering) et IIA4WebEconomies (Intelligent Information Agent for WebEconomies).

**MONET European Network**

The MONET Network (The European Network of Qualitative Excellence in Model Based Systems and Reasoning‰ - http://monet.aber.ac.uk), is dedicated to the transfer of

technologies MBS&QR to industry. Participation in the projects "automobile diagnosis" and "bridge" (COSI team)

**LESNEX: LEan Simulation Network of Excellence**

With 20 European laboratories (COSI team)

**Canada-France Cooperation Project**

Presented in November 2004, between the INCA team of the LSIS (for the pole geomatic) and the CRG of the Laval University.

**Projet France-Canada Research Foundation**

Generalized Discrete-Event modeling with application to biomedical studies (COSI team) avec Carleton University (Prof. G Wainer) - Ottawa

**Proposition Programme VINCI**

Design of a parsimonious and reliable approach of effective diagnosis adapted to the vehicles, in collaboration with the University of Turin - Prof Luca Console.

## *National Collaborations*

At the national level, the teams of LSIS are largely implied in working groups and ensure (or ensured) the animation of several of them. We give, in the following, a not-exhaustive list of these actions.

In addition to these collaborations, there are obviously many others with researchers of laboratories of the field of the STIC but also of other fields (SHS, SDV...).

At the regional level, the existing relations with teams of INRIA (Sophia-Antipolis) were concretized by joint projects. Collaborations were also established with the laboratories of the Mediterranean front (LIRMM, I3S). Moreover, several projects are current with laboratories of the PACA area (laboratories of IFR Marey, Inrets, Cemagref, ONERA, ECA, Map- Ecole of Architecture...).

**GDR I3 – Creation of the VERSIM group (COSI team)**

GdR I3 "Information - Interaction - Intelligence" (http://sis.univ-tln.fr/gdri3/) is one of the 5 GdR of department STIC of CNRS. A new working group was created within the GDR I3 in 2004. This group VERSIM "Towards a theory of Simulation" was created on the initiative of the LSIS. It is animated by Pofessors Norbert Giambiasi (LSIS Marseilles) and David Hill (ISIMA/LIMOS Aubiere). This group met 3 times in 2004, it counts currently more than 60 French-speaking members and, moreover, several American Professors Nord-Américains.

**GDR-MACS – AS : Diagnosis of hybrid systems (COSI team)**

Participation in creation with the LVR of Bourges

**GDR-MACS - AS : Fault Tolerance ((COSI team)**

**GDR-MACS AS: Production and Logistics in the company: collaborative models and tools (PRODLOG)**

Contact: J.Erschler - LAAS (Toulouse) (P. Pujo, F Ounnar) (COSI team)

**GDR-MACS –Thematic group « Automatics and Automobiles » (COSI team)**

Participation in creation.

**GDR-MACS - GT S3 Safety-Supervision-monitoring (cosi team)**

**GDR-MACS - GT "Identification" (COSI team)**

**GDR-MACS GT OGP ; STP Pole, (P. Pujo, F. Ounnar)**

**GDR-MACS GT Vendôme, STP Pole, (F. Ounnar)**

**GDR-MACS GT CSP, STP Pole, (P. Pujo)**

**GDR-MACS**

Member of the follow-up committee of pole STP (Sciences and Technology of Production of goods and services) (Modeling, Analysiss and Systems Management) (P. Pujo)

**GDR-MACS Organization**

(Organizers: P. Pujo - COSI team, with J.P. Kieffer – IMS team
The LSIS organized, on October 21, & 22 2004, the 3rd Synthesis Days of pole STP (Sciences and Technology for the Production of Goods and Services) of GDR MACS (Modeling, Analyse and Systems Management). The LSIS is member of the follow-up committee of this animation and action structure of CNRS These days, biannual, followed upon the days of Nantes, organized by IRCCyN. Thus, 220 researchers, professors and PhD student assisted in Aix-en-Provence, at the ENSAM of LSIS. The next days will be organized in Mars 2005 in Clermont Ferrand by LIMOS.

**GDR I3 GT 2.2 « Multi-agent systems architectures and development environment »**

(B. Espinasse – E. Tranvouez)

**GDR I3 GT 2.4 « MIMOSA - Individual-centered modeling and simulation»**

(B. Espinasse, A. Ferrarini, E. Tranvouez)

**GDR MACS, GT « Information system and communicating company»**

(C. Cauvet).

## Industrial Collaboration

Certain LSIS teams had established since many years industrial relations resting on contracts and PhD theses finances. The synergy created among the teams, in particular, through the transversal poles, was concretized in 2004 by broader industrial collaborations and a clear increase in the number and volume of the industrial contracts.

On another plan, the LSIS intends to amplify its transfer actions towards SME-SME and to confirm the role which its research teams played by creating relations between great industrial groups and SME-SME (for example, between SME Vibria and Arcelor). The creation of a network of industrialists will support this type of actions by allowing the installation of new projects gathering great groups and small or average software firms. Moreover, this network will make possible to young doctors to judge the impact of their work in industrial reality and will support the search for the first employment. A council of partners, made up of industrial representatives and local authorities, will be set up as soon as possible This council will meet once a year to judge and support the actions of LSIS towards the socio-economic world.

At the regional level, LSIS established close cooperations with great groups installed in the PACA area, collaborations being based on research contracts and many PhD theses financings (for example, 8 by STMicroelectronics, 6 CIFRE scholarships with Eurocopter). Collaborations with SME-SME of our area also constitute one of our priorities which are also concretized by regional or CIFRE sholarships, contracts and the creation of mixed teams as the one installed with the company TRANSIM (a second team will be soon operational).

Moreover, the meeting days LSIS-Industries are regularly organized on classes of industrial problems, these days are organized by the LSIS or co-are organized with regional partners. The recent organizations are pointed out below.

### *Demonstrations organized or co-organized by LSIS for an Industrial public*

**The industrial Contribution to the advanced automatic**

(M. Ouladsine) (September 11, and 12 2002 at the Congress Palace of Arles)
These days, organized in collaboration with the ISA (the Instrumentation, Systems and Automation), the SEE and IRA (Institute of Regulation and Automation), aimed at:

- informing the industrialists on the contributions of advanced automatic advanced in technical and economic terms
- being a place of exchanges, experience sharing, know-how transfers.

**Conference on the advanced Techniques and innovating Strategies in modeling and robust command of the industrial processes**

(M. Ouladsine) (September 21, and 22, 2004 in Martigues)
This Conference was organized in collaboration with the ISA (Instrumentation, Systems and Automation). It was chaired by professors Ioan Doré Pram, émeritus research director at CNRS and Guy Dumont of the University of Vancouver.

**Systems Engineering Seminar 2003-2004**

(P. Micouin et JP. Kieffer)
The seminar on the systems engineering which we had organized in 2002-2003 was a real success. It allowed building systems owners and manufacturers of the auronautics sector (Eurocopter, Dassault-Aviation), car sector (PSA Peugeot Citroen), defense (Dga-spn, Dcn-

cms), energy (Technicatome, EDF-cipn, Alstom TDE), micro-electronics (Micro ST), medical (BioMérieux), mainly of the South-eastern area, to meet around common concerns, to confront their experiments and to exchange "good practices". On the basis of this first experiment, the participants decided to prolong the seminar over 2003-2004 by extending it to other participants, industrialists, clients, manufacturers and equipment suppliers, on the following topics:

- Risks and the reduction of risks, Thursday November 06, 2003 -
- Costs of the life cycle of a system Thursday December 11, 2003 -
- The integrated logistic support, Thursday January 22, 2004
- Company knowledge, Thursday March 11, 2004
- Control of deadlines, risks and costs, Thursday April 08, 2004 -
- Control of the acquisition processes, Thursday June 03, 2004 -
- Human in the loop, Thursday December 09, 2004: -
- Systems of systems, Thursday January 20, 2005:

## Articles and publications 2002-2004

### *Collective Books*

[1] International Mediterranean Modeling Multiconference, vol. 1 : AVCS 2004, CMS 2004 Edited by A.G. Bruzzone, C. Frydman, N. Giambiasi and R. Mosca, n° ISBN : 88-900732-4-1

[2] International Mediterranean Modeling Multiconference, vol. 2 : IMAACA 2004, MAS 2004 Edited by A.G. Bruzzone, C. Frydman, N. Giambiasi and R. Mosca, n° ISBN : 88-900732-4-1

[3] F. Barros, N. Giambiasi, special issue of Journal of Intelligent & Robotic Systems, « Modelling and Simulation » dernier trimestre 2004, Kluwer Academic Publishers.

[4] P. Bouché, A. Garrido De Ceita, G. Grosset, O. Labarthe, J. Serment, "Manifestation des Jeunes Chercheurs dans le domaine des Sciences et Technologies de l'Information et de la Communication, MAJECSTIC'2003", n° ISBN: 2-9520712-0-9, 2003. 128 pages.

[5] "AI, Simulation and Planning in High Autonomous Systems", F. Barros and N. Giambiasi, n° ISBN: 1-56555-242-3, 2002. 340 pages.

[6] "ESS'2001", Simulation in Industry, N. Giambiasi and C. Frydman, n° ISBN: 90-77039-02-3, 2001. 970 pages.

[7] "Harbour Maritime & Multimodal Logistics Modelling & Simulation Conference", A.G. Bruzzone and Y. Merkuryev and L.M. Gambardella and N. Giambiasi, n° ISBN 90-77039-03-1, Genova, Italia: Society for Computer Simulation International - SCS Europe, 2001. 340 pages.

[8] F. Ounnar, E. Tranvouez, B. Espinasse, P. Ladet (2001) chapitre 4 : Pillotage par tentative d'ajustement du plan prévisionnel, In Pilotage des systmes de production, Hermès Ed. ISBN 2-7462-0514-9

### *Journals*

[1] J.C. Carmona, N. Giambiasi and A. Naamane "A Generalized Discrete Event Abstration for Continuous System: application to an integrator", in: Int. Journal of Intelligent & Robotic Systems , vol. 41, pp. 37-64, sept. 2004.

[2] F. Ounnar, P. Pujo, "Supplier evaluation process within a self-organized logistical

network", International Journal of Logistics Management, (à paraître)

[3] M. Le Goc, C. Frydman, "The Discrete Event Concept as a Paradigm for the "Perception Based Diagnosis" of Sachem", in: Journal of Intelligent & Robotic Systems, Theory and Applications, vol. 4, n° 2, pp. 207-232, juin 2004. Kluwer Academic Publishers.

[4] E. Soulier, J. Caussanel, "Organiser une base de documents narratifs pour supporter l'échange d'expérience", in: Coopération et Organisation numérique, numéro spécial de la revue Documents Numériques, vol. 8, n° 1, janvier 2004.

[5] G. Wainer, N. Giambiasi, "Using G-DEVS for continuous cell-DEVS modeling and simulation", in: Transactions of SCS, 2004. à paraître.

[6] F. Ounnar, P. Ladet, "Consideration of machine breakdown in the control of flexible production systems", in: International Journal of Computer Integrated Manufacturing System, vol. 17, n° 1, pp. 69-82, 2004.

[7] M. El Adel, M. Ouladsine, H. Noura, "Design Lyapunov Controller for Vehicle Dynamics", in: International Acta Electrotechnica, vol. 45, n° 1, pp. 19-24, 2004.

[8] M. Ouladsine, G. Bloch, X. Dovifaaz, "Neural Modelling and Control of a Diesel Engine with Pollution Constraints", in: Journal of Intelligent and Robotic Systems; Theory and Application, 2004. accepté pour publication en 2004.

[9] W. Jumpamule, J.L. Paillet, N. Giambiasi, "Using Simulation for the Validation of High Level Specifications of Control Systems", in: Journal of Intelligent & Robotic Systems, vol. 38, n° 3/4, pp. 345-375, décembre 2003. Kluwer Acad. Publ., Netherlands.

[10] D. Theilliol, H. Noura, J.C. Ponsart. "Fault diagnosis and accommodation of a three-tank system based on analytical redundancy." ISA Transactions, Vol. 41, N° 3, pp. 365-382, 2002.

[11] M. Le Goc, C. Frydman, L.Torres, "Verification and validation of the SACHEM conceptual model", in: International Journal of Human Computer Studies, vol. 56, n° 2, pp. 199-223, Academic Press,, février 2002.

[12] G. Wainer, N. Giambiasi, "N-Dimensional Cell-DEVS", in: Discrete Event Dynamic Systems, vol. 12, n° 2, pp. 135-157, Kluwer, avril 2002.

[13] X. Dovifaaz, R. Outbib, M. Ouladsine, A. Rachid, "A New Control Strategy for Diesel Engine", in: ASME, 2002.

[14] J.L. Paillet, N. Giambiasi, "DECM, A User Oriented Formalism for High Level Discrete Event Specifications of Real- Time Systems", in: Journal of Intelligent & Robotic Systems, n° 34, pp. 27-81, Kluwer Academic Publishers, 2002.

[15] P. Pujo, "Etude par simulation de la suppression de l'impact des arrêts lors du déménagement d'une ligne de production manufacturière", in: Revue Française de Gestion Industrielle, vol. 21, n° 1, pp. 73-87, 2002.

[16] C. Frydman, M. Le Goc, N. Giambiasi, L. Torres, "Knowledge-Based diagnosis in SACHEM using DEVS models", in: Special Issue of Transactions of SCS on Recent Advances in DEVS Methodology, vol. 18, n° 3, pp. 148-159, septembre 2001.

[17] N. Giambiasi, A. Naamane, A. Damiba, "Generalized Discrete Event Simulation of Bond Graph", in: Simulation, Society for Computer Simulation International, vol. 77, n° 1-2, pp. 4-22, juillet-août 2001.

[18] G. Wainer, N. Giambiasi, "Application of the Cell-DEVS Paradigm for Cell Spaces Modelling and Simulation", in: Simulation, vol. 76, n° 1, pp. 22-39, janvier 2001.

[19] N. Giambiasi, B. Escudé, S. Ghosh, "Generalized Discrete Event Simulation of Dynamic Systems", in: Issue 4 of SCS Transactions: Recent Advances in DEVS Methodology-part II, vol. 18, pp. 216-229, décembre 2001. ISSN:0740-6797.

[20] El Hajjaji, M. Ouladsine, "Modeling and Real Time Implementation of a Nonlinear Control for Magnetic Levitation Systems", in: IEEE Transactions on Industrial Electronics, vol. 48, n° 4, pp. 831-838, août 2001.

[21] S. Ghosh, N. Giambiasi, "Breakthrough in Modeling and Simulation of Mixed-Signal Electronic Designs in n-VHDL", in: Modeling and Simulation, Special publication by Simulation Councils, 2001.

[22] P. Pujo, F. Ounnar, "Proposition d'un pilotage décentralisé, auto-organisé et rapproché pour système automatisé flexible: Application à un Hub de transbordement robotisé fer-fer", in: Journal Européen des Systèmes Automatisés, vol. 35, n° 7-8, pp. 905-932, 2001.

[23] L. Torres, C. Frydman, "Utilisation des réseaux de Petri pour la vérification et la validation de modèles d'expertise KADS", in: Revue d'Intelligence Artificielle, Hermès Science Publications, vol. 15, n° 2, pp. 247-276, 2001.

## *Book Chapters*

[1] J.P. Kieffer, P. Pujo, "Concepts fondamentaux du pilotage des systèmes de production", in: Collection IC2 - Productique : Fondements du Pilotage des Systèmes de Production, Hermès, 2002.

[2] F. Ounnar, E. Tranvouez, B. Espinasse, P. Ladet, "Pilotage par tentative d'ajustement du plan prévisionnel", in: Collection IC2 - Productique : Méthodes du Pilotage des Systèmes de Production, Hermès, 2002.

[3] M. Pillet, P. Pujo, "Pilotage par la Qualité", in: Collection IC2 - Productique : Méthodes du Pilotage des Systèmes de Production, Hermès, 2002.

[4] P. Pujo, D. Brun-Picard, "Pilotage sans création de plan prévisionnel, ni d'ordonnancement préalable", in: Collection IC2 - Productique : Méthodes du Pilotage des Systèmes de Production, Hermès, 2002.

[5] G. Wainer, N. Giambiasi, "Timed Cell-DEVS: modelling and simulation of cell spaces", in: Discrete Event Modeling & Simulation: Enabling Future Technologies (in honor of the 60th birthday of Bernard P. Zeigler), H. Sarjouand and F. Cellier, Springer-Verlag, novembre 2001. Conférencier invité,.

## *Conferences with Proceedings*

[1] C. Urrea, H. Noura, M. Ouladsine, "Actuator fault-tolerant control in a two D.O.F. planar manipulador", in: International Conference on Advances in Vehicle Control and Safety AVCS'04, Octobre 28-31 2004.

[2] C. Zanni, M. Le Goc, C. Frydman, "A Systemic Characterization of Knowledge-Based Diagnosis Applications", in: ASAI 2004, VI Argentine Symposium on Artificial Intelligence, Cordoba, Argentina, Septembre 2004.

[3] E. Soulier, J. Caussanel, "Apprentissage assisté par Story Telling : pédagogie de l'erreur", in: actes de la conférence TICE 2004 « Technologies de l'Information et de la Connaissance dans l'Enseignement Supérieur et l'Industrie », Compiègne, octobre 2004.

[4] S. Aberkane, H. Noura, D. Sauter, "Active fault-tolerant control : application to a robot manipulator", in: International conference on Advances in Vehicle Control and Safety AVCS'04, Genova, Italy, October 28-31 2004.

[5] F. Ounnar, P. Pujo, L. Mekaouche, N. Giambiasi, "Decentralized Self Organized Control of a

Partnership Network in an Intelligent Supply Chain", in: IMS International Forum 2004: Global Challenges in Manufacturing, Italy, mai 2004.

[6] M. Le Goc, P. Bouché, "Towards a Discrete Event Formalization of Sachem's Perception Based Monitoring", in: MMM'04, 11th IFAC Symposium on Automation in Mining, Mineral and Metal Processing, Nancy, France, 8-10 septembre 2004.

[7] P. Bouché, M. Le Goc, "Discovering operational signatures with time constraints from a discrete event sequence", in: HIS'04, 4th International Conference on Hybrid Intelligent Systems, Kitakyushu, Japan, 6-8 décembre 2004.

[8] A. Hamri, N. Giambiasi, C. Frydman, "Simulation Semantics for Min-Max DEVS Models", in: AIS2004, AI Simulation and Planning, Seoul, Korea, 4-6 octobre 2004.

[9] M. Seck, C. Frydman, N. Giambiasi, "Using DEVS for Modeling and Simulation of Human Behavior", in: AI, Simulation and planning in high autonomy systems - AIS 2004, Jeju Island, Korea, 4-6 octobre 2004.

[10] F. Chane, N. Giambiasi, J.-L. Paillet, "Formal Specification of Reactive Systems: DEVS or Timed Automata", in: Conference on Conceptual Modeling and Simulation, Gênes, Italie, 29-31 octobre 2004.

[11] J.-C. Carmona, A. Naamane, N. Giambiasi, "Accurate GDEVS modelling : discrete event integrator", in: Conference on Conceptual Modeling and Simulation, Gênes, Italie, 29-31 octobre 2004.

[12] J. L. Paillet, W. Jumpamule, N. Giambiasi, "Using DECM to Formally Describe the Behaviour of Controlled Systems", in: Conference on Conceptual Modeling and Simulation, Gênes, Italie, 29-31 octobre 2004.

[13] H. Shraim, M. Ouladsine, H. Noura, M. El Adel, "The study of the influence of the pneumatic defects of the vehicles' dynamics", in: International Conference on Advances in Vehicle Control and Safety AVCS'04., 28-31 octobre 2004.

[14] M. El Adel, M. Ouladsine, "Commande prédictive décentralisée pour une classe de systèmes non linéaires interconnectés", in: ISA-The instrumentation, Systems and Automation Society, Martigues, France, 28-31 octobre 2004.

[15] M. Romero, N. Giambiasi, "Direct Torque and Flux Discrete Event Control of Induction Motors", in: International Conference on Integrated Modeling & Analysis in Applied Control & Automation, International Mediterranean Modeling Multiconference, Gênes, Italie, 28-30 octobre 2004.

[16] M. Romero, "Performance Analysis of a Three Phase Current Controlled PWM-inverter with Siliding Mode Approach", in: International Conference on Integrated Modeling & Analysis in Applied Control & Automation, International Mediterranean Modeling Multiconference, Gênes, Italie, 28-30 octobre 2004.

[17] M. Romero, "Chattering Reduction Techniques in Sliding Modes Control Implemented in Discrete Time", in: International Conference on Integrated Modeling & Analysis in Applied Control & Automation, International Mediterranean Modeling Multiconference, Gênes, Italie, 28-30 octobre 2004.

[18] P. Pujo, M. Pedetti, N. Giambiasi, "Relocation of a flow-shop, without interrupting the production: optimization by DEVS modelisation and simulation", in: SCSC2004, Summer Computer Simulation Conference, San Jose, California, USA, 25-29 juillet 2004.

[19] C. Frydman, A. Hamri, L. Torres, "Airport Modeling using CommonKADS", in: SCSC2004, Summer Computer Simulation Conference, San Jose, California, USA, 25-29 juillet 2004.

[20] T. Rakotomamonjy, T. Le Moing, M. Ouladsine, "Modèle de Simulation d'un Microdrone à ailes vibrantes", in: IEEE CIFA 2004 - Conférence Internationale Francophone d'Automatique, Douz, Tunisie, 22-24 novembre 2004.

[21] F. Chane, N. Giambiasi, J.-L. Paillet, "From DEVS Model to Timed Automata", in: SERP'04, International Conference on Software Engineering Research and Practice, Las Vegas, Nevada, USA, 21-24 juin 2004.

[22] G. A. Wainer, N. Giambiasi,"Accurate Modeling and Simulation of Heart Tissue Using GDEVS/CELL-DEVS", in: MSV'04, International Conference on Modeling, Simulation and Vizualization Methods, Las Vegas, Nevada, USA, 21-24 juin 2004.

[23] C. Frydman, L. Torres, S. Ghedira, "Using DEVS for an Extended UML", in: SERP'04, International Conference on Software Engineering Research and Practice, Las Vegas, Nevada, USA, 21-24 juin 2004.

[24] M. Ouladsine, "Les réseaux de neurones pour la modélisation et le diagnostic", in: Université de Printemps - Energie et Automatique : Technologies et nouvelles approches, Univ. Hassan II Ain Chock, Casablanca, Maroc, 19-23 avril 2004.

[25] G. Grosset, M. Ouladsine,"Diagnosis of multi-variable systems using neural networks", in: IEEE SCS "Signaux, Circuits et Systèmes" (IEEE SCS'04), Monastir, Tunisie, 18-21 mars 2004.

[26] A. Naamane, N. Giambiasi,"Logic Gate Modeling and Simulation using Generalized Discrete Event Specifications : G-DEVS", in: SCI2004, 8th World Multiconference on Systemics, Cybernetics and Informatics, Orlando, Florida, USA, 18-21 juillet 2004.

[27] A. Hamri, C. Frydman, L. Torres, "Formal Modelling for Combined Simulation in Logistics", in: SCI2004, 8th World Multiconference on Systemics, Cybernetics and Informatics, Orlando, Florida, USA, 18-21 juillet 2004.

[28] A. Hamri, C. Frydman, L. Torres, "Using DEVS for Simulation of CommonKADS Specified Systems: an Airport Application", in: HMS2004, 8th International Workshop Harbour, Maritime & Multimodal Logistics Modelling and Simulation, Rio de Janeiro, Brésil, 16-18 septembre 2004.

[29] P. Pujo, M. Pedetti et F. Ounnar, "Pilotage proactif des lignes de production kanban par modelisation DEVS et simulation temps reel", 5e Conférence Francophone de MOdélisation et SIMulation “Modélisation et simulation pour l’analyse et l’optimisation des systèmes industriels et logistiques”, MOSIM’04, 2004 - Nantes (France).

[30] P. Bouché, M. Le Goc, "Analyse Markovienne de séquences d'événements discrets pour la recherche de signature", in: MAJECSTIC'04, MAnifestation des JEunes Chercheurs STIC, Calais, France, 13-15 octobre 2004.

[31] A. Hamri, "Utilisation de Arena pour la simulation des modèles spécifiés avec CommonKADS", in: MAJECSTIC'04, MAnifestation des JEunes Chercheurs STIC, Calais, France, 13-15 octobre 2004.

[32] G. Zacharewicz, "Environnement de simulation GDEVS compatible HLA", in: MAJECSTIC'04, MAnifestation des JEunes Chercheurs STIC, Calais, France, 13-15 octobre 2004.

[33] T. Rakotomamonjy, T. Le Moing, M. Ouladsine, "Simulation model of a apping-wing Micro Air Vehicle", in: EMAV 2004, Braunschweig, Germany, 13-14 juillet 2004.

[34] G. Moraru, D. Brun-Picard, M. Ouladsine, S. Mas, "Diagnostic et maintenance prédictive des UGV", in: 3ème ASSISES Machines et Usinage Grande Vitesse, Clermont Ferrand, 10-11 mars 2004.

[35] C. Zanni, M. Le Goc, C. Frydman, "A Three Dimensional Framework for Comparing Knowledge-Based Diagnosis Applications", in: MONET Workshop on Model Based Systems at ECAI 2004, European Conference on Artificial Intelligence, Valence, Espagne, 2004.

[36] M.A. Hamri, C. Frydman, L. Torres, "Specifying and Validating Reactive Systems with CommonKADS Methodology", in: KES03, 7th International Conference on Knowledge-Based Intelligent Information & Engineering Systems & Allied Technologies, University of Oxford, United Kingdom, september 3-5 2003.

[37] M. El Adel, M. Ouladsine, "On Decentralized Adaptative Control of MIMO Interconnected Systems", in: IEEE International Symposium on Intelligent Control, The Westin Galleria, Texas, USA, octobre 2003.

[38] A. Naamane, N. Giambiasi, "Logic Gate Modeling and Simulation using Generalized Discrete Event Specifications : G-DEVS", in: ESM'03, European Simulation Multiconference, Naples, Italie, octobre 2003.

[39] M. El Adel, M. Ouladsine, H. Noura, "Design Lyapunov Controller For Vehicle Dynamics", in: ELECTROMOTION'03, 5th International symposium on Advanced Electromechanical Motion Systems, Marrakech, novembre 2003.

[40] M. El Adel, M. Ouladsine, L. Radouane, "Predictive Steering control Using Laguerre Series Representation", in: CCA'03, IEEE Conference on Control Application, Istanbul, Turkey, juin 2003.

[41] A. Garrido De Ceita, L. Torres, C. Frydman, "Specification and Validation of Knowledge-Based Systems", in: SCSC'03, Summer Computer Simulation Conference, Montreal, Canada, juillet 20-24 2003.

[42] G. Blanc, J.L. Paillet, N. Giambiasi, "A correspondence between DECM and Event Graphs", in: SCSC'03, Summer Computer Simulation Conference, Montreal, Canada, juillet 2003.

[43] A. Naamane, N. Giambiasi, "Hybrid system modeling usins G-DEVS", in: SCSC'03, Summer Computer Simulation Conference, Montreal, Canada, juillet 2003.

[44] A. Naamane, K. Sia, "Bond graph : a suitable tool for fault diagnosis", in: ICMBM'03, Phoenix, Arizona, janvier 2003.

[45] C. Zanni, M. Le Goc, C. Frydman, "Diagnosis problem in SACHEM", in: CIMCA'03, Vienna, Austria, février 2003.

[46] N. Giambiasi, J.L. Paillet, F. Chane, "From Timed Automata to DEVS Models", in: WSC'03, New Orleans, décembre 2003.

[47] J.F. Le Maitre, "Virtual Reality, Toward a New Approach of Automatic Control Theory", in: ISMCR'03, 13th International Symposium on Measurement and Control in Robotics, Madrid, Spain, décembre 2003. Key Note Paper.

[48] S. Nicolas, J.F. Le Maitre, "Using Physical Modelling and Multi-Agents System for Virtual Reality Simulator and Robot Protoype Design", in: ISMCR'03, 13th International Symposium on Measurement and Control in Robotics, Madrid, Spain, décembre 2003.

[49] E. Soulier, J. Caussanel, "HyperStoria : acquire, represent, understand and share experiences by the way of narration", in: Workshop on Narration and Knowledge Management, European Institute for advanced Studies in Management, EIASM, Bruxelles, décembre 2003.

[50] E. Soulier, J. Caussanel, "Médiatiser la narration pour le transfert d'expériences : application au domaine du conseil en Knowledge Management", in: CITE'2003, Coopération Innovation et TEchnologie, Troyes, décembre 2003.

[51] E. Soulier, J. Caussanel, "Médiatiser la narration pour le transfert d'expériences", in: COMETIC Médiation et Ingénierie des Connaissances, Marseille, décembre 2003.

[52] S. Aberkane, H. Noura, D. Sauter. "Fault-tolerant control of a robot manipulator." Colloque IAR, Duisburg, Germany, November 2003.

[53] J.C. Carmona, M. Ouladsine, M. El Adel, "L1 Prediction error System Identification: a modified AIC rule", in: SYSID'03, 13th IFAC Symposium on System Identification, Rotterdam, The Netherlands, août 2003.

[54] M. El Adel, M. Ouladsine, J.C. Carmona, "Adaptative Laguerre Time Scaling Factor in Predictive Control", in: SYSID'03, 13th IFAC Symposium on System Identification, Rotterdam, The Netherlands, août 2003.

[55] M. Massour El Aoud, M. Franceschi, M. Maher, "Multivariable control for greenhouse climate", in: CESA'2003, IMACS Multiconference on Comutational Engineering in Systems Applications, Lille, France, 9-11 juillet 2003. (Actes sur CD-ROM).

[56] F. Ounnar, H. Bouchriha, P. Pujo, P. Ladet, S. D, "Faire ou faire-faire dans un réseau logistique auto-organisé", in: 5e Congrès International de Génie Industriel, Québec, Canada, 26-29 octobre 2003.

[57] V. Riccardi, P. Pujo, C. Frydman, "DEVS Modelling For The Proactive Control By Simulation Of Kanban Production Lines", in: The International Workshop on Modeling & Applied Simulation (MAS 2003), Italy, 2-4 octobre 2003.

[58] P. Pujo, M. Pillet, "Duality between control and quality", in: QUALITA 2003, Nancy, France, 2003.

[59] M. El Adel and A. Hajjaji. (2002). Decentralized Predictive Control For Automated Highway Systems. Proc. AIS'2002. April 7-10. Lisbonne ; Portugal pp. 232-237.

[60] X. Dovifaaz, M. Ouladsine, others, "Neural Modeling and Control of Diesel Engine with Pollution Constraints", in: ACC'2002, Americain Control Conference, Alaska, USA, mai 2002.

[61] J. Caussanel, J.P. Cahier, M. Zacklad, J. Charlet, "Les Topic Maps sont-ils un bon candidat pour lÕingénierie du Web Sémantique ?", in: ICÕ2002, Rouen, juin 2002.

[62] E. Soulier, J. Caussanel, "La narration pour la compréhension et la résolution de problème collective", in: ICÕ2002, Rouen, juin 2002.

[63] M. Ouladsine, X. Dovifaaz, J.M. Olive, "Modélisation par réseaux de neurones de la pollution Diesel", in: CIFA'02, Nantes, France, juillet 2002.

[64] X. Dovifaaz, M. Ouladsine, others, "Neural Modeling For Diesel Engine Control", in: IFAC'02, 15th IFAC world congress, Barcelone, Espagne, juillet 2002.

[65] E. Soulier, J.Caussanel, "Narrative Tools to improve Collaborative Sense-Making", in: MeaN-2002, Workshop on MEANING NEGOTIATION at National Conference on Artifical Intelligence (AAAI-02), Edmonton, Canada, juillet 2002.

[66] C. Zanni, "Intelligent Monitoring and Diagnosis: another point of view for analysis", in: DSIAGE'2002, Cork, Irlande, juillet 2002.

[67] C. Zanni, M. Le Goc, C. Frydman, "Towards a Unique Framework to Describe and Compare Diagnosis Approaches", in: HIS 2002, Santiago de Chile - Chile, décembre 2002.

[68] X. Dovifaaz, M. Ouladsine, others, "Neural Modeling and Control of Diesel Engine with Pollution Constraints", in: AISÕ2002 Simulation And Planning in High Autonomy Systems, Lisbonne, Portugal, avril 2002.

[69] N. Giambiasi, "Timed Automata, DEVS and Formal Verifications", in: 2002 AI, Simulation and Planning, Lisbonne, Portugal, avril 2002. Keynote Presentation.

[70] M. Le Goc, M. Gaéta, C.C. Thirion, "Adaptiveness of Agent through Structural Modelling in Generic Spaces: The Example of Sachem", in: AIS'2002, Artificial Intelligence, Simulation and Planning in High Autonomy Systems, Lisbonne, Portugal, avril 2002.

[71] A. Naamane, I. Simeonov, "Hybrid mathematical modeling and control of the anaerobic waste aters treatment processes", in: AIS'2002, Artificial Intelligence, Simulation and Planning in High

Autonomy Systems, Lisbonne, Portugal, avril 2002.

[72] J.L. Paillet, N.Giambiasi, "Hardware Implementation of Control Systems from DECM High Level Specifications", in: AIS'2002, AI, Simulation and Planning in High Autonomy Systems, pp. 51-56, Lisbonne, Portugal, 2002.

[73] H. Noura, F. Hamelin, D. Theilliol, D. Sauter. Fault-tolerance analysis for major actuator failures: application to a winding machine. 15th IFAC World Congress, Barcelona, Spain, 2002.

[74] N. Giambiasi, J.L.Paillet, W.Jumpamule, "An extension of Discrete Event High Level Specification DECM Formal Language", in: Proc. of ESS'01 (13th European Simulation Symposium and Exhibition), Marseille, France, octobre 2001.

[75] M. Le Goc, C. Frydman, L. Torres, N. Giambiasi, "Using a DEVS Simulator for the Recognition of Chronicles : an example with the ELP Language", in: ESS'2001, 13th European Simulation Symposium), Marseille, France, octobre 2001.

[76] A. Naamane, A. Damiba, N. Giambiasi, "GDEVS-Bond Graph variable structure", in: ESS'2001, 13th European Simulation Symposium), Marseille, France, octobre 2001.

[77] A. Naamane, C. Frydman, N. Giambiasi, "Intensive Educational Program in advanced Logistics", in: HMS'2001, Marseille, octobre 2001.

[78] C. Frydman, M. Le Goc, L. Torres, N. Giambiasi, "The Diagnosis Approach Used in SACHEM", in: DX'2001, 12th International Workshop on Principles of Diagnosis, pp. 63-70, Sansicario, Italy, mars 2001.

[79] N. Giambiasi, B. Escude, S. Ghosh, "GDEVS : A Generalized Discrete Event Specification for Accurate Modeling of Dynamic", in: IEEE ISADS 2001 Conference, Dallas, Texas, mars 2001.

[80] D. Theilliol, J.C. Ponsart, H. Noura, D. Sauter. Sensor fault-tolerant control method based on multiple model approach. In European Control Conference ECC 2001, Porto, Portugal, 2001.

[81] F. Hamelin, H. Noura, D. Sauter. Fault detection method of uncertain system using interval method. In European Control Conference ECC 2001, Porto, Portugal, 2001.

[82] J.C. Ponsart, D. Theilliol, H. Noura. Fault-tolerant control method for actuator and component faults applied to a hydraulic system. In European Control Conference ECC 2001, Porto, Portugal, 2001.

[83] A. Naamane, N. Giambiasi, "Diamsim : a discrete Event modeling and simulation Environment", in: International Conference Automatics and Informatics, pp. 159-168, Sofia, juin 2001.

[84] C. Zanni, C. Frydman, L. Torres, "A new category in Intelligent in Monitoring and Diagnosis for Industrial Systems", in: 5th World Multiconference on Systemics, Cybernetics and Informatics SCI 2001, Orlando, USA, juillet 2001.

[85] A. Naamane, A. Damiba, N. Giambiasi, "Bond Graphs & GDEVS", in: ICBGM2001, Phoenix, janvier 2001.

[86] C. Frydman, L. Torres, M. Le Goc, N. Giambiasi, "Timed Discrete Event Modeling For Knowledge Based Diaognosis : Application to the SACHEM System", in: CIMCA'2001, International Conference on Computational Intelligence for Modeling, Control and Automation, Las Vegas, USA, 2001.

[87] N. Giambiasi, W. Jumpamule, J.L. Paillet, "An extension of Discrete Event High Level Specification DECM Formal Language", in: ESS01,3th European Simulation Symposium and Exhibition, Marseille, France, 2001.

[88] W. Jumpamule, N.Giambiasi, J.L. Paillet, "Validation of Discrete Event High Level Specification by Simulation", in: Proc. of ESM2001, 15th European Simulation Multiconference, pp. 230-234, Prague,

Rep. Tchèque, 2001.

[89] W. Jumpamule, J.L. Paillet, N.Giambiasi, "DECM Modelling Methodology for Control Systems", in: Proc. of NCSEC 2001, Fith National Computer Science and Engineering Conference, pp. 177-184, Chiang Mai, Thaïlande, 2001.

[90] F. Ounnar, P. Pujo, "Décentralisation des mécanismes de pilotage de la relation donneurs d'ordres / fournisseurs", in: 4e Congrès International de Génie Industriel, Aix-en-Provence, Marseille, 2001.

[91] J.L. Paillet, "Formal Methods: High Level Specifications of Discrete Event Systems", in: Proc. of NCSEC 2001, Fith Nationel Computer Science and Engineering Conference, pp. 13-22, Chiang Mai, Thaïlande, 2001. invited conference.

[92] P. Pujo, "Déménagement d'une ligne de production manufacturière sans arrêt de l'activité de production", in: 3ème Conférence de Modélisation et de SIMulation, Troyes, France, 2001.

[93] P. Pujo, F. Ounnar, "Decentralised control and self organisation in flexible manufacturing systems", in: ETFA'2001, 8th IEEE International Conference on Emerging Technologies and Factory Automation, Antibes, France, 2001.

[94] P. Pujo, F. Ounnar, "Task Decentralised Scheduling in a Hub, Harbour Maritime & Multimodal Logistics Modelling and Simulation", in: HMS'2001, Marseille, France, 2001.

[95] L. Torres, C. Frydman, A. Garrido de Ceita, "Adding Event-driven Control Knowledge in a CommonKADS Knowledge Model", in: 5th International Conference on Knowledge-Based Intelligent Information Engineering Systems month Allied Technologies (KES'2001), Oaka month Nara, Japon, 2001.

## *Conférences without Proceedings*

[1] M. El Adel, M. Ouladsine, C. Urrea, "Longitidinal control for nonlinear vehiculs dynamics", in: dynamicsIFAC International Conference on Advances in Vehicle Control and Safety AVCS'04., pp. 145-149, Octobre 28-31 2004.

[2] H. Noura, "Diagnostic de defauts sur les systèmes industriels", in: Université de Printemps-Energie et Automatique : Technologies et nouvelles approches ENSEM, Univ. Hassan II Ain Chock, Casablanca, Maroc, 19-23 avril 2004.

[3] L. Mekaouche, F. Ounnar, P. Pujo, N. Giambiasi, « Pilotage auto organisé de la relation Clients-Fournisseurs », in: Groupe OGP (Organisation et Gestion de la Production / GDR MACS, pôle STP), Aix-en-Provence, France, 21-22 octobre 2004.

[4] M. Pedetti, P. Pujo, N. Giambiasi, « GEMES : conception d'un MES pour PME-PMI », in: Groupe ERP (Enterprise Ressource Planning / GDR MACS, pôle STP), Aix-en-Provence, France, 21-22 octobre 2004.

[5] M. Pedetti, P. Pujo, N. Giambiasi, « Modélisation DEVS et simulation du déménagement d'un flow shop sans interruption de la production », in: Groupe CSP (Conception des Systèmes de Production / GDR MACS, pôle STP), Aix-en-Provence, France, 21-22 octobre 2004.

[6] F. Ounnar, I. Hunt, P. Pujo, P. Méreau, « Global Education in Manufacturing. An cursus overview », in: journées finales du Projet GEM - GDR MACS, pôle STP, Aix-en-Provence, France, 21-22 octobre 2004.

[7] P. Méreau, Klaus-D. Thoben, Fouzia Ounnar, Patrick Pujo, « Le projet GEM (Global Education in Manufacturing) : une offre de formation en e-learning pour la productique », in: journées finales du Projet GEM - GDR MACS, pôle STP), Aix-en-Provence, France, 21-22 octobre 2004.

[8] G. Zacharewicz, C. Frydman, C. Zanni, "Workflow/HLA Distributed Simulation Environment", in: Harbour, Maritime & Multimodal Logistics Modelling and Simulation, HMS 2002, Bergeggi, Italy, October 3 - 5 2002.

[9] P. Bouché, M. Le Goc, "Représentation markovienne de séquences pour la construction de signatures.", in: Journées des Doctorants du LSIS (JDL6), pp. 43-50, Marseille, France, décembre 2002.

[10] A. Garrido De Ceita, "Extension de la méthodologie CommonKADS pour la spécification du comportement des systèmes réactifs.", in: Journées des Doctorants du LSIS (JDL6), pp. 91-98, Marseille, France, décembre 2002.

[11] P. Bouché, "Using markov's theory to represent behavior of complex systems", in: AIS 2002, pp. 189-194, Lisbonne, Portugal, 7-10 avril 2002.

[12] P. Pujo, F. Ounnar, "Global Education in Manufacturing. An IMS Project", in: Groupe OGP/GRP (Organisation et Gestion de la Production / Groupement pour la Recherche en Productique), Tarbes, France, 2002.

## Appendix : Industrial Collaboration Contracts

**Project with COMAU - COSI and IMS teams**
"Development of procedures, measurement means and analysis for the predictive maintenance high speed machining"
September 2003 - September 2004
Amount HT (euros): 10000€ of which 5000€ for the IMS team
Researcher in charge: Daniel BRUN-PICARD & Mustapha OULADSINE

**PhD Thesis accompanying (Marie curie) - Eurocopter - COSI and IMS teams**

September 2003 - December 2006
Subject: Diagnosis
Amount HT (euros): 4000€/year
Researcher in charge: Daniel BRUN-PICARD & Hassan NOURA

**Contract STBA - COSI team in collaboration with the INCA team**

July 2004 - January 2006
Subject: Validation and Evolution of Algorithmics for the development of the tools for air terminals capacity
Amount HT (euros): 24000 € (with INCA)
Researcher in charge: Claudia FRYDMAN

**SIMFONHYC Project (1999-2003) – INCOD team**

Project SIMFONHYC for "Simulation of the hydraulic operation of the Camargue", is a study having for objective to represent, using an information processing system, the interactions between hydraulic management and the operation of the ecosystem.
Partner: Desmid-CNRS.
Study subsidized by the Regional Council PACA.
The cost of this study is of 1,63 MF, it is subsidized by area PACA to 41 % (either 665 KF).
Researcher in charge: B. Espinasse.

**Projet IEPAL (Intensive Educational Program in Advanced Logistics) – COSI team**

Joint European Community/ United States Consortia for Cooperation in Higher Education and Vocational Education and Training, 2000-2004.
Partners : Boston College (USA), Arizona State University (USA), University of Nothingham (U.K), Bradley University, National Center for Simulation-NASA (association of 150 American companies, created and directed by NASA), University of Genoa (Italy), University Otto von Guericke, University Aix Marseilles 3 (LSIS).
Subject: Development of a formation (postmaster) of simulation for logistics.
Researcher in charge: N. Giambiasi.
Participants : C. Frydman, A. Naamane.
Octobre 2000 - Octobre 2003
Montant HT (euros) : 30000

**ANVAR - AJIT – COSI team**

January 2001 - September 2001

Subject: Design of decentralized control of robotized transport systems,in the framework of a of a secured car park project.
Amount HT (euros): 1090
Researcher in charge: Patrick PUJO

**IMRA-Europe – COSI team**

December 2002 - March 2003
Subject: Feasibility study for the application of artificial intelligence approaches for danger evaluation for the design of a secured system for parking assistance.
Amount HT (euros): 12 000€
Researcher in charge: Marc LE GOC

**CIFRE PhD Thesis Accompanying - Project with Eurocopter - COSI team**

December 2002 - December 2005
Subject: Diagnosis
Amount HT (euros): 7500€ per year
Researcher in charge : Mustapha OULADSINE

**PhD Thesis Accompanying – Eurocopter – COSI team**

September 2003 - December 2006
Subject: Diagnosis
Amount HT (euros): not defined yet
Researcher in charge: Mustapha OULADSINE

**CIFRE PhD Thesis Accompanying - ITSoft - COSI team**

March 2003 - March 2006
Subject: Specification, Operationalization, and Validation of knowledge- based workflow.
Amount HT (euros): 7500 € per year.
Researcher in charge: Claudia FRYDMAN

**Collaboration contract with STMicroeletronics - COSI team**

April 2004 - March 2005
Subject: Simulation and diagnosis for integrated circuits production lines control assistance
Amount HT (euros): 420 000 euros per year
Researcher in charge: Hassan NOURA
Project over 5 years, renewable each year

**Usinor-SACHEM – COSI team**

1994-2002. SACHEM is a very large scaleknowledge-based system developed by the USINOR group (now Arcelor) to assist the operators in controling the Blast furnaces. In 2001 and 2002, we had the following contracts:

- 2001: Diagnosis of continuous physical processes using the DEVS formalism. Application to the diagnosis of the phenomena detected by Sachem: Specification and Implementation (continuation)
  Amount : 250kF
  Researcher in charge: N Giambiasi.
  Participants: C.Frydman, L Torres.

- 2002: Contribution to knowledge acquisition for diagnosis of dynamic systems.
  Amount : 300KF.
  Researchers in charge : N. Giambiasi, C. Frydman