Relatório de Actividade

das Unidades

R1. SCIENTIFIC COUNCIL

President: Manuel António Cerqueira da Costa Matos

R1.1 INTRODUCTION

In the year 2005, the Scientific Council developed its activity through plenary meetings and e-mail conferencing. The activity included the contribution to reports, the formulation of advices about institutional reports and plans and the collaboration in the process of strategic debate lead by the Board of Directors.

R1.2 SUMMARY OF ACTIVITIES

The Council analyzed and produced an advice on the report of 2004 and plan for 2005 (in the framework of FCT multiyear financing), and also on the report of 2004 and plan for 2005 for the General Council of INESC Porto.

Regarding the work of the Committee for Monitoring the Scientific Production, it was not possible yet to begin the systematic analysis of the publications of all the researchers. The Scientific Council will analyze the reasons of this failure in 2006, in order to remove the obstacles to the work of this Committee.

On the other hand, the Council, through its president, has continued validating the applications to the prize created by the Board of Directors for the publications in international journals referenced in the Web of Science and Inspec.

Finally, the Council has participated in the debate over the Strategic Guidelines for 2006-08, producing a document with its comments on a discussion paper issued by the Board of Directors.

R2. UNIT: UTM – TELECOMMUNICATIONS AND MULTIMEDIA

R2.1 SHORT DESCRIPTION OF THE UNIT

The Telecommunications and Multimedia Unit carries out research and development, consulting and technology transfer in scientific and technological areas that lay the foundation of the modern communications networks and services.

The Unit is organized in three main Areas. Each Area addresses a number of specific but related research topics, under a common strategy and goals that are mainly determined by the market sector it covers:

- Network Architectures and Services: IP Networks, Network Monitoring and Test Systems, QoS and Resource Management, Wireless and Mobile Communications.
- Multimedia Technologies and Systems: Audio Signal Analysis, Image and Video Processing, Digital Television, Multimedia Services.
- Optical and Electronics Technologies: Optical Communications and Microwaves, Microelectronics, Micro-optics Technologies.

The R&D groups that constitute the Unit perform basic and applied research in the above areas and promote advanced training of his members. Coordination between these groups allows the exploitation of their specific competences in information, communications and signal processing technologies as well as the synergies necessary to design, develop and integrate complex systems that cover a broad range of application fields.

An important part of the activity of the Unit has been oriented towards the international market and carried out under contract and in partnership with network operators and service providers, television broadcasters and manufacturers of communications systems and test equipment. In this context, the successful participation in projects funded by European R&D programmes has a high strategic value, since it allows scientific and technical co-operation with leading R&D institutions, continuous progress and updated knowledge and experience in state-of-the-art technologies and research topics, and liaison with standards bodies.

R.2.2 ACTIVITIES DEVELOPED IN 2005

R2.2.1 National programmes

The national research projects carried out in 2005 were funded by FCT under the PRAXIS XXI programme (3D4LBMS, TAICAS, WANDER, IAMA, DOMIR and EBGCOM) and by Agência de Inovação (ASSOCIATE).

Under "Programa Nacional de Re-equipamento Científico", FCT funded the upgrade and reinforcement of the R&D infrastructure in communications and optical technologies at INESC Porto, which allowed setting up a new Photonics and Microwave laboratory and opening a new research area in "Fibre Supported Microwave/Radio Systems".

The main goals and results achieved on each project are briefly described next.

ASSOCIATE (Advanced Solutions for Innovative SOC Testing in Europe) is a project approved by the European Programme MEDEA+, with the Portuguese participation funded by Agência de Inovação (AdI). The project had the goal of developing test methods and infrastructures of integrated micro-systems. Funding by AdI continued until December 2005. Work carried out in 2005 concentrated on:

- implementation, calibration and evaluation of a prototype developed to demonstrate the feasibility of taking advantage of on-site existing reconfigurable logic to implement dedicated processors to run mixed-signal test operation in integrated systems.
- development of a software tool dedicated to optimize the generation of dedicated programs for testing analogue and mixed-signal circuits.

A new Medea+ project (NanoTEST) began its activities in January 2005. The same team is continuing the activity started with ASSOCIATE, on the implementation of analogue and mixed-signal tests that take advantage of existing reconfigurable logic. Another area of interest concerns the test and design for testability of integrated RF circuits and first results were obtained with the development of functional and structural test methods for Low Noise Amplifiers. The functional test method is based on a polynomial fitting approach and the structural method is based on the observation of cross-correlation between dynamic power supply current and output voltage.

The main goal of 3D4LBMS (3D modeling of virtual urban environments for location based mobile services) is the development of procedures to create tri-dimensional models of virtual urban environments, which can be used in services and applications that provide users with a hypermedia virtual environment of the surrounding area. During 2005, the following tasks were completed:
- specification of the geo-referenced data model that supports the creation of urban virtual models, as well as interoperable access to the information sources that make them available.
- implementation of a semi-automatic 3D modeler for complex urban virtual scenes.
- development of a basic mechanism for the segmentation of 3D scenes, based on geo-spatial filters.

The prototype of the 3D4LBMS service is under development; it provides, on request, extracts of the 3D urban virtual model that depend on the geographical context of the user.

TAICAS (Advanced Techniques for the Identification and Correction of Room Acoustics) aims at the development and implementation of a real-time digital signal processing platform able to perform room equalization in a transparent, adaptive and automatic way. The main results achieved during 2005 were:
- migration of the implementation platform based on the TMS320C6711 DSP to a new and more powerful platform based on the TMS320C6713 DSP;
- extension of the processing capabilities of the DSP platform from monophonic to stereo processing;
- development of an accurate procedure for the cancellation of multiple acoustic feed-backs;
- optimization of the frequency-domain equalization algorithm using, as excitation, white noise;
- development of a new method for the extraction "on-the-fly" and in a transparent way, of the acoustic response of the room, so as to adapt the equalization filtering in an automatic way;
- preparation of a graphical user interface allowing the unidirectional communication from the DSP platform to the host PC.

WANDER (IPv6 Wireless Access Network: Deploying, Evaluating and Re-engineering) has as main goals the specification, development and deployment of a wireless local area network based on the IEEE 802.11 family of standards and other wireless access technologies. The network infrastructure, already created, includes wireless access networks of different technologies (IEEE 802.11, Bluetooth) interconnected by a wired core network, different types of fixed and mobile terminal devices, as well as a control network for configuration and maintenance of the whole demonstrator. This infrastructure is also being used by other projects to support research activities in Quality of Service (QoS), mobility and security, in 4G network scenarios. It includes software modules that were developed to support a QoS architecture specified to match the characteristics and requirements of such heterogeneous network environments, and a number of services that support a prototype ambient network.

The main objective of IAMA (Implementation of a biologically realistic associative memory in analogue CMOS-VLSI) is the analogue implementation of a set of coupled oscillators for memory association. The

design of an integrated circuit (IC) with testing circuits was completed; a novel non-linear function was proposed and the IC was sent for fabrication, thus fulfilling the main goals set for 2005.

DOMIR (Dialogs and Ontologies for Multimedia Information Retrieval) aims at exploring three aspects that can bring significant improvements to the state-of-the-art in information retrieval: the organization and analysis of multimedia documents, the construction of ontologies from textual documents and the use of dialogues in the interaction with the user and in the processing of answer sets. The project expects to obtain results in these open research areas, integrate them in operational tools and test their effectiveness with performance measures capable of evaluating them at a finer grain than current retrieval measures. As an overall effort the project will build a prototype system for multimedia information retrieval based on results from previous projects of the research team and incorporating features from the newly developed tools. In 2005 the following main results were achieved:

- Multimedia feature analysis: the gstreamer open source tool has been evaluated with respect to the automation of the extraction process.
- Retrieval methods: a Java-based evaluation platform has been developed and used for evaluating several multidimensional indexing methods and a new indexing method has been proposed and implemented.
- Multimedia database prototype: the database prototype (developed in MetaMedia, a former FCT project) has been upgraded using the JetSpeed portal development tool.

The main goal of CFD (Custom Computing Architectures for Computational Fluid Dynamics) is to develop a dedicated computer to execute, in an efficient way, calculus applications in fluid dynamics. The work carried-out during 2005 concentrated in two main areas: optimization of data formats and parallelization of the VENTOS application software (developed by the project team). In the first task, the dynamic range of the data involved in the computation process was evaluated. That required changing the VENTOS application to allow for extracting maxima and minima of each variable involved in the computation of the system of equations, using the TDMA method. Results showed that it is possible to reduce the number of bits of the exponent of the representation of data according to the IEEE 754 standard. It is also possible to reduce the number of bits of the mantissa, in this case accepting some accuracy reduction. As far as the second task, software parallelization was obtained by dividing the computational domain in different partitions. With this parallel version it was possible to accelerate the execution speed by a factor of 1.6 using two processors from the IBM cluster available at FEUP, corresponding to an efficiency of 80%. Parallel and sequential solutions are virtually identical and independent either from how the domain is divided or the number of partitions being used.

EBGCOM (Electromagnetic band gap antennas and components for broadband communications) has the main objective of designing, developing and implementing novel RF/microwave components based on EBG technology that find applications in wireless and optical communication systems. More specifically, it aims at developing methodologies for the design of EBG components (filters, delay lines and antennas), developing EBG devices for chromatic dispersion equalization in the electrical domain for coherent and SSB optical communication systems and implementing EBG antennas (single and phased arrays) for broadband wireless communications (wireless LANs and MANs). The project began its activities in October 2005 and started with identification of the state-of-the-art in EBG technology. Some filters have already been simulated and designed using this technology; in particular it was shown that although the EBG filters are generally band-reject filters, low pass-filters can also be designed. A low-pass microwave filter structure that achieves a very fast roll-off characteristic (in the order of 450 dB/octave) has been designed.

R2.2.2 European programmes

Six research projects funded by the European Commission were active in 2005 – one of the Non-Nuclear Energy programme (FP5) and the remaining (DAIDALOS, WWI Ambient Networks, ENTHRONE, VISNET and TARGET) of the IST programme (FP6). A brief description of goals and results of each project follows.

The main goal of MICROGRIDS (Large Scale Integration of MICRO-Generation to Low Voltage GRIDS) was the introduction of micro-generation in the low power electrical plants. The activities of INESC Porto were carried out by USE and UTM. The latter was responsible for the specification of the communications architecture for supporting the Microgrids control applications, and its evaluation. These applications run on an agents' platform based on the *Java Agent DEvelopment Framework* (JADE) over TCP/IP. The performance evaluation of the JADE platform was carried out from the points of view of response time and scalability, using the *Contract Net Protocol* (CNP), and took into consideration different scenarios (agents residing in the same or different platforms) and alternative choices for the Message Transfer Protocol (MTP). The study led to the conclusion that HTTP is the best choice for MTP and simulation results have shown excellent scalability properties of the selected architecture. The project concluded its activities in December 2005, but research in this area will continue in a new project (MORE MICROGRIDS).

The main goal of DAIDALOS (Designing Advanced network Interfaces for the Delivery and Administration of Location independent, Optimised personal Services) was the integration of heterogeneous network technologies to ensure optimal inter-working between different networks, including fixed and mobile, wireline and wireless, symmetric and asymmetric, ad-hoc and infrastructure networks, within the same administrative domain. In this scope, three main activities were carried out by INESC Porto:

- development of a new concept capable of supporting the optimised communication between mobile and wireless terminals over heterogeneous access wireless access networks;
- development of new model for enabling the communication of a set of ad-hoc interconnected terminals with the infrastructure network provided by operators;
- development of a monitoring system usable by call admission control mechanisms which allows the precise characterisation of the traffic transported by a network.

For the three activities both scientific contributions and working prototypes have been developed. DAIDALOS concludes early in 2006, but will continue on a second phase, already approved.

The main objective of the WWI Ambient Networks (AN) project was to implement dynamic composition of AN domains. Network composition goes beyond internetworking as known today in the Internet (packet level connectivity, established over domain boundaries), and includes interworking and integration of control functionality. INESC Porto participated in WP 3, which addressed two issues that are central for composition: the means to interconnect the control functions of two domains and an end-to-end connectivity service enhanced with mobility-aware QoS control and congestion management. More specifically, the UTM team was involved in two tasks: "Connecting Ambient Networks" and "QoS in Ambient Networks". In the former it contributed to the design of the ANI interface and the GANS (Generic Ambient Network Signaling) protocol, in particular the GANS Transport Layer Protocol (GTLP), and to the GANS scalability analysis. In the latter the focus was on new models for an end-to-end QoS solution, which includes dynamic SLA (Service Level Agreement) negotiations between domains, and on the specification and development of Negotiation and Admission Control modules for the system prototype. The project concluded in December 2005, and its second phase started immediately after, in January 2006.

ENTHRONE (End-to-End QoS through Integrated Management of Content, Networks and Terminals) aimed at the development of tools to provide end-to-end Quality of Service, over heterogeneous networks, to audiovisual services adapted to the utilization context, the capabilities of the terminal devices and the profile or preferences of the user. The overall goal was thus to ensure universal access to audiovisual information, over heterogeneous domains and from any type of device or network. INESC Porto

contributed with the specification and development of an integrated management system based on distributed technologies (Web Services) and MPEG-21 concepts and a set of tools for the creation, publishing, management, search and consumption of audiovisual content in the form of Digital Items, as prescribed in MPEG-21. In 2005, the prototype developed during the preceding year was redesigned to accommodate new requirements and offer extended functionality. This resulted in the implementation of a new prototype offering content search capability, improved adaptation decision capability enabling adaptation by real-time transcoding, and extended support for the monitoring of the level of perceived quality. Finally, additional services were developed, specific to particular application areas (such as a "statistics service" used in interactive TV applications). The project concludes during the first quarter of 2006, but its extension has recently been approved.

VISNET (Networked audiovisual media technologies) is a Network of Excellence (NOE) aimed at creating a sustainable world force of leading research groups in the field of networked audiovisual (AV) media technologies. INESC Porto participated in most of the research areas covered by the project, namely transmission of AV information over heterogeneous networks, support to video content adaptation, based on content and context descriptions, interoperability between data models and formats, audio and speech analysis and multimodal analysis, thus promoting the cooperation among its research groups involved in the project. A network testbed and a content mediation platform were built at INESC Porto to support research activities during and beyond VISNET time frame. The network testbed is made up of different wireless access technologies and was created and used to investigate new architectural solutions to support end-to-end Quality of Service to AV services in heterogeneous environments typical of 4G networks. The content mediation platform is based on the MPEG-21 framework, in order to support multiple formats and content adaptation decisions, and adopts a modular services oriented approach; it is able to use a variety of content descriptions, to support content and context adaptation, to allow transparent access of heterogeneous devices and to take decisions regarding the need to adapt the content. VISNET concluded with success by the end of 2005, but a second phase, already approved, will start on the second quarter of 2006.

TARGET (Top Amplifier Research Groups in a European Team) is a Network of Excellence that aims at integrating different European research groups in the field of microwave amplifiers. INESC Porto participates in three work packages - "Power Amplifier Overview", "Power Amplifier Characterization Criteria" and "Tutorials" – and during 2005 was involved in the test and characterization of CMOS RF amplifiers, particularly that of power amplifiers. Under the "Exchange" work package, it was possible to obtain simulation and experimental results on the applicability of the polynomial fitting approach to test different classes and technologies of RF power amplifiers. These results are now being further explored.

R2.2.3 Other programmes, consulting, services

During 2005, three projects under contract with PT Inovação (PTIN) started their activities – "QoS VoIP", "Secure IP Multicast of Video Channels" and "MPEG-21 (management and adaptation of multimedia content)". A common goal of these projects was to give advanced training to young researchers who would join PTIN at the end of the projects.

The project "QoS VoIP" had the main goal of evaluating the use of information carried by protocols that support the VoIP service in the negotiation of Service Level Agreements (SLA), taking into account objective QoS criteria. The study analysed protocols both in the data and control planes (RTP, RTCP and its extension RTCPXR, SIP, SDP, MGCP, etc.), operations models and key performance and quality indicators in the perspective of the VoIP service and evaluated available software packages to be integrated in a test network.

The project "Secure IP Multicast of Video Channels" has the main goal of building a prototype of a system that demonstrates the feasibility of multicasting, in a secure way, multiple video channels over

IP. The system architecture has been specified and a first version of the protocol has already been developed and demonstrated.

The project "MPEG-21 (management and adaptation of multimedia content)" has the goals of studying and following the evolution of the MPEG-21 standard, with emphasis on part 7 (DIA) that covers "Content Adaptation", and the development and test of tools that implement the functionality specified by the standard. Two state-of-the-art reports have been produced (on MPEG-21 and MPEG-21 DIA), and a set of tools and software applications, either from the MPEG group repository or developed at INESC Porto, were tested.

Another contract, signed with "Comissão de Vigilância do Castelo de Santa Maria da Feira", is aimed at developing and giving support to a medieval documentation center, with the assistance of a team of archivists and historians. The application involves a multimedia database and a Web-base interface to the document collection; different user profiles will be available to archivists for loading descriptive metadata and digitized items, for specialized search and for Web-like browsing. The metadata model has been adjusted to the problem domain and the main interface for descriptive metadata has been completed. It is also possible to perform the upload of digitized items in the Web interface.

Within the contract with Fibersensing, a spin-off of INESC Porto, two researchers of the Unit continued to give support to the development of optical sensor and measurement units, which are included in the portfolio of products of the company.

Finally, a number of internal projects were carried out in 2005, covering the following research topics: Analysis and recognition of audio signals, Transaction of multimedia content, Ambient Networks, and Integration of ad-hoc with structured networks.

R.2.3 SUMMARY OF RESULTS OF THE RESEARCH ACTIVITIES OF THE TEAM MEMBERS

- **Projects**

Summary of projects developed in 2005

Type of Activity (1)	No. Projects (2)			Total Income (€)
	N	E	I	
R - Research	8	6		490.000
D - Development	3			52.500
C - Consulting	1			9.0002
A – Advanced training				
T – Technology Transfer	2			161.000
O - Other				
TOTAL	14	6		712.500

Summary of relative distribution of sources of income

Financing (3)	Status (4)			Total Income (€)
	S - Started	OG– On-going	C - Concluded	
NP – National Programmes	2,11%	10,39%	14,18%	190.000
EP – European Programmes		29,89%	24,27%	386.000
CS – Consulting and Services	8.63%		10,53%	136.500
O – Other R&D sources				
OS – Other Sources				
Total	10,74%	40,28%	49,98%	712.500

Summary of projects developed in 2005

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ.		Starting date	Conclusion (prediction)	Status (4)
				Type (3)	Prog.			
METAVISION	J. Cardoso	T	N	NP	PRIME	10-2001	04-2005	F
ASSOCIATE	J. M. Silva	R	N	NP	POCTI	09-2002	12-2005	F
Microgrids	J. Ruela	R	E	EP	NE	12-2002	11-2005	F
Daidalos	M. Ricardo	R	E	EP	6PQ	11-2003	04-2006	OG
3D4LBMS	A. A. Sousa	R	N	NP	FCT	11-2003	04-2006	OG
Enthrone	T. Andrade	R	E	EP	6PQ	12-2003	03-2006	OG
VISNET	J. Ruela	R	E	EP	6PQ	12-2003	11-2005	F
WWI	J. Ruela	R	E	EP	6PQ	01-2004	12-2005	F
Target	V. Tavares	R	E	EP	6PQ	01-2004	06-2006	OG
TAICAS	A. J. Ferreira	R	N	NP	FCT	01-2004	06-2006	OG
WANDER	J. Ruela	R	N	NP	FCT	03-2004	02-2006	OG
Fibersensing	Luís Ferreira	T	N	CS	-	05-2004	12-2005	F
IAMA	V. Tavares	R	N	NP	FCT	06-2004	05-2007	OG
DOMIR	C. Ribeiro	R	N	NP	FCT	03-2005	03-2007	S
Multicast IP	M. Ricardo	D	N	CS	-	03-2005	06-2006	S

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
MPEG21	T. Andrade	D	N	CS	-	04-2005	03-2006	S
VoIP	J. Ruela	C	N	CS	-	04-2005	01-2006	S
C. Feira	G. David	D	N	CS	-	05-2005	06-2006	S
CFD	J. C. Alves	R	N	NP	FCT	05-2005	11-2007	S
EBGCOM	H. Salgado	R	N	NP	FCT	09-2005	08-2007	S

(1) Type of Project: R – Research; D – Development; C – Consulting; A – Advanced Training; T – Technology Transfer; O - Other

(2) Degree of internationalization: N – National; E – European; I – International *(Select one)*

(3) Source of financing: NP – National Programmes; EP – European Programmes; CS – Consulting and services; O – Other R&D financing sources; OS – Other sources

(4) Status: S – Starting: activities initiated in 2005 and continuing in 2006; OG – On-going: activities started earlier than 2005 and continuing in 2006; F – Finished: activities ending in 2005.

- **Summary of publications**

Summary of publications in 2005

Type of publication	Number
Theses concluded in 2005 by members of the unit	7
Books (author)	
Chapter/paper in books	4
Publications (editor)	3
Papers in International Journals with scientific referees	8 + 10 (*)
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	33 + 4(*)
Other publications (National meetings, local journals, etc.)	3 + 1 (*)
Total	58 + 15(*)

(*) papers co-authored with UOSE researchers

- **Summary of post-graduation activities**

Summary of theses supervised by members of the unit in 2005

Type	Starting	On-going	Concluded	Total
Master	15	19	11	45
Doctoral	5	17	6	28
Total	20	36	17	73

- **Summary of Advanced Training Actions**

Summary of Advanced Training Actions organized for external trainees in 2005

Type	Number
Training for graduation students *(estágios curriculares)*	30
Training for other purposes *(estágios extra-curriculares)*	
Professional training actions *(estágios profissionais)*	
Other actions	1
Total	31

- **Summary of activities of cooperation or dissemination**

Summary of items

Type	Number
Organizing conferences or meetings	7
Collaboration in papers authored by INESC Porto researchers	36
External persons directly involved in actions organized by INESC Porto	

- **Human resources in 2005**

Summary of Unit personnel at the end of 2005

Type	Education				Total	Variation (*)
	PhD.	MSc.	BSc.	Other		
R&D						
University or Politechnic staff	25	6			31	0
INESC Porto scholars		1	8		9	+3
Other scholars		5	12		17	+1
Contracted	2	1	1		4	+1
Trainees						
Other						
Administrative				1	1	-1
Total	27	13	21	1	62	+4

(*)   Relative to 2004, in absolute numbers.

R2.4 LIST OF PUBLICATIONS

R2.4.1 Theses concluded in 2005 by members of the unit

SANTOS CARDOSO, J., "Classification of Ordinal Data", MSc Thesis, FCUP, November 2005.

BOTELHO MAMEDE, J., "A Methodology for the Progressive Testing of Telecommunications Protocols", PhD Thesis, FEUP, October 2005.

SOUSA DIAS, J., "QoS in IP over UMTS Networks", MSc Thesis, FEUP, October 2005.

PINTO, A.A., "Video Broadcast using Secure IP Multicast Techniques", MSc Thesis, FEUP, July 2005.

OLIVEIRA, J.M., "An Adaptation Methodology for the Presentation of Multimedia Contents in the Virtual Home Environment", PhD Thesis, FEUP, April 2005.

SANTOS, V., "Quality assessment of manufactured ceramic work using digital signal processing", MSc Thesis, FEUP, April 2005.

TORRES, J.M., "Visual Information Retrieval through Multimedia Queries", PhD Thesis, Univ. Lancaster, April 2005.

R2.4.2 Books (Author)

Blank.

R2.4.3 Chapter/paper in Books

MACHADO DA SILVA, J., MENDONÇA, H., "ADCs' Applications and Terminology", *Dynamic Characterisation of Analogue-to-Digital Converters*, Kluwer Academic Publishers, September 2005.

MACHADO DA SILVA, J., MENDONÇA, H., MAZZOLENI, S., "Comparative Study of ADC Sinewave Test Methods", *Dynamic Characterisation of Analogue-to-Digital Converters*, Kluwer Academic Publishers, September 2005.

MACHADO DA SILVA, J., MENDONÇA, H., "Differential Gain and Phase Testing", *Dynamic Characterisation of Analogue-to-Digital Converters*, Kluwer Academic Publishers, September 2005.

FREIRE, M., MONTEIRO, P., SILVA, H., RUELA, J., "Ethernet Passive Optical Networks: A High-Speed and Low-Cost Solution for Residential Access", *Encyclopedia of Multimedia Technology and Networking*, April 2005.

R2.4.4 Publications (Editor)

DE SOUSA, A.A., NAVAZO, I., COMBA, J., "State of the Art in Computer Graphics in Ibero-American Countries", *Computers and Graphics*, Elsevier, October 2005, vol.29, no.5.

MACHADO DA SILVA, J., DALLET, D., "Dynamic Characterisation of Analogue-to-Digital Converters", Springer, *The International Series in Engineering and Computer Science*, Kluwer Academic Publishers, September 2005, Vol. 860.

DE SOUSA, A.A., SANTOS, M.P., LOPES, A., "Advances in Computer Graphics in Portugal 2006", *Revista Virtual* (special issue), 2005.

R2.4.5 International Journals with scientific referees

SANTOS CARDOSO, J.D., CORTE-REAL, L., "Accumulator size minimization for a fast cumulant-based motion estimation", *IEEE Transactions Circuits and Systems for Video Technology*, December 2005, vol.15, no.12, p.1660-1664.

SANTOS CARDOSO, J.D., CORTE-REAL, L., "Toward a Generic Evaluation of Image Segmentation", *IEEE Transactions on Image Processing*, November 2005, vol.14, no.11, p.1773-1782.

MUNIZ, R.M.R., FRAZÃO, O.J.D.R., MARQUES, P.V.D.S., SALGADO, H.M.D.C.F., et al., "Chirped fibre bragg grating based multiplexer and demultiplexer for DWDM applications", *Optics and Laser in Engineering*, September 2005, vol.43, no.9, p.987-994.

FRAZÃO, O.J.D.R., CARVALHO, J.P.P.D., SALGADO, H.M.D.C.F., "Low Loss Splice in a Microstructured Fibre Using a Conventional Fusion Splicer", *Microwave and Optical Technology Letters*, July 2005, vol.46, no.2, p.172-174.

TABARCE, S., TAVARES, V.M.G., OLIVEIRA, P.H.H.G.D., "Programmable analogue VLSI implementation for asymmetric sigmoid neural activation function and its derivative", *IEE Electronic Letters*, July 2005, vol.41, no.15, p.863-864.

SANTOS CARDOSO, J.D., PINTO DA COSTA, J., CARDOSO, M.J., "Modelling ordinal relations with SVMs: an application to Objective Aesthetic Evaluation of Breast Cancer Conservative Treatment", *Neural Networks*, June 2005, vol.18, no.5, p.808-817.

CARDOSO, M.J., SANTOS, A.C., SANTOS CARDOSO, J., et al., "Choosing observers for evaluation of aesthetic results in breast cancer conservative treatment", *International Journal of Radiation Oncology*Biology*Physics*, March 2005, vol.61, no.3, p.879-881.

MARQUES, P., CASTRO, H., PEREIRA RICARDO, M., "Monitoring Emerging IPv6 Wireless Access Networks", *IEEE Wireless Communications Magazine*, February 2005, vol.12, no.1, p.47-53.

R2.4.6 National Journals with scientific referees

Blank.

R2.4.7 Conference Proceedings with scientific referees

CAMPOS, R.L., PEREIRA RICARDO, M., "Autoconfiguration and Self-management of Personal Area Networks: a New Framework", *WWRF 2005 - Wireless World Research Forum*, December 2005, Paris, France.

OYARZABAL, J., JIMENO, J., RUELA, J., ENGLER, A., HARDT, C., "Agent based Micro Grid Management System", *Proceedings of FPS 2005 - International Conference on Future Power Systems*, November 2005, Amsterdam, The Netherlands.

DUARTE, F.X.F., ALVES, J.C., MACHADO DA SILVA, J., PINHO, A.G., SILVA MATOS, J.D., "A High Level Test Processor and Test Program Generator", *DCIS'05 - Design of Circuits and Integrated Systems*, November 2005, Lisboa, Portugal.

CANAS FERREIRA, J., SILVA, M.L., "Generation of Hardware Modules for Run-time Reconfigurable Hybrid CPU/FPGA Systems", *DCIS'05 - Design of Circuits and Integrated Systems*, p. 169, November 2005, Lisboa, Portugal.

MACHADO DA SILVA, J., PINHO, A.G., SILVA MATOS, J.D., "Design for Embedded testing of a LNA", *DCIS'05 - Design of Circuits and Integrated Systems*, November 2005, Lisboa, Portugal.

ZHOU, D., POYHONEN, P., AKHTAR, N., PINHO, C.N.D.O., "Ambient Network Interfaces and Network Composition", *GMC'05 - Global Mobile Congress 2005*, October 2005, Chongqing, China.

PINTO DA COSTA, J., SANTOS CARDOSO, J.D., "Classification of Ordinal Data Using Neural Networks", *Proceedings of ECML - European Conference on Machine Learning*, October 2005, Porto, Portugal, p.690-697.

MARTINS, S., ALVES, J.C., "A High-level Tool for the Design of Custom Image Processing Systems", *DSD'2005 - 8th EUROMICRO Conference on Digital System Design*, September 2005, Porto, Portugal.

DUARTE, F.X.F., MACHADO DA SILVA, J., ALVES, J.C., SILVA MATOS, J.D., PINHO, A.G., "A processor for testing mixed-signal cores in System-on-Chip", *DSD'2005 - 8th EUROMICRO Conference on Digital System Design*, September 2005, Porto, Portugal.

CAMPOS, R.L., PINHO, C.N.D.O., PEREIRA RICARDO, M., RUELA, J., et al, "Dynamic and Automatic Interworking between Personal Area Networks using Composition", *PIMRC'2005 - The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, September 2005, Berlin, Germany.

CAMPOS, R.L., PEREIRA RICARDO, M., "Dynamic Autoconfiguration in 4G Networks: Problem Statement and Preliminary Solution", *ACM MobiCom'05 - First International ACM Workshop on Dynamic Interconnection of Networks in conjunction with ACM MobiCom 2005*, September 2005, Koln, Germany.

MENDES, P., ANDRES-COLAS, J., PINHO, C.N.D.O., "Information Model for the Specification of QoS Agreements among Ambient Networks", *PIMRC'2005 - The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, September 2005, Berlin, Germany.

LAMEIRO ABRANTES, F., PEREIRA RICARDO, M., "On Congestion Control for Interactive Real-time Applications in Dynamic Heterogeneous 4G Networks", *PIMRC'2005 - The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, September 2005, Berlin, Germany.

FORTUNA, A.P., CARNEIRO, G.J.A.M., PEREIRA RICARDO, M., "Robust Header Compression in 4G Networks with QoS Networks", *PIMRC'2005 - The 16th Annual IEEE International Symposium on Personal Indoor and Mobile Radio Communications*, September 2005, Berlin, Germany.

CANAS FERREIRA, J., SILVA, M.L., "Using a Tightly-Coupled Pipeline in Dynamically Reconfigurable Platform FPGAs", *DSD'2005 - 8th EUROMICRO Conference on Digital System Design*, September 2005, Porto, Portugal.

SANTOS CARDOSO, J.D., PINTO DA COSTA, J., CARDOSO, M.J., "SVMs Applied to Objective Aesthetic Evaluation of Conservative Breast Cancer Treatment", *Proceedings of IJCNN05 - International Joint Conference on Neural Networks*, July 2005, Montreal, Canada, p.2481-2486.

MACHADO DA SILVA, J., "Low-Power In-Circuit Testing of a LNA", *Proceedings of the 11th International Mixed-Signal Testing Workshop*, Cannes, June 2005.

PINTO CALÇADA, T., PEREIRA RICARDO, M., "Extending the Coverage of a 4G Telecom Network using Hybrid Ad-Hoc Networks: a Case Study", *MedHoc'2005 Net - Fourth Annual Mediterranean Ad Hoc Networking Workshop*, June 2005, Ile de Porquerolles, France.

CALISTRU, C.M., RIBEIRO, M.C., TORCATO DAVID, G., "Flexible Descriptor Indexing for Multimedia Databases", *CBMI'2005 - Fourth International Workshop on Content-Based Multimedia Indexing*, June 2005, Riga, Latvia.

SARGENTO, S., PINTO CALÇADA, T., PEREIRA RICARDO, M., et al, "Mobile Ad-Hoc Networks Integration in the Daidalos Architecture", *14th IST Summit - 14th IST Mobile & Wireless Communications Summit*, June 2005, Dresden, Germany.

BOTELHO MAMEDE, J., CARRAPATOSO, E., PEREIRA RICARDO, M., "Protocol Conformance Using a Progressive Test Approach", *ACIT-CS 2005 - The IASTED International Conference on Communications Systems*, June 2005, Novosibirsk, Russia.

CARNEIRO, G.J.A.M., PEREIRA RICARDO, M., et al, "The DAIDALOS Architecture for QoS over Heterogeneous Wireless Networks", *14th IST Summit - 14th IST Mobile & Wireless Communications Summit*, June 2005, Dresden, Germany.

FRAZÃO, O.J.D.R., SALGADO, H.M.D.C.F., et al, "Twin Fibre Bragg Gratings for Tuneable Dispersion Compensation", *SEON 2005 - III Symposium On Enabling Optical Network*, June 2005, Aveiro, Portugal.

PIMENTA, M.N., SALGADO, H.M.D.C.F, "Two wavelength operation of a nonlinear optical loop mirror for optical switching and wavelength conversion applications", *SEON 2005 - III Symposium On Enabling Optical Network*, June 2005, Aveiro, Portugal.

ROCHA, A.F., SOUSA FERREIRA, A.J.D., "An Accurate Method of Detection and Cancellation of Multiple Acoustic Feedbacks", *118th AES Convention - 118th AES Audio Engineering Convention*, May 2005, Barcelona, Spain.

LEITE, A., SOUSA FERREIRA, A.J.D., "An Improved Adaptive Room Equalization in the Frequency Domain", *118th AES Convention - 118th AES Audio Engineering Convention*, May 2005, Barcelona, Spain.

BOTELHO MAMEDE, J., CARRAPATOSO, E., PEREIRA RICARDO, M., "A Progressive Method for Testing Protocol Conformance", *Conftele'2005 - 5th Conference on Telecommunications*, April 2005, Tomar, Portugal.

MOREIRA, R.J., et al., CARRAPATOSO, E., "Dynamically Adaptable Digital Library Service: a case study", *Conftele'2005 - 5th Conference on Telecommunications*, April 2005, Tomar, Portugal.

CANAS FERREIRA, J., SILVA, M.L., "Run-Time Reconfiguration Support for FPGAs with Embedded CPUs: The Hardware Layer", *19th IEEE International Parallel and Distributed Processing Symposium (IPDPS'05) – 12th Reconfigurable Architectures Workshop (RAW 2005)*, Denver, USA, April 2005.

COELHO, A.C., SOUSA, A.A., NUNES FERREIRA, F., "Modelling Urban Scenes for LBMS", *Web3D'05 - Web3D 2005 Symposium*, April 2005, Bangor, UK.

PINTO, A.A., PEREIRA RICARDO, M., "Multiple Video Channel Transmission using Secure IP Multicast", *Conftele'2005 - 5th Conference on Telecommunications*, April 2005, Tomar, Portugal.

PEREIRA RICARDO, M., RUELA, J., "Research Activities in 4G Networks at INESC Porto", *Conftele'2005 - 5th Conference on Telecommunications*, April 2005, Tomar, Portugal.

BOTELHO MAMEDE, J., CARRAPATOSO, E., PEREIRA RICARDO, M., "Progressive On-the-Fly Test Method", *IADIS'2005 - International Conference Applied Computing 2005*, February 2005, Algarve, Portugal.

R2.4.8 Other Publications

BESSA, M., COELHO, A.C., MOURA, J.P., NUNES FERREIRA, F., SOUSA, A.A., "Modelação Expedita de Ambientes Virtuais Urbanos para Utilização em Dispositivos Móveis", *EPCG13 - 13º Encontro Português de Computação Gráfica*, October 2005, Vila Real, Portugal.

MARTINS, S., ALVES, J.C., "Automatic RTL Code Generation for Custom Real-Time Image Processing Systems", *REC 2005 - Jornadas sobre Sistemas Reconfiguráveis*, February 2005, Faro, Portugal.

CANAS FERREIRA, J., SILVA, M.L., "Development of Applications with Run-Time Support for Dynamic Reconfiguration", *REC 2005 - Jornadas sobre Sistemas Reconfiguráveis*, February 2005, Faro, Portugal.

R2.5 LIST OF JOURNALS

Journal	Number of papers
IEE Electronic Letters	1
IEEE Transactions on Circuits and Systems for Video Technology	1
IEEE Transactions on Image Processing	1
IEEE Wireless Communications Magazine	1

Journal	Number of papers
International Journal of Radiation Oncology*Biology*Physics	1
Microwave and Optical Technology Letters	1
Neural Networks	1
Optics and Laser in Engineering	1
TOTAL	8

R2.6 LIST OF PATENTS

Arquitectura Auto-Reconfigurável Multi-Protocolo para Receptores Digitais de Comunicação
(Multi-standard self-reconfigurable architecture for digital communication receivers)
Developed under internal project
Demo Place: INESC Porto
Development Period: March 2003 – July 2003
Type: National
Submission Date: 8 of April 2005 (awarded)

R2.7 LIST OF PROTOTYPES

Enhanced distributed platform for universal access to multimedia content based on MPEG21
(enhanced content adaptation decision module, perceptual QoS monitoring service, MPEG21 database with upload and search modules)
Developed under Enthrone and Visnet
Demo Place: INESC Porto
Development Period: January – December 2005

Browser for MPEG21 digital items
Developed under Enthrone
Demo Place: INESC Porto
Development Period: January – December 2005

Speaker segmentation and tracking module
Developed under internal project
Demo Place: INESC Porto
Development Period: January – December 2005

Image segmentation tool based on depth information
Developed under internal project
Demo Place: INESC Porto
Development Period: January – December 2005

Image segmentation evaluation tool
Developed under VISNET
Demo Place: INESC Porto

Development Period: January - August 2005

<u>Demonstrator of automatic, adaptive and transparent acoustic equalization of a room</u>
Developed under TAICAS
Demo Place: INESC Porto
Development Period: January 2004 – December 2005

<u>Didactic demonstrator for the analysis of sounds</u>
Developed under internal project
Demo Place: INESC Porto / Visionarium (Europarque)
Development Period: January 2004 – December 2005

<u>Network testbed for 4G networks</u>
Developed under WANDER and VISNET
Demo Place: INESC Porto
Development Period: September 2004 – December 2005

<u>Quality of Service Abstraction Layer (QoS-AL) for heterogeneous access networks</u>
Developed under DAIDALOS
Demo Place: INESC Porto
Development Period: September 2004 – December 2005
<u>Passive traffic monitoring system (for verification of SLS conformance)</u>
Developed under DAIDALOS
Demo Place: INESC Porto
Development Period: September 2004 – December 2005

<u>Interconnection of ad-hoc and infrastructure networks</u>
Developed under DAIDALOS
Demo Place: INESC Porto
Development Period: September 2004 – December 2005

<u>Secure IP multicast (first version)</u>
Developed under contract with PTIN
Demo Place: INESC Porto
Development Period: April 2005 – December 2005

<u>NSIS (Next Steps in Signaling) implementation</u>
Developed under VISNET
Demo Place: INESC Porto
Development Period: April – December 2005

<u>Automatic and progressive protocol test generator</u>
Developed under internal project
Demo Place: INESC Porto

Development Period: January 2004 – September 2005

Ultra-fast demultiplexer for application in optical networks, based on a non-linear fiber optical ring
Developed under internal project
Demo Place: INESC Porto
Development Period: February - July 2005

Resonant cavity for measuring humidity in corks
Developed under internal project
Demo Place: INESC Porto
Development Period: February - July 2005

Dynamic dispersion compensator based on Bragg networks
Developed under internal project
Demo Place: INESC Porto
Development Period: February - July 2005

Optical switch based on wavelength conversion
Developed under internal project
Demo Place: INESC Porto
Development Period: February - July 2005

Bio-inspired Integrated Circuits
Developed under IAMA
Demo Place: INESC Porto
Development Period: April – September 2005

Embedded analogue and mixed-signal testing
Developed under ASSOCIATE
Demo Place: FEUP
Development Period: January 2004 – December 2005

A2.8 LIST OF THESES SUPERVISED BY MEMBERS OF THE UNIT DURING 2005

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Benjamim Fonseca	UTAD	E. Carrapatoso	INESC Porto/FEUP	The usage of distributed processing architectures in services of computer supported collaborative work	2005
Jorge Mamede	FEUP	E. Carrapatoso M. Ricardo	INESC Porto/FEUP	Automatic Generation of Tests for IP Systems	2005
José Manuel Cabral	UM	Joaquim Neves José Ruela	UM INESC Porto/FEUP	An architecture for adapting of low bit rate traffic for control applications	2005

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
José Oliveira	FEUP	E. Carrapatoso	INESC Porto/FEUP	Security aspects in telecommunications services	2005
Paulo Martins	UTAD	E. Carrapatoso	INESC Porto/FEUP	A model for distance learning in environments that support mobility	2005
Rosa Maria Romero Muniz	FEUP	H. Salgado Paulo Marques	INESC Porto/FEUP	Fibre Bragg Grating Structures: Applications in Optical Communications and Sensor Technology	2005
António Fernando Castro Coelho	FEUP	F. N. Ferreira A. A. Sousa	FEUP INESC Porto/FEUP	Fast Modeling of Three-dimensional Scenes for Virtual Reality	2006
Gaspar Rego	FEUP	H. Salgado José Luís Santos	INESC Porto/FEUP	Arc-Induced Long-Period Fibre Gratings. Fabrication and their Applications in Optical Communications and Sensing	2006
Jaime dos Santos Cardoso	FEUP	Luís Corte-Real	INESC Porto/FEUP	Image segmentation based on depth maps	2006
Luís Miguel Teixeira	FEUP	Artur P. Alves Luís Corte-Real	INESC Porto/FEUP	Statistical multiplexing of video coding	2006
Paula Viana	FEUP	Artur P. Alves	INESC Porto/FEUP	Digital Television Archives	2006
Teresa Andrade	FEUP	Artur P. Alves	INESC Porto/FEUP	Quality of service multiplexing and transmission of digital video	2006
Vítor Gonçalves	FEUP	E. Carrapatoso	INESC Porto/FEUP	Semantic Web in the educational context	2006
Catalin Calistru	FEUP	Gabriel David M. Cristina Ribeiro	INESC Porto/FEUP	Data organization and search in multimedia databases	2007
Luís Gustavo Martins	FEUP	Aníbal Ferreira	INESC Porto/FEUP	Analysis and recognition of audio oriented to music applications	2007
Pedro Miguel do Vale Moreira	FEUP	A. A. Sousa	INESC Porto/FEUP	Management and Visualization of Very Complex 3D Models and Scenes	2007
Alexandre Carvalho	FEUP	A. A. Sousa	INESC Porto/FEUP	Visualization of Spatiotemporal Database Systems	2008
Filipe Lameiro Abrantes	FEUP	Manuel Ricardo	INESC Porto/FEUP	Congestion control in 4G heterogeneous networks	2008
José Fernando Martins	FEUP	A. A. Sousa	INESC Porto/FEUP	3D Modeling in Augmented Reality Environments	2008
Luís Filipe Teixeira	FEUP	Luís Corte-Real Aníbal Ferreira	INESC Porto/FEUP	Automatic description of video based on multimodal analysis	2008
Miguel Magalhães Silva	FEUP	João C. Ferreira José Carlos Alves	INESC Porto/FEUP	Management of dynamically reconfigurable resources in CPU/FPGA systems	2008
Rui Campos	FEUP	Manuel Ricardo	INESC Porto/FEUP	Creation and composition of Ambient Networks	2008
Tânia Calçada	FEUP	Manuel Ricardo	INESC Porto/FEUP	Integration of ad-hoc with infrastructured networks	2008
António C. Martins	FEUP	E. Carrapatoso	INESC Porto/FEUP	Adaptive Hypermedia Systems	2009
António Pedro Fortuna Santos	FEUP	Manuel Ricardo	INESC Porto/FEUP	Mobility management architecture for 4G mobile communications networks	2009
Jaime Sousa Dias	FEUP	Manuel Ricardo	INESC Porto/FEUP	Security in Mobile IP Networks with Multicast Traffic	2009
Pedro Mota	FEUP	J. Machado Silva	INESC Porto/FEUP	In-circuit testing of adaptive RF front-end circuits	2009
Ricardo Sousa	FEUP	Aníbal Ferreira	INESC Porto/FEUP	Audio signal processing applied to speech rehabilitation	2009
1	2	3	4	5	6

1 – Name of the post-graduation student

2 – Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester

3 – Name of supervisor or supervisors

4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid

5 – Title of the thesis

6 – Predicted year of conclusion and delivery – will be taken in account in summary tables

MSc Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ana Barroso	FEUP	Teresa Restivo E. Carrapatoso	FEUP INESC Porto/FEUP	Dissemination of multidisciplinary projects in engineering	2005
António André Silva	FEUP	E. Carrapatoso	INESC Porto/FEUP	Web vision – surveillance and remote control	2005
António Castro	FEUP	E. Carrapatoso	INESC Porto/FEUP	The usage of multimedia technologies in the e-learning of programming languages	2005
António Pinto	FEUP	Manuel Ricardo	INESC Porto/FEUP	Secure IP multicast	2005
Armindo Dias	FEUP	E. Carrapatoso	INESC Porto/FEUP	Affective computing	2005
Eduardo Marques	FEUP	E. Carrapatoso	INESC Porto/FEUP	WebTV - Audio and video streaming with interactivity	2005
Jaime Sousa Dias	FEUP	Manuel Ricardo	INESC Porto/FEUP	Quality of Service in UMTS networks	2005
Joana Lessa	FEUP	Vasco Branco E. Carrapatoso	UA INESC Porto/FEUP	Human expressions and communication through interactive multimedia systems	2005
José Moreira	FEUP	E. Carrapatoso	INESC Porto/FEUP	Service oriented software architectures	2005
Vasco Santos	FEUP	Aníbal Ferreira	INESC Porto/FEUP	Quality Assessment of Manufactured Ceramic work using Digital Signal Processing techniques	2005
Vítor Marmelo	FEUP	E. Carrapatoso	INESC Porto/FEUP	Technologies for interactive educational environments	2005
Ana Afonso	FEUP	E. Carrapatoso	INESC Porto/FEUP	The Web as a learning method in technical courses in Computer Science	2006
Alberto Lírio	FEUP	E. Carrapatoso	INESC Porto/FEUP	Globalization of the associative relationship - model and implementation	2006
António Fonseca	FEUP	E. Carrapatoso	INESC Porto/FEUP	Usability in digital multimedia libraries	2006
António Gabriel Pinho	FEUP	José Machado Silva	INESC Porto/FEUP	Test methodologies and project for the testability of RF circuits	2006
António Pedro Fortuna Santos	FEUP	Manuel Ricardo	INESC Porto/FEUP	Robust Header Compression in 4G Networks	2006
Atilano Suarez	FEUP	E. Carrapatoso	INESC Porto/FEUP	Design of a multimedia virtual tour – a tool to support corporate communication	2006
Brígida Faria	FEUP	A. A. Sousa	INESC Porto/FEUP	Light Field for Image Based Rendering	2006
Carlos Pinho	FEUP	J. Ruela	INESC Porto/FEUP	Application of wireless sensor networks to intelligent games	2006
Daniel Ramos	FEUP	J. Ruela	INESC Porto/FEUP	Quality of Service in MPLS / DiffServ networks	2006
Francisco Duarte	FEUP	José Machado Silva José Carlos Alves	INESC Porto/FEUP	Dedicated processor for in-circuit test of A/D blocks in integrated microsystems	2006
Gil Coutinho	FEUP	José Ruela	INESC Porto/FEUP	Virtual private LAN services in metropolitan area networks	2006
Gustavo Carneiro	FEUP	Manuel Ricardo	INESC Porto/FEUP	QoS in heterogeneous networks	2006
Joana Gomes Rocha	FEUP	A. A. Sousa	INESC Porto/FEUP	Segmentation of Virtual Urban Environments for location-based Mobile Services	2006

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Joel Pedro Carvalho	FEUP	Henrique Salgado	INESC Porto/FEUP	Optical switching	2006
Júlio Pinto	FEUP	E. Carrapatoso	INESC Porto/FEUP	The interface of a multimedia content portal used in Engineering projects	2006
Luís Grifo	FEUP	Aníbal Ferreira	INESC Porto/FEUP	Audio driven cartoon production	2006
Luís Miguel Marques	FEUP	Luís Pinho José Ruela	ISEP INESC Porto/FEUP	Simulation of temporal behavior of routing protocols in PLC based networks	2006
M. Raquel Patrício	FEUP	E. Carrapatoso	INESC Porto/FEUP	Evaluation of the usability of a child's portal – a new interactive multimedia application	2006
Miguel Melo	FEUP	Paulo Marques H. Salgado	INESC Porto/FCUP INESC Porto/FEUP	Bragg gratings for applications in optical communications systems and sensors	2006
Mourylise Hamer	FEUP	E. Carrapatoso	INESC Porto/FEUP	Graphical interfaces in multimodal interaction systems	2006
Nelson Américo Eira	FEUP	Henrique Salgado A. Lobo	INESC Porto/FEUP UFP	Wavelength conversion in optical networks	2006
Olinda Figueiredo	FEUP	E. Carrapatoso	INESC Porto/FEUP	A distance learning system with a strong ludicrous component	2006
Paulo Almeida	FEUP	Manuel Ricardo	INESC Porto/FEUP	Mobile networks	2006
Paulo Jorge Monteiro	FEUP	E. Carrapatoso	INESC Porto/FEUP	Integration of Learning Objects in a Learning Management System	2006
Pedro Miguel Alves	FEUP	João C. Ferreira	INESC Porto/FEUP	Flexible programmable cores for SOC applications	2006
Pedro Miguel Silva	FEUP	José Carlos Alves	INESC Porto/FEUP	Synthesis of complex digital functions for DSP	2006
Pedro Vieira	FEUP	Luís Corte-Real	INESC Porto/FEUP	Scaleable video and interoperability in multimedia networks	2006
Rui F. Vaz	FEUP	José Ruela	INESC Porto/FEUP	Service Level Agreements In VoIP services	2006
Sérgio Martins	FEUP	José Carlos Alves	INESC Porto/FEUP	Automatic generation of RTL code for real-time image acquisition and processing systems	2006
Suzana Leitão	FEUP	Teresa Restivo E. Carrapatoso	FEUP INESC Porto/FEUP	Design and implementation of a remote laboratory	2006
Vera Moutinho de Almeida	FEUP	A. A. Sousa	INESC Porto/FEUP	Application of Information and Communication Technologies to a Museum Space	2006
Vítor Alves	FEUP	E. Carrapatoso	INESC Porto/FEUP	Teaching course in Visual and Technological Education for children with special educational needs	2006
Vítor Barbosa	FEUP	Henrique Salgado	INESC Porto/FEUP	EBG components for broadband communications systems	2006
Vítor Calçada	FEUP	Manuel Ricardo	INESC Porto/FEUP	Traffic characterization in a mobile operator	2006
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3 – Name of supervisor or supervisors
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5 – Title of the thesis
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R2.9 ORGANISATION OF INTERNATIONAL SCIENTIFIC EVENTS

CEIG'2005 – XV Congreso Español de Informática Gráfica
Granada, Spain
September 14-16, 2005
A. Augusto de Sousa - member of Program Committee

CONVR'2005 - 5th International Conference on Construction Applications of Virtual Reality
Durham, United Kingdom
September 12-13, 2005
A. Augusto de Sousa - member of Program Committee

WWI Ambient Networks - WP Meeting
Porto, Portugal
November 10-11, 2005
José Ruela, Manuel Ricardo, Rui Campos, Carlos Pinho - organisation

21st Annual ACM Symposium on Applied Computing – Document Engineering Track
Dijon, France
April 23-27, 2005
Luís Corte-Real – Member of Program Committee

DCIS 2004 – XX Conference on Design of Circuits and Integrated Systems
Lisbon, Portugal
November 23-25, 2005
José Silva Matos – Program Chair and member of Steering Committee

8th Euromicro Conference on Digital System Design (DSD) and
31st Euromicro Conference on Software Engineering and Advanced Applications (SEAA)
Porto, Portugal
August 31 – September 2, 2005
José Silva Matos – Organisation Chair
António Araújo, Hélio Mendonça, João Canas Ferreira, José Carlos Alves, José Machado da Silva, Vítor Grade Tavares – local organisation

R2.10 ADVANCED TRAINING

VISNET Short Course – Technologies for Networked Audiovisual Communications
University of Thessaloniki, Greece
September 29-30, 2005
José Ruela – Tutorial on "QoS for IP based networked multimedia applications"

R2.11 OTHER CONTRIBUTIONS TO THE OBJECTIVES OF ASSOCIATE LABORATORY

UNIT: UTM – TELECOMMUNICATIONS AND MULTIMEDIA	Thematic Line
Consolidation of research work in "wireless and mobile communications in 4G networks" and in "advanced services for universal access to multimedia content", aligned with two important thematic areas of the 6th Framework Programme (6FP) of the EC - *Mobile and wireless systems beyond 3G* and *Networked audiovisual systems and home platforms*. These activities were mainly carried out in the framework of research projects funded by 6FP and national programmes, were supported by on-going and newly started PhD and MSC theses in related topics, and gave rise to a number of prototypes and demonstrators.	Support technologies for networked audiovisual applications
Launching of a new research area in "Fiber Supported Microwave/Radio Systems" supported by a Photonics and Microwave laboratory setup during 2005.	
Continuation of research activities in audio, image and video processing, with a focus on segmentation techniques.	
Setup of new R&D contracts (with PTIN), covering consultancy, development and advanced training activities.	

R2.12 AWARDS, RECOGNITIONS

Blank.

R2.13 ANALYSIS AND ASSESSMENT OF DEVIATIONS RELATIVE TO FORMER PLANNING

R2.13.1 Comparison with strategic actions or policy lines defined in the plan of the previous year

The activity of the Unit in 2005 was carried out according to the plan, without any significant deviations. The main performance indices (projects, publications, theses, expected scientific results) were achieved or even overtaken, thus putting in evidence a clear progress in relation to previous years.

European projects continue to play an important role in reaching a high level of scientific excellence and gaining expertise in advanced and emerging technologies as well as in establishing strategic partnerships. They provide a very rich environment for training young researchers, in particular in association with MSc and PhD programmes, leading to an increase in the critical mass of the research teams.

Three Integrated Projects (Daidalos, Ambient Networks and Enthrone) and one Network of Excellence (Visnet) of the 6th Framework Programme (6FP) of the EC were due to complete their first phase by the end of 2005 (or beginning of 2006). Submission and approval of proposals for a second phase of these projects was essential to continue this strategy and thus required a considerable effort put by the Unit towards this goal, as planned. The continuation of all these projects was approved. In parallel, the Unit participated in the preparation of some new proposals, two of which succeeded. Overall, this means that this important line of activity has been strengthened and is guaranteed for the next two years.

A new research area in "Fiber Supported Microwave/Radio Systems" has been launched, as planned, and is supported by a Photonics and Microwave laboratory setup during 2005, funded by FCT under "Programa Nacional de Re-equipamento Científico".

Researchers of the Unit continued active in promoting the National Thematic Network in the area of Mobile Communications, contributing with technical presentations in scientific meetings organized by the network.

Regular open meetings, organized at the Unit or Area level, continued to take place and were mainly used to present results of on-going research projects, MSc and PhD theses, or results being published in journals or conferences, as well as to discuss scientific issues that cross different areas and thus require the active participation of different research groups.

Finally three new R&D contracts were signed with PT Inovação in the areas of consultancy, development and advanced training. This re-opened a line of work that had been interrupted for some time and that will be extended to other national partners (industry, network and service providers, broadcasters, etc.).

R2.13.2 Cases of success, problems met, internal and external conditioning factors

The cases of success were already pointed out in the previous section. At a global level the scientific results were rather positive, as proven by various performance indices.

The four research projects of the 6th Framework Programme of the EC that were scheduled to conclude in 2005 (Daidalos, Ambient Networks, Enthrone and Visnet) completed (or almost completed) their activities with success. The INESC Porto teams that participated in these projects made important contributions at various levels – specification, development, integration and test of prototype systems and demonstrators, technical reports, deliverables and scientific papers.

All these projects submitted new proposals for their continuation on a second phase, and these included contributions from INESC Porto. The strength of the consortia and the quality of the proposals (that built on existing results of the first phase) were certainly the mains reason for their approval.

The participation and results achieved in National and European research projects constitute the major cases of success, to which it is possible to add the partnership with PT Inovação in three new R&D contracts and the strengthening of research activities in optical communications and microwaves.

The main problems met by the Unit lie in the difficulties in establishing stable partnerships and R&D contracts with the industry and operators, either for consulting, development or technology transfer. This is mainly due to external factors rather than to the lack of expertise or know-how within the Unit.

R3. UNIT: UOSE – OPTOELECTRONICS AND ELECTRONIC SYSTEMS

R3.1 SHORT DESCRIPTION OF THE UNIT

The Unit develops its activity in the areas of Optoelectronics and Electronic Systems Integration, mainly in the domain of optical fiber technology. The Electronics section is essentially oriented towards the process of technology transfer to industrial portuguese companies, the integration of optoelectronic systems. The scientific research made by the Unit is directed to the research in the domain of Optoelectronics, particularly the applied research in optical fiber sources, optical communications, optical fiber sensors and microfabrication (thin films and integrated optics). In the framework of its activity it proportionates the adequated environment to the integration of post-graduate students, mainly coming from the Physics Department of the Sciences Faculty of the University of Porto and the Electrotechnical and Computer Engineering Department of the Engineering Faculty of the same University. Throughout the years, R&D collaborations have been made with prestigious institutions, national and international (Universities, Institutes or companies), very often within the framework of R&D joint projects. Nowadays, the Unit priorities are: strengthen its competences in its areas of activity, through crossed fertilization actions among them beginning with a careful and adequated selection of R&D projects to be submitted, as well as institutional links with other organizations, to develop actions in order to maintain a minimum number of PhD researchers able to frame all the Unit R&D activity, to define the process of equipment renewal of the Unit with the goal of keeping a modern laboratory in optoelectronic technologies.

The main vectors of the Unit activity development are presented:

- Research, development and technology transfer in the area of the optical fiber sensors;
- Development and technology transfer in systems integration;
- Research in sol-gel technology;
- Research in optical filtering using fused coupler technology, Bragg gratings and long-period gratings;
- Research in the techniques of PZT films deposition in optical fibres;
- Research in optical coherent tomography for medical applications;
- Research and development in multi-axis optical fiber accelerometer.

R3.2 ACTIVITIES DEVELOPED IN 2005

R3.2.1 National programmes

During 2005, the Unit was involved in ten R&D projects. Three of these projects dealt with microfabrication issues, five were concerned with optical fibre sensors principles and applications, one is the re-equipment program of the technological infrastructure and the other one is a first step in the area of micro-packaging of optical devices. Microfabrication projects developed fundamental technology for sensors and communications devices in optical fiber and integrated optics that will enable further developments in these areas. Namely, add-drop multiplexers for optical communications, piezoelectric films in optical fibers for sensing and actuation and other novel devices were developed. The sensors projects were dedicated to applications in acoustic emission detection by optical fibers, fluorescence sensors for chemical species detection and structural health monitoring in civil engineering. The Optopack project is oriented towards know-how acquisition in micropackaging technology for optical fiber devices.

R3.2.2 European programmes

The Unit took part in four European projects during 2005. One of the projects ended this year, PLATON, and it was dedicated to integrated optics devices fabrication. URANUS is concerned with ultrafast technology for multicolor high power systems and the Unit participation is related to advanced optical fiber Bragg gratings fabrication and characterization. Another project, FIDELIO, intends to develop the next generation of lidar onboard detection systems for aeronautics and the Unit works in fundamental issues of nonlinear optics. SOLTECH is a Marie Curie fellowship and it has not been possible to find the adequate candidate for the job.

R3.2.3 Other programmes, consulting, services

The Unit continued the contract with Fibersensing in the framework of its incubation at INESC Porto premises. Several sensing heads for geotechnical and civil engineering applications were developed and tested as well as a range of interrogation units, both laboratory and portable, were designed and characterized. Previous collaboration with the Optical Research Center of Tampere University opened up the opportunity to develop and build a novel Bragg grating writing system.

R3.3 SUMMARY OF RESULTS OF THE RESEARCH ACTIVITIES OF THE TEAM MEMBERS

- **Projects**

Summary of projects developed in 2005

Type of Activity (1)	No. Projects (2)			Total Income (€)
	N	E	I	
R - Research	10	3		249.679
D - Development				
C - Consulting				
A – Advanced training		1		86.000
T – Technology Transfer	3	1		223.182
O - Other				
TOTAL	13	5		558.861

Summary of relative distribution of sources of income

Financing (3)	Status (4)			Total Income (€)
	S - Started	OG– On-going	C - Concluded	
NP – National Programmes	12,71%	6,43%	7,53%	149.019
EP – European Programmes		30,53%	9,30%	222.600
CS – Consulting and Services	7,56%		25,95%	187.242
O – Other R&D sources				
OS – Other Sources				
Total	20,26%	36,96%	42,78%	558.861

Summary of projects developed in 2005

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ.		Starting date	Conclusion (prediction)	Status (4)
				Type (3)	Prog.			
SOLTECH	P. Marques	A	E	EP	5PQ	01-2002	06-2006	OG
PLATON	P. Marques	R	E	EP	5PQ	09-2002	05-2005	F
WDM	P. Marques	R	N	NP	FCT	09-2002	04-2005	F
LASER	P. Marques	R	N	NP	FCT	06-2003	12-2005	F
ACÚSTICA	J. L. Santos	R	N	NP	FCT	09-2003	08-2005	F
FLU	J. L. Santos	R	N	NP	FCT	09-2003	12-2005	F
PONTE VF	J. L. Santos	T	N	CS	PS	12-2003	12-2005	F
PIEZO	E. Joanni	R	N	NP	FCT	01-2004	12-2005	F
FIBERSENSING	J. L. Santos	T	N	CS	PS	03-2004	02-2005	F
URANUS	F. Araújo	R	E	EP	5PQ	07-2004	07-2007	OG
CORDVISION	I. Dias	T	N	NP	IDEIA	09-2004	08-2006	OG
FIDELIO	M. J. Marques	R	E	EP	5PQ	12-2004	12-2007	OG
NODA	J. L. Santos	R	N	NP	FCT	01-2005	12-2006	S
CUTINSHEAR	F. Araújo	R	N	NP	FCT	03-2005	02-2007	S

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
EVANESCENTE	J. L. Santos	R	N	NP	FCT	05-2005	04-2008	S
OPTOPACK	F. Araújo	R	N	NP	FCT	05-2005	04-2007	S
KAISER	L. A. Ferreira	R	N	NP	FCT	09-2005	08-2008	S
WORKSTATION	F. Araújo	T	E	CS	PS	09-2005	12-2006	S

(1) Type of Project: R – Research; D – Development; C – Consulting; A – Advanced Training; T – Technology Transfer; O - Other

(2) Degree of internationalization: N - National; E - European; I - International *(Select one)*

(3) Source of financing: NP – National Programmes; EP – European Programmes; CS – Consulting and services; O – Other R&D financing sources; OS – Other sources

(4) Status: S – Starting: activities initiated in 2005 and continuing in 2006; OG - On-going: activities started earlier than 2005 and continuing in 2006; F – Finished: activities ending in 2005.

- **Summary of publications**

Summary of publications in 2005

Type of publication	Number
Theses concluded in 2005 by members of the unit	4
Books (author)	
Chapter/paper in books	
Publications (editor)	
Papers in International Journals with scientific referees	30
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	51
Other publications (National meetings, local journals, etc.)	
Total	85

- **Summary of post-graduation activities**

Summary of theses supervised by members of the unit in 2005

Type	Starting	On-going	Concluded	Total
Master		2		2
Doctoral	1	8	3	12
Total	1	10	3	14

- **Summary of Advanced Training Actions**

Summary of Advanced Training Actions organized for external trainees in 2005

Type	Number
Training for graduation students *(estágios curriculares)*	
Training for others *(estágios extra-curriculares)*	

Type	Number
Professional training actions *(estágios profissionais)*	2
Other actions	
Total	2

- **Summary of activities of cooperation or dissemination**

Summary of items

Type	Number
Organizing conferences or meetings	1
Colaboration in papers authored by INESC Porto researchers	48
External persons directly involved in actions organized by INESC Porto	42

- **Human resources in 2005**

Summary of Unit personel at the end of 2005

Type	Education				Total	Variation (*)
	PhD.	MSc.	BSc.	Other		
R&D						
University or Politechnic Lecturers	11	4			15	+1
Grantees INESC Porto			1		1	-6
Other Grantees	2	5	1		8	-1
Contracted	1		2	1	4	-2
Trainees						-2
Other						0
Administrative				1	1	0
Total	14	9	4	2	29	-10

(*)   Relative to 2004, in absolute numbers.

R3.4 LIST OF PUBLICATIONS

R3.4.1 Theses concluded in 2005 by members of the unit

GOMES, L.A., "Optical Fibre Lasers", PhD Thesis, FCUP, December 2005.

ROSA, C.S., "Low-coherence interferometry", PhD Thesis, FCUP, July 2005.

MUÑIZ, R., "Fibre Bragg Grating Structures: Applications in Optical Communications and Sensor Technology", PhD Thesis, FEUP, March 2005.

FERNANDES, J.R., "Micro-Actuadores Piezoeléctricos", PhD Thesis, FCUP, January 2005.

R3.4.2 Books (Author)

Blank.

R3.4.3 Chapter/paper in Books

Blank.

R3.4.4 Publications (Editor)

Blank.

R3.4.5 International Journals with scientific referees

IVANOV, O., "Fabrication of long-period fiber gratings by twisting a standard single-mode fiber", OPTICS LETTERS, December 2005, vol.30, no.24, p.3290-3292.

ROSA, C.S., ROGERS, J., GH. PODOLEANU, A., "Fast scanning transmissive delay line for optical coherence tomography", OPTICS LETTERS, December 2005, vol.30, no.24, p.3263-3265.

MARDARE, A.I., MARDARE, C.C., FERNANDES, J.R.A., GOMES MOREIRA, J.A., MARQUES, M.J.B., "Bottom electrode crystallization of Pb(Zr, Ti)O3 thin films made by RF magnetron sputtering", Journal of Physics: Condensed Matter, November 2005, vol.17, no.46, p.7263-7273.

FRAZÃO, O., FALATE, R., BAPTISTA, J.M., L. FABRIS, J., SANTOS, J.L., "Optical bend sensor based on a long-period fiber grating monitored by an OTDR", Optical Engineering, November 2005, vol.44, no.11.

FRAZÃO, O.J.D.R., CARVALHO, J.P.P.D., FERREIRA, L.A.D.A., ARAÚJO, F.M.M., SANTOS, J.L.C.D.O., "Discrimination of strain and temperature using Bragg gratings in microstructured and standard optical fibres", Journal of Measurement Science and Technology, October 2005, vol.16, p.2109-2113.

REGO, G.M.D., SANTOS, J.L.C.D.O., SALGADO, H.M.D.C.F., et al. , "Effect of ionizing radiation on the properties of arc-induced long-period fiber gratings", APPLIED OPTICS , October 2005, vol.44, no.29, p.6258-6263.

FRAZÃO, O.J.D.R., BAPTISTA, J.M.R.T., et al. , "Simultaneous measurement of pressure and temperature using single mode optical fibres embedded in a hybrid composite laminated", Composites Science and Technology, September 2005, vol.65, no.11, p.1756-1760.

REGO, G.M.D., FALATE, R., SANTOS, J.L.C.D.O., SALGADO, H.M.D.C.F., et al. , "Arc-induced long-period gratings in aluminosilicate glass fibers", OPTICS LETTERS, August 2005, vol.30, no.16, p.2065-2067.

FRAZÃO, O.J.D.R., FERREIRA, L.A.D.A., ARAÚJO, F.M.M., SANTOS, J.L.C.D.O., "Simultaneous measurement of strain and temperature using Bragg gratings in a twisted configuration", Journal of Optics A: Pure and Applied Optics, August 2005, vol.7, no.8, p.427-430.

PEREIRA PINTO, N.M., FRAZÃO, O.J.D.R., BAPTISTA, J.M.R.T., SANTOS, J.L.C.D.O., "Transversal load measurement based on twisted optical fibres", Review of Scientific Instruments, August 2005, vol.76, no.8.

SOPPERA, O.A., MOREIRA, P.J.B., MARQUES, P.V.D.S., et al. , "Low-loss photopatternable hybrid sol-gel materials", Journal of Sol-Gel Science and Technology, July 2005, vol.35, no.1, p.27-39.

MARDARE, C.C., JOANNI, E., MARDARE, A.I., et al. , "The performance of Zr as barrier layer for Pt bottom electrodes in Pb(Zr,Ti)O-3 thin film capacitors", Thin Solid Films, July 2005, vol.483, no.1, p.21-26.

MUNIZ, R.M.R., FRAZÃO, O.J.D.R., PEREIRA, D.C.A., SALGADO, H.M.D.C.F., et al., "Intensity-referenced and temperature-independent curvature sensing concept based on chirped fibre bragg gratings", APPLIED OPTICS, June 2005, vol.44, no.18, p.3821-3826.

REGO, G., MARQUES, P., SANTOS, J.L., SALGADO, H., "Arc-induced long-period gratings", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.245-259.

FRAZÃO, O.J.D.R., FERREIRA, L.A.D.A., ARAÚJO, F.M.M., SANTOS, J.L.C.D.O., "Applications of fiber optic grating technology to multi-parameter measurement ", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.227-244.

JORGE, P.A.D.S., CALDAS, P.S.D.A., ROSA, C.S.S.C., SANTOS, J.L.C.D.O., et al., "Luminescence-based optical fiber chemical sensors ", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.201-225.

CARVALHO, J.P.P.D., MUNIZ, R.M.R., MELO, M.A.R.D., GOMES, L.A.D.A.O., et al., "Optical fiber communications: Recent contributions in photonic device technology ", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.371-394.

LOBO RIBEIRO, A., SANTOS, J.L.C.D.O., BAPTISTA, J.M.R.T., FERREIRA, L.A.D.A., et al., "Optical fiber sensor technology in Portugal ", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.171-199.

MARQUES, P.V.D.S., MOREIRA, P.J.B., ALEXANDRE, D.M.L., MELO, M.A.R.D., et al., "Photosensitive materials for integrated optic applications ", FIBER AND INTEGRATED OPTICS, May 2005, vol.24, no.3, p.149-169.

FRAZÃO, O.J.D.R., MUNIZ, R.M.R., ARAÚJO, F.M.M., FERREIRA, L.A.D.A., SANTOS, J.L.C.D.O., "Strain-temperature discrimination using a step spectrum profile fibre Bragg grating arrangement", SENSORS AND ACTUATORS A-PHYSICAL, May 2005, vol.120, no.2, p.490-493.

PEREIRA, D.C.A., FRAZÃO, O.J.D.R., FERREIRA, J.M.C., DIAS, I.M.S., SANTOS, J.L.C.D.O., "Tecnologías ópticas avanzadas para monitorear estuarios y ambientes costeros" [Advanced Optical Technologies for Monitoring Estuaries and Coastal Environments], Journal Ciencias Marinas, May 2005, vol.31, no.1, p.275-284.

FRAZÃO, O.J.D.R., MELO, M.A.R.D., MARQUES, P.V.D.S., SANTOS, J.L.C.D.O., "Chirped Bragg Grating Fabricated in fused fibre taper for strain-temperature discrimination", Journal of Measurement Science and Technology, April 2005, vol.16, p.984-988.

MARDARE, C.C., JOANNI, E., MARDARE, A.I., et al. , "Effects of adhesion layer (Ti or Zr) and Pt deposition temperature on the properties of PZT thin films deposited by RF magnetron sputtering" [243 (1-4): 113-124 APR 30 2005], APPLIED SURFACE SCIENCE , April 2005, vol.243, no.1, p.113-124.

ALLSOP, T., FLOREANI, F., JEDRZEJEWSKI, K., MARQUES, P., MUÑIZ, R., WEBB, D., BENNION, I."Refractive index sensing with long-period grating fabricated in iconical tapered fibre", ELECTRONICS LETTERS, April 2005, vol.41, no.8, p.471-472.

MARDARE, C.C., JOANNI, E., MARDARE, A.I., "Bottom electrode crystallization of PZT thin films for ferroelectric capacitors", Journal of European Ceramic Society, February 2005, vol.25, no.5, p.735-741.

MOREIRA, P.J.B., MARQUES, P.V.D.S., LEITE, A.M.P.P., "Hybrid sol-gel channel waveguide patterning using photoinitiator-free materials", Photonics Technology Letters, February 2005, vol.17, no.2, p.399-401.

REGO, G.M.D., MARQUES, P.V.D.S., SALGADO, H.M.D.C.F., SANTOS, J.L.C.D.O., "Simultaneous measurement of temperature and strain based on arc-induced long-period fibre gratings", ELECTRONICS LETTERS, January 2005, vol.41, no.2, p.60-62.

ROSA, C.S., SHIDLOVSKI, V., A. ROGERS, J., B. ROSEN, R., G. PODOLEANU, A., "Broadband SLD based source for retina investigations", Coherence domain optical methods and optical tomography in biomedicine IX 2005, p.540-547.

MOLINA, C., MOREIRA, P., R. GONÇALVES, R., A. S. FERREIRA, R., MESSADDEQ, Y., J. L. RIBEIRO, S., SOPPERA, O., P. LEITE, A., MARQUES, P., D. BERMUDEZ, V., D. CARLOS, L., "Planar and UV written channel optical waveguides prepared with siloxane poly(oxyethylene)-zirconia organic-inorganic hybrids. Structure and optical properties", Journal of Materials Chemistry 2005, vol.15, no.35, p.3937-3945.

ROSA, C.S., GH. PODOLEANU, A., "Signal to noise ratio in balanced OCT under wide band illumination", Coherence domain optical methods and optical tomography in biomedicine IX 2005, p.365-371.

R3.4.6 National Journals with scientific referees

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R3.4.7 Conference Proceedings with scientific referees

BAPTISTA, J.M.R.T., SANTOS, S.F., REGO, G.M.D., FRAZÃO, O.J.D.R., SANTOS, J.L.C.D.O., "Measurement of angular rotation using a long period fiber grating in a self-referenced fiber optic intensity sensor", LEOS 05 - LEOS 2005, October 2005, Sydney, Australia.

A. RAMOS, C., FRAZÃO, O.J.D.R., DIAS, I.M.S., TORRES MARQUES, A., "Behaviour of composite laminated with optical fibre sensor during the cure process", III IMS - III International Materials Symposium, March 2005, Aveiro, Portugal.

F. O. SILVA, S., FRAZÃO, O.J.D.R., SANTOS, J.L.C.D.O., "IN SITU CURE MONITORING OF COMPOSITE LAMINATED USING FIBRE BRAGG GRATING SENSORS", III IMS - III International Materials Symposium, March 2005, Aveiro, Portugal.

ROSA, C.S., SHIDLOVSKI, V., A. ROGERS, J., B. ROSEN, R., G. PODOLEANU, A., "Broadband SLD based source for retina investigations", Photonics West 2005 / BIOS 2005 2005, San Jose, USA.

MARQUES, P.V.D.S., MOREIRA, P.J.B., MELO, M.A.R.D., MUENZNER, R., LEITE, A.M.P.P., "Fabrication of Waveguides Containing Bragg Gratings by Laser Direct Writing Through a Single Exposure Step", ECIO05 - 2th European Conference on Integrated Optics and Technical 2005, Grenoble, France.

ROSA, C.S., A. ROGERS, J., GH. PODOLEANU, A., "Fast Scanning transmissive delay line for multi-scan optical coherence tomography", ECBO - European Conference on Biomedical Optics 2005, Munich, Germany.

JORGE, P.A.D.S., CALDAS, P.S.D.A., SANTOS, J.L.C.D.O., et al., "Intensity based luminescent optical fiber oxygen sensor using quantum dots", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

MIGUEL DIAS, J., VAZ, N., NOLASCO, R., SANTOS, J.L., TEIXEIRA, M., FRAZÃO, O., SOARES, A., FORTES LOPES, J., SANTOS, F., "Monitorização de sistemas costeiros: desenvolvimento e aplicação de tecnologias inovadoras", III Congresso sobre planejamento e gestão da zona costeira dos países de expressão portuguesa 2005, Maputo, Moçambique.

DA SILVA, J.C.E., MACHADO, A.F., PINHEIRO, P.B., JORGE, P.A.D.S., et al., "Optical fiber pH Sensors Based on Carboxynaphtho-fluorescein and Ru(dpp)3 Immobilized in sol-gel matrices", MAF9 - 9th International Conference on Methods and Applications of Fluorescence Spectroscopy – MAF9 2005, Lisboa, Portugal.

DA SILVA, J.C.E., PINHEIRO, P.B., JORGE, P.A.D.S., CALDAS, P.S.D.A., SANTOS, J.L.C.D.O., "Polypyridyl complexes of Osmium(II) as Sensors for Near Infrared fiber Optic pH Probes", MAF9 - 9th International Conference on Methods and Applications of Fluorescence Spectroscopy – MAF9 2005, Lisboa, Portugal.

JORGE, P.A.D.S., CALDAS, P.S.D.A., SANTOS, J.L.C.D.O., et al., "Self-referenced intensity based optical fibre temperature probes for luminescent chemical sensors using quantum dots", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

FRAZÃO, O., MELO, M., MUÑIZ, R., MARQUES, P., ARAÚJO, F., FERREIRA, L.A., SANTOS, J.L., "Short-in-fibre Bragg grating structure for simultaneous measurement of strain and temperature", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

ROSA, C.S., GH. PODOLEANU, A., "Signal to noise ratio in balanced OCT under wide band illlumination", Photonics West 2005 / BIOS 2005 2005, San Jose, USA.

REGO, G.M.D., MARQUES, P.V.D.S., SALGADO, H.M.D.C.F., SANTOS, J.L.C.D.O., et al. , "Simultaneous Temperature and Strain Measurement based on Arc-Induced Long-Period Fiber Gratings", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

FRAZÃO, O., PEREIRA, D., SANTOS, J.L., ARAÚJO, F., FERREIRA, L.A., "Strain and temperature discrimination using a Hi-Bi grating exposed to partially etched cladding", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

REGO, G.M.D., MARQUES, P.V.D.S., et al. , "Stress Profiling of Arc-Induced Long-Period Gratings Written in Pure-Silica-Core Fibers", OFS17 - Optical Fibre Sensors 17th 2005, Bruges, Belgium.

F. O. SILVA, S., FRAZÃO, O.J.D.R., B. ALMEIDA, J., SANTOS, J.L.C.D.O., BRAGA VALENTE DE ALMEIDA RESTIVO, M.T., "MONITORIZAÇÃO DO PROCESSO DE FABRICO DE PLACAS COMPÓSITAS USANDO SENSORES DE BRAGG EM FIBRA ÓPTICA", APAET 6 - 6º congresso da APAET, August 2005, Ponta Delgada, Portugal.

VIEIRA, A., FRAZÃO, O.J.D.R., ARAÚJO, F.M.M., DE OLIVEIRA SIMÕES, J.A., "Monitorização de integridade mecânica e funcional in vivo de implantes ortopédicos", Biomecânica 1 - Encontro, 1, Biomecânica, April 2005, Abrantes, Portugal.

MARDARE, A.I., MARDARE, C.C., FERNANDES, J.R.A., "Bottom Electrode Crystallization Method: Thin Film Properties Uniformity", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

MOREIRA, P.J.B., MARQUES, P.V.D.S., LEITE, A.M.P.P., "Dispositivos ópticos integrados em tecnologia SOL-GEL híbrido", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

FRAZÃO, O.J.D.R., CARVALHO, J.P.P.D., SALGADO, H.M.D.C.F., SANTOS, J.L.C.D.O., et al. , "Fibras ópticas microestruturadas e suas aplicações em sensores e telecomunicações", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

REGO, G.M.D., MELO, M.A.R.D., MARQUES, P.V.D.S., SANTOS, J.L.C.D.O., SALGADO, H.M.D.C.F., "Fibre Gratings for Sensing and Communications", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

MARDARE, C.C., MARDARE, A.I., FERNANDES, J.R.A., "Lanthanum Nickel Oxide Thin Films: Fabrication and Characterization", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

SAVU, R., JOANNI, E., " Laser ablated ITO thin films and their electrical behavior", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

GOMES, L.A.D.A.O., GUENNADIEVICH OKHOTNIKOV, O., MARQUES, M.J.B., " Lasers mode locked com SESAM'S em fibra dopada com Itérbio", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

ROSA, C.S.S.C., A. ROGERS, J., GH. PODOLEANU, A., " Linha de atraso rápida e transmissiva para tomografia de coerência óptica", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

FRAZÃO, O.J.D.R., SANTOS, J.L.C.D.O., ARAÚJO, F.M.M., FERREIRA, L.A.D.A., " REDES DE BRAGG EM FIBRA ÓPTICA E SUAS APLICAÇÕES COMO ELEMENTOS SENSORES EM COMUNICAÇÕES ÓPTICAS", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

BAPTISTA, J.M.R.T., SANTOS, S.F., FRAZÃO, O.J.D.R., SANTOS, J.L.C.D.O., " Self-Referenced Fibre Optic Intensity Sensors", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

CARVALHO, J.P.P.D., FRAZÃO, O.J.D.R., MUNIZ, R.M.R., MARQUES, M.J.B., "All-optical switching in a Bragg grating structure using a high power laser diode", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

REGO, G.M.D., MARQUES, P.V.D.S., SANTOS, J.L.C.D.O., SALGADO, H.M.D.C.F., "Arc-Induced Gratings", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

MARDARE, A.I., MARDARE, C.C., FERNANDES, J.R.A., "Bottom Electrode Crystallization Method: Thin Film Properties Uniformity", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

F. O. SILVA, S., FRAZÃO, O.J.D.R., FERREIRA, L.A.D.A., ARAÚJO, F.M.M., SANTOS, J.L.C.D.O., "Bragg Grating in Twisted Configuration for Multi-Parameters Measurement", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

IVANOV, O., "Cladding modes of optical fibers: properties and applications", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

MOREIRA, P.J.B., MARQUES, P.V.D.S., LEITE, A.M.P.P., "Dispositivo ópticos integrados em tecnologia SOL-GEL híbrido " [Hybrid sol-gel technology integrated optical devices], Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

MARDARE, C.C., JOANNI, E., MARDARE, A.I., SAVU, R., "Effect of deposition and processing conditions for LaNiO3 bottom electrodes on the properties of Pb(Zr,Ti)O3 thin film capacitors made by RF magnetron sputtering", MAT2005 - Materiais 2005 2005, Aveiro, Portugal.

MELO, M.A.R.D., MARQUES, P.V.D.S., "Fabrication of apodized, chirped and sampled Bragg Gratings by phase mask dithering/moving techniques", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

MARDARE, A.I., JOANNI, E., MARDARE, C.C., SAVU, R., "Ferroelectric properties of Pb(Zr,Ti)O3 thin film capacitors made by RF magnetron sputtering and heat-treated by the bottom electrode crystallization method", MAT2005 - Materiais 2005 2005, Aveiro, Portugal.

REGO, G.M.D., SALGADO, H.M.D.C.F., SANTOS, J.L.C.D.O., "Interrogation of a Fiber Bragg Grating using a Mechanically Induced Long-Period Fiber Grating", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

JORGE, P.A.D.S., CALDAS, P.S.D.A., SANTOS, J.L.C.D.O., et al. , "Luminescence Oxygen sensors with unique spectral signature for multiplexing applications", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

SAVU, R., JOANNI, E., "Microstructure and electrical resistance of porous nanocrystalline ITO thin films deposited by laser ablation", MAT2005 - Materiais 2005 2005, Aveiro, Portugal.

DE OLIVEIRA, R., A. RAMOS, C., FRAZÃO, O., T. MARQUES, A., "Monitorização da integridade de estruturas compósitas com sensores de fibra óptica", APAET 6 - 6º congresso da APAET 2005, Ponta Delgada, Portugal.

PATRÍCIO, S., TEDIM, J., FONSECA, J., MENDONÇA, S., MARQUES, M.J., MOURA, C., APELIDO, C.F., "Non-linear optical properties of polymeric films based on transition metal complexes", VI Conferência de Química Inorgânica 2005, Funchal, Portugal.

FERNANDES, J.R.A., JOANNI, E., SAVU, R., "Optimization of fabrication parameters for piezoelectric thin film actuators made by physical deposition methods", MAT2005 - Materiais 2005 2005, Aveiro, Portugal.

FRAZÃO, O.J.D.R., REGO, G.M.D., SANTOS, J.L.C.D.O., et al., "Phase-Shifted Long-Period Fiber Gratings based on Electric-Arc Discharges", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

DIAS, I.M.S., PEREIRA, D.C.A., FERREIRA, J.M.C., FRAZÃO, O.J.D.R., et al., "Remote monitoring of Ria de Aveiro with optical fiber Bragg gratings and wireless technologies", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

JORGE, P., CALDAS, P., ROSA, C.S., G. OLIVA, A., SANTOS, J.L., "Sensores de oxigénio em fibra óptica para aplicações RMN in vivo", FiTS - Conferência Física, Tecnologia e Saúde 2005, Lisboa, Portugal.

JORGE, P.A.D.S., CALDAS, P.S.D.A., ROSA, C.S.S.C., DA SILVA, J.C.E., et al., "Sensores Luminescentes em Fibra Óptica para Análises Bioquimicas", Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

JORGE, P.A.D.S., CALDAS, P.S.D.A., ROSA, C.S.S.C., SANTOS, J.L.C.D.O., et al., "Sensores luminescentes em fibra óptica para determinação de grandezas bioquímicas" [Optical fibre luminescent sensors for evaluation of biochemical mensurands], Física 2005 - Física 2005 - Física para o Século XXI 2005, Porto, Portugal.

TAVARES, P.B., MARDARE, C.C., JOANNI, E., SAVU, R., "Synthesis of BiFeO3 Ceramic Targets and Thin Film Deposition by Laser Ablation", MAT2005 - Materiais 2005 2005, Aveiro, Portugal.

CARVALHO, J.P.P.D., FRAZÃO, O.J.D.R., MUNIZ, R.M.R., MARQUES, M.J.B., SALGADO, H.M.D.C.F., "Técnicas e arquitecturas de comutação totalmente óptica em redes de multiplexagem densa por comprimento de onda" [Techniques and architectures of all-optical switching in dense wavelength division multiplexing], JETC'05 - Terceiras Jornadas de Engenharia de Electrónica e Telecomunicações e de Computadores 2005, Lisboa, Portugal.

FRAZÃO, O.J.D.R., BAPTISTA, J.M.R.T., et al., "Transversal strain measurement using a microbend fibre optic sensor referenced by Brillouin effect", SEON 2005 - III Symposium On Enabling Optical Network 2005, Aveiro, Portugal.

R3.4.8 Other Publications

Blank.

R3.5 LIST OF JOURNALS

Journal	Number of papers
Applied Optics	2
Applied Surface Science	1
Coherence domain optical methods and optical tomography in biomedicine IX	2
Composites Science and Technology	1
Electronics Letters	2
Fiber and Integrated Optics	6
Journal Ciencias Marinas	1
Journal of European Ceramic Society	1
Journal of Materials Chemistry	1
Journal of Measurement Science and Technology	2
Journal of Optics A: Pure and Applied Optics	1
Journal of Physics: Condensed Matter	1
Journal of Sol-Gel Science and Technology	1
Optical Engineering	1
Optics Letters	3
Photonics Technology Letters	1

Journal	Number of papers
Review of Scientific Instruments	1
Sensors and Actuators A-Physical	1
Thin Solid Films	1
TOTAL	30

R3.6 LIST OF PATENTS

Optical router for DWDM systems with selectivity and wavelength conversion
Developed under (Project Name): N/A
Demo Place: UOSE
Development Period: 2002-2003
Type (National or International): National
Submission Date: 27/6/2003
Granting date: 22/4/2005

Wavelength converter based upon a rare earth doped optical fiber laser
Developed under (Project Name): N/A
Demo Place: UOSE
Development Period: 2002-2003
Type (National or International): National
Submission Date: 27/6/2003
Granting date: 22/4/2005

Film crystalization process using conducting films as resistive heating elements
Developed under (Project Name): N/A
Demo Place: UOSE
Development Period: 2002-2003
Type (National or International): National
Submission Date: 10/7/2003
Granting date: 22/4/2005

R3.7 LIST OF PROTOTYPES

Interrogation unit for Bragg grating optical fibre sensors
Developed under (Project Name): Fibersensing
Demo Place: UOSE
Development Period: 1-3-2004 to 30-9-2005

Sensing heads for geotechnical and civil engineering applications
Developed under (Project Name): Fibersensing
Demo Place: UOSE
Development Period: 1-3-2004 to 30-9-2005

R3.8 LIST OF THESES SUPERVISED BY MEMBERS OF THE UNIT DURING 2005

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Carla Carmerlo Rosa	FCUP	José Luís Santos	INESC Porto/FCUP	Low-coherence interferometry	2005
José Ramiro Fernandes	FCUP	José Luís Santos Ednan Joanni	INESC Porto/FCUP INESC Porto/UTAD	Micro-Actuadores Piezoeléctricos	2005
Luís Gomes	FCUP	Manuel J. Marques	INESC Porto/FCUP	Optical fibre lasers	2005
Rosa R. Muniz (*)	FEUP	Henrique Salgado Paulo Marques	INESC Porto/FEUP INESC Porto/FCUP	Fibre Bragg Grating Structures: Applications in Optical Communications and Sensor Technology	2005
Andrei Mardare	FCUP	Manuel J. Marques Ednan Joanni	INESC Porto/FCUP	Thin film microfabrication	2006
Gaspar Mendes Rego (*)	FEUP	Henrique Salgado José Luís Santos	INESC Porto/FEUP INESC Porto/FCUP	Long Period Fibre Gratings	2006
Paulo Moreira	FCUP	Paulo Marques	INESC Porto/FCUP	Integrated optic devices	2006
Pedro Jorge	FCUP	José Luís Santos	INESC Porto/FCUP	Fluorescence based optical fibre sensors	2006
Cezarina Mardare	FCUP	Manuel J. Marques Ednan Joanni	INESC Porto/FCUP	Thin film microfabrication	2007
Daniel Alexandre	FCUP	Paulo Marques	INESC Porto/FCUP	Fabrication of integrated optics devices by laser direct writing	2007
Dionísio Pereira	FCUP	Manuel J. Marques	INESC Porto/FCUP	Optical fiber technologies	2007
Jaime Ribeiro Viegas	FCUP	Paulo Marques	INESC Porto/FCUP	Integrated optics	2007
Rui Pedro Morais	FCUP	Paulo Marques Henrique Salgado	INESC Porto/FCUP INESC Porto/FEUP	Optical fiber technology	2007
Orlando Frazão	FCUP	José Luís Santos	INESC Porto/FCUP	Optical fiber sensors	2008
1	*2*	*3*	*4*	*5*	*6*

1 – Name of the post-graduation student
2 – Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester
3 – Name of supervisor or supervisors
4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid
5 – Title of the thesis
6 – Predicted year of conclusion and delivery – will be taken in account in summary tables
(*) Thesis to be counted in UTM.

MSc Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Miguel Melo	FEUP	Paulo Marques	INESC Porto/FCUP	Fiber Bragg fabrication	2006
Susana F. O. Silva	FCUP	José Luís Santos	INESC Porto/FCUP	Pi-phase shift fiber Bragg gratings	2006
1	*2*	*3*	*4*	*5*	*6*

1 – Name of the post-graduation student
2 – Institution holding the course where this student in enrolled in; if the host institution is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester
3 – Name of supervisor or supervisors

4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid
5 – Title of the thesis
6 – Predicted year of conclusion and delivery – will be taken in account in summary tables

R3.9 ORGANISATION OF INTERNATIONAL SCIENTIFIC EVENTS

<u>SEON 2005 – III Symposium on Enabling Optical Networks</u>
Aveiro, Portugal
June 27, 2005
José Luís Santos, Paulo Marques – Scientific Committee
Orlando Frazão, Organizing Committee

R3.10 ADVANCED TRAINING

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R3.11 OTHER CONTRIBUTIONS TO THE OBJECTIVES OF ASSOCIATE LABORATORY

UNIT: UOSE – OPTOELECTRONICS AND ELECTRONIC SYSTEMS	Thematic Line
Consolidation and reinforcement of research activities in: • Optical fiber sensors relevant to bio-chemical measurands; • Novel devices. Reinforcement of the research team: hiring of a new post-doc researcher through an international call for fellowships, to work in theoretical modelization of devices and processes. Lauching of a new PhD thesis. Co-organization of a symposium concerning optical fiber technologies, SEON 2005.	Fiber Optic Devices and Networks for Multi-Parameter Sensing

R3.12 AWARDS, RECOGNITIONS

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R3.13 ANALYSIS AND ASSESSMENT OF DEVIATIONS RELATIVE TO FORMER PLANNING

R3.13.1 Comparison with strategic actions or policy lines defined in the plan of the previous year

The perspective of reinforcement of the technological and scientific capability of the Unit was increased with the beginning of negotiations to acquire dry-etching and PECVD equipment that will enable novel developments in terms of integrated optics devices. This equipment was approved the previous year and during 2005 suppliers selection and qualification were carried out in order to make a technically sound and budget compatible decision.

The services component of the activity of the Unit reached interesting values due to research under contract with Fibersensing, INESC Porto spin-off company.

Concerning industrial property rights, three national applications were granted but a valorization strategy is still lacking to exploit this potential source of income. Internationalization and/or a partnership with Fibersensing may help in this objective.

The high participation of the Unit members in conference scientific committees and as journal referees was achieved and shall be increased, with a special reference to the Symposium on Enabling Optical Networks that is co-organized by the Unit and that is gaining wide participation from national institutions and researchers.

The Unit presented one European project proposal that was approved and that is due to begin next year. The proposal is concerned with optical gases sensing and is proposed by a strong European consortium that will increase Unit´s international visibility. On the other way, the invitation to take part in this project acknowledges the Unit competences.

Concerning the national research in consortium program, a project was approved with Fibersensing in the area of micropackaging of optical devices.

R3.13.2 Cases of success, problems met, internal and external conditioning factors

The main success case refers to Fibersensing project. The development contract run with undeniable success and constitutes a model of research under contract and mixed teams of R&D institutions and companies collaboration work that shall be replicated. The prototypes developed and the timely execution of the contract shows the technological and scientific capability of the Unit.

The end of the incubation at INESC Porto premises and the change of the company to rented facilities at a new location brought also a temporary but potentially definitive hiring of several researchers of the Unit that fragilized the area of Electronic and Systems Integration.

This situation presents now a unique challenge to the Unit: how to continue becoming a source of technical innovation and upstream of new ideas and products.

Another interesting result is the contract with the Optoelectronics Research Center of Tampere University in Finland to develop and build an integrated Bragg grating fiber manufacturing workstation. This activity, high-end advanced optical fiber technology equipment development, is to be enhanced, profiting from synergies with Fibersensing.

R4. UNIT: UESP – MANUFACTURING SYSTEMS ENGINEERING

R4.1 SHORT DESCRIPTION OF THE UNIT

The main goal of the Manufacturing Systems Engineering Unit is to promote the improvement of performance of industrial enterprises through R&D projects, consulting, technology transfer and training services. The Unit main competencies are related with Operations Management and Enterprise Information Systems, applied to industrial companies and enterprise cooperation networks, namely:

- <u>Operations Management</u>: Process Management (intra and inter companies); Design and optimisation of production systems; Production Planning, Scheduling and Control; Internal Logistics; Performance monitoring and evaluation.

- <u>Enterprise Information Systems:</u> Requirements engineering; Technical and organisational suitability assessment; Design and development of new systems; Information Systems Planning; Project management.

The Unit has regularly promoted and participated in applied research projects, in partnership with software houses, aiming at the development of innovative products in the fields of: production planning, scheduling and control, quality and maintenance management, decision support, cutting and packing optimisation, knowledge management, and integration infrastructures.

The Unit activity can be divided in five main areas: Enterprise Cooperation Networks, Internal Logistics, Cutting and packing, Systems Integration and Consulting Services.

The work in these areas is grounded in research activity in the following scientific domains:

- <u>Inter-organisational networks:</u> Operations management; collaboration processes management; management and decision support systems; Knowledge management; Interoperability.
- <u>Optimisation:</u> Decision process structuring; optimisation methods; Combinatorial Optimisation and meta-heuristics; optimisation for planning and scheduling problems; optimisation for cutting and packing problems; Simulation.
- <u>Information Systems in Organisations</u>: Requirements engineering; advanced applications of information systems; enterprise integration.

The Unit supplies consulting services to industrial companies, including the analysis and optimisation of business processes, requirements analysis of IT systems, selection of IT systems (ERP and others), change management and support in the implementation phase. These services follow a proprietary methodology, developed over many years of field experience. The Unit has also a large experience in the fields of manufacturing systems integration.

The Unit plays also a role in the promotion of the utilization of advanced technologies by industrial enterprises through dissemination, training and consulting actions, aiming at creating awareness of the advantages and limitations of new technological solutions, identifying new requirements, and supporting their implementation. The Unit supplies R&D services to develop innovative products to technology suppliers, software houses, systems integrators and producers of manufacturing equipment.

R4.2 ACTIVITIES DEVELOPED IN 2005

R4.2.1 National programmes

During 2005 ten projects have been executed with support from national programmes to RTD activities, representing 41,7% of the year income. The projects CpackMO, Codework, GlobalNest, Meta-Sim and APIS have been supported by the FCT; the projects FATEC and GESTE have been supported by the PRIME programme. The projects Meta-Sim and APIS started during 2005. The FATEC project, a large 4 year RTD and technological mobilisation project finished in December 2005 with several relevant results for the shoe industry.

The projects Sia-soft and ISO-Pross started in 2005 with support from the IDEIA programme and the RCED project started with support from the North Operational Programme (ON).

R4.2.2 European programmes

During 2005 the Unit participated in eight European projects, that have represented 44,3 of its global activity. The Kobas and the AMI@netfood projects are being supported by the IST programme, and the CEC-Made-Shoe project was supported jointly the IST and Growth programmes. The projects Regina, R+D+I for SME's and Coopnav were supported by the INTERREG programme, the IRC Portugal project was supported by the INNOVATION programme, and Knowconstruct was supported by the COLLECTIVE research programme.

R4.2.3 Other programmes, consulting, services

The main consulting and technology transfer projects during 2005 were:

- Development of scheduling optimisation algorithms for a commercial ERP system.

- Design and development of a benchmarking system for the Metal manufacturing industry.

- Design and specification of a scheduling application for a company that produces decorative high pressure laminates.

- Consulting contracts to support several companies (Durit, Moldit, Alba and Siclave) in analyzing their business processes, identifying their requirements on IT, supporting the selection and implementation of the selected solutions.

- Consulting contract to support AURN – North Association of Universities on the identification of exploitable research results on associated Universities and the identification of local companies technological requirements.

- Technical support to the systems and applications previously installed at SONAFI.

- Technical support to the implementation of Internal Logistic systems done by the partner company Lirel.

R4.3 SUMMARY OF RESULTS OF THE RESEARCH ACTIVITIES OF THE TEAM MEMBERS

- **Projects**

Summary of projects developed in 2005

Type of Activity (1)	No. Projects (2)			Total Income (€)
	N	E	I	
R - Research	10	5		703.700
D - Development	4			72.700
C - Consulting	3			62.350
A – Advanced training				
T – Technology Transfer	1	3		154.650
O - Other				
TOTAL	18	8		993.400

Summary of relative distribution of sources of income

Financing (3)	Status (4)			Total Income (€)
	S - Started	OG- On-going	C - Concluded	
NP – National Programmes	3,61%	8,06%	26,69%	381.100
EP – European Programmes	12,46%	35,15%		473.000
CS – Consulting and services	1,38%	9,24%	3,40%	139.300
O – Other R&D sources				
OS – Other sources				
Total	17,45%	52,46%	30,09%	993.400

Summary of projects developed in 2005

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ.		Starting date	Conclusion (prediction)	Status (4)
				Type (3)	Prog.			
Consultoria	A. C. Alves	C	N	CS	-	-	Several contracts	OG
Lirel	P. S. Marques	T	N	CS	-	-	Renewable	OG
SONAFI	Paula Silva	D	N	CS	-	-	Renewable	OG
FATEC	Rui Diogo	R	N	NP	PRIME	06-2002	12-2005	F
CpackMO	J. F. Oliveira	R	N	NP	FCT	09-2002	08-2005	F
GESTE	J. S. Ferreira	R	N	NP	PRIME	10-2003	04-2006	OG
Regina	A.C. Alves	T	E	EP	Interreg	11-2003	10-2006	OG
CodeWork	Lucas Soares	R	N	NP	FCT	01-2004	12-2006	OG
GlobalNest	M. C. Ribeiro	R	N	NP	FCT	03-2004	02-2006	OG
IRCPortugal	A. C. Alves	T	E	EP	IST	04-2004	03-2008	OG
Kobas	A. Azevedo	R	E	EP	NMP	06-2004	05-2007	OG
I+D+I PME's	A.C. Alves	T	E	EP	Interreg	09-2004	12-2006	OG
Softi9	Luís Guardão	D	N	CS	-	09-2004	06-2006	OG
CEC Made Shoe	Rui Diogo	R	E	EP	IST	10-2004	09-2008	OG

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
CoopNav	Luís Guardão	R	E	NP	Interreg	10-2004	03-2006	OG
ISO-Pross	Paula Silva	R	N	NP	Ideia	10-2004	09-2006	OG
DURIT AD	A. C. Alves	C	N	CS	Demtec	12-2004	05-2006	OG
Benchmarking	Luís Guardão	D	N	CS	-	01-2005	12-2005	F
SIASoft	Luís Guardão	R	N	NP	Ideia	01-2005	03-2006	S
KnowConstruct	Lucas Soares	R	E	EP	C. R.	01-2005	08-2007	S
AMI@NETFOOD	J.P. Sousa	R	E	EP	IST	04-2005	06-2006	S
Sonae	Luís Guardão	D	N	CS	-	06-2005	06-2006	S
META-SIM	J.P. Sousa	R	N	NP	FCT	07-2005	06-2007	S
RCED	Luis Carneiro	R	N	NP	PON	07-2005	06-2006	S
APIS	J. F. Oliveira	R	N	NP	FCT	09-2005	08-2007	S
Adavntec	A.C. Alves	C	N	CS	-	12-2005	10-2006	S

(1) Type of Project: R – Research; D – Development; C – Consulting; A – Advanced Training; T – Technology Transfer; O - Other

(2) Degree of internationalization: N – National; E – European; I – International *(Select one)*

(3) Source of financing: NP – National Programmes; EP – European Programmes; CS – Consulting and services; O – Other R&D financing sources; OS – Other sources

(4) Status: S – Starting: activities initiated in 2005 and continuing in 2006; OG – On-going: activities started earlier than 2005 and continuing in 2006; F – Finished: activities ending in 2005.

- **Summary of publications**

Summary of publications in 2005

Type of publication	Number
Theses concluded in 2005 by members of the unit	3
Books (author)	
Chapter/paper in books	2
Publications (editor)	
Papers in International Journals with scientific referees	2
Papers in National Journals with scientific referees	1
Conference Proceedings in events with scientific referee and selection	19
Other publications (National meetings, local journals, etc.)	13
Total	40

- **Summary of post-graduation activities**

Summary of theses supervised by members of the unit in 2005

Type	Starting	On-going	Concluded	Total
Master	9	7	14	30
Doctoral	2	14	3	19
Total	11	21	17	49

- **Summary of Advanced Training Actions**

Summary of Advanced Training Actions organized for external trainees in 2005

Type	Number
Training for graduation students *(estágios curriculares)*	3
Training for others *(estágios extra-curriculares)*	
Professional training actions *(estágios profissionais)*	2
Other actions	
Total	5

- **Summary of activities of cooperation or dissemination**

Summary of items

Type	Number
Organizing conferences or meetings	1
Colaboration in papers authored by INESC Porto researchers	7
External persons directly involved in actions organized by INESC Porto	-

- **Human resources in 2005**

Summary of Unit personel at the end of 2005

Type	Education				Total	Variation (*)
	PhD.	MSc.	BSc.	Other		
R&D						
University or Politechnic Lecturers	10	7	2		19	-2
Grantees INESC Porto		1	3	1	5	-3
Other Grantees		1			1	0
Contracted	1	2	7	2	12	0
Trainees			2		2	+2
Other						
Administrative			1	1	2	0
Total	11	11	15	4	41	-3

(*)   Relative to 2004, in absolute numbers.

R4.4 LIST OF PUBLICATIONS

R4.4.1 Theses concluded in 2005 by members of the unit

RODRIGUES, A.M., "Algoritmos Meméticos no Problema do Carteiro Rural", MSc Thesis, FEUP, September 2005.

MOURA, A., "Abordagens Heurísticas ao Planeamento de Rotas e Carregamento de Veículos", PhD Thesis, FEUP, June 2005.

CORREIA, M.H. , "Optimização na Indústria do Papel", PhD Thesis, FEUP, April 2005.

R4.4.2 Books (Author)

Blank.

R4.4.3 Chapter/paper in Books

VIANA, A., PINHO DE SOUSA, J., MATOS, M., "GRASP with Constraint Oriented Neighbourhoods: An Application to the Unit Commitment Problem", in Metaheuristics: Progress as Real Problem Solvers, editors Toshihide Ibaraki, Koji Nonobe and Mutsunori Yagiura, Kluwer Academic Publishers, 2005, Series: Operations Research/Computer Science Interfaces Series, Vol. 32.

MADUREIRA, R., "The Role of Personal Contacts of Foreign Subsidiary Managers in the Coordination of Industrial Multinationals.", Advances in Business Marketing and Purchasing, April 2005, Woodside, A. (ed.) Elsevier Ltd. ISBN: 0-7623-1159-2., vol.13, p.337-521.

R4.4.4 Publications (Editor)

Blank.

R4.4.5 International Journals with scientific referees

AZEVEDO, A., TOSCANO, C., PINHO DE SOUSA, J., "Cooperative planning in dynamic supply chains", International Journal of Computer Integrated Manufacturing, July 2005, vol.18, no.5, p.350-356.

MOURA, A., OLIVEIRA, J.F., "A GRASP Approach to the Container-Loading Problem", IEEE Intelligent Systems, July 2005, vol.20, no.4, p.50-57.

R4.4.6 National Journals with scientific referees

MOREIRA, A.C., "O Problema da co-especialização no desenvolvimento colaborativo de novos produtos" [The co-specialization problem in collaborative new product development], Revista Produção, January 2005, vol.15, no.1, p.23-33.

R4.4.7 Conference Proceedings with scientific referees

AZEVEDO, A., CHITUC, C., "Multi-perspective Challanges on Collaborative Networks Business Environments", *in Proceedings of, PRO-VE'05 - 6th IFIP Working Conference on Virtual Enterprises*, September 2005, in Proceedings, Valencia, Espanha.

PINHO DE SOUSA, J.M., et al. , "A multi-criteria DSF for the Formation of Collaborative Networks of Enterprises", *in Proceedings of, PRO-VE'05 - 6th IFIP Working Conference on Virtual Enterprises*, September 2005, Valencia, Espanha.

CRISPIM, J.A., PINHO de SOUSA, J., "A multi-criteria decision support system for the formation of collaborative networks of enterprises", in Proceedings of, *PRO-VE'05 - 6th IFIP Working Conference on Virtual Enterprises*, editores Luís M. Camarinha-Matos e Hamideh Afsarmanesh, Kluwer Academic Publishers, Valencia, Espanha, September, 2005.

MADUREIRA, R.A., "Personal Contacts in the Coordination of Multinationals.", *1st IIBC - 1st Iberian International Business Conference*, September 2005, Acta 1st IIBC, Porto, Portugal.

MOREIRA DA SILVA, M.F., SIMÕES, D., SOARES, A.L., COSTA, R., "Knowledge based community management in the Construction Industry", *TKE 2005 - 7th International Conference on terminology and Knowledge Engineering*, August 2005, Copenhagen, Denmark.

CRISPIM, J.A., PINHO de SOUSA, J., "A multi-criteria Reactive GRASP / Tabu Search approach for the formation of virtual enterprises", in Proceedings of *MIC2005 - 6th Metaheuristics International Conference*, Viena, Áustria, August 2005.

VIANA, A., PINHO DE SOUSA, J., MATOS, M., "Multiobjective Constraint Oriented Neighbourhoods", in Proceedings of *MIC2005 - 6th Metaheuristics International Conference*, Viena, Áustria, August 2005.

CLARO, J.A., PINHO DE SOUSA, J., "Multiobjective Local Search for Mean-Variance Combinatorial Optimisation", in Proceedings of *MIC2005 - 6th Metaheuristics International Conference*, Viena, Áustria, August 2005.

MOURA, A., OLIVEIRA, J.F., "Solving Container Loading Problem with metaheuristics: a computational evaluation", in Proceedings of *MIC2005 - 6th Metaheuristics International Conference*, Viena, Áustria, August 2005.

GOMES, A.M., COSTA, M.T., OLIVEIRA, J.F., "An Iterated Local Search approach to the large-scale regular packing of irregular shapes in a limited sheet", in Proceedings of *MIC2005 - 6th Metaheuristics International Conference*, Viena, Áustria, August 2005.

CARNEIRO, L., MOREIRA, A.C., TAVARES, M., et al., "Regional Innovation Strategy for the ICTE Clusters in the North of Portugal", *ISPIM2005 - 16th ISPIM Annual Conference: The Role of Knowledge in Innovation Management* 2005, Porto, Portugal, June 2006.

MOREIRA, A.C., TAVARES, M., CARNEIRO, L., "Critical Technologies for the ITCE Clusters from the North of Portugal", in the Proceedings of *ISPIM 2005 – 16th Annual Conference of the International Society for Professional Innovation Management*, Porto, Portugal, June 2005.

CARRAVILLA, M.A., RIBEIRO, M.C., "CP and MIP in the resolution of hard combinatorial problems: A case study with nesting problems", *CSLP 2005 - CSLP 2005: Joint Annual Workshop of ERCIM/CoLogNet on Constraint Solving and Constraint Logic Programming*, June 2005, Uppsala, Sweden.

CHITUC, C., AZEVEDO, A.,, "Towards a Self-forming Business Networking Environment", in Proceedings of *ICEIS'2005 – 7th International Conference on Enterprise Information Systems*, Florida International University – Miami - Florida, EUA, May 2005.

CHITUC, C., AZEVEDO, A., "Enablers and Technologies Supporting Self-Forming Networked Organizations", in Proceedings of *INTEROP-ESA'095 – First International workshop on Interoperability of Enterprise Software and Applications*, Geneva, Switzerland, February 2005.

OLIVEIRA, J.F., CARRAVILLA, M.A., RIBEIRO, M.C., GOMES, A.M., "A XML format for data representation in Nesting Problems", in Proceedings of *IFORS 2005 - IFORS International Triennial Conference 2005*, Honolulu, Hawaii, USA - Hawaii.

GOMES, A., OLIVEIRA, J.F., "Local CmpactII - a neighbourhood structure for Nesting Problems", *IFORS 2005 - IFORS International Triennial Conference 2005*, Honolulu, Hawaii, USA - Hawaii.

PINTO FERREIRA, M.E., OLIVEIRA, J.F., "Algorithm based on graphs for the non-guillotinable two-dimensional packing problem", *IFORS 2005 - IFORS International Triennial Conference 2005*, Honolulu, Hawaii, USA - Hawaii.

FERREIRA, D., FERREIRA, H., "Learning, planning and the life cicle of workflow management", *EDOC 2005 - EDOC Conference (EDOC 2005)*, Enschede, Holanda.

R4.4.8 Other Publications

VIEIRA, G.A., AZEVEDO, A., "Suporte Tecnológico ao Balanced Scorecard - a proposed architecture", 5ª Conferência da APSI – Associação Portuguesa de Sistemas de Informação, IPB, Bragança, Portugal, 3-5 November 2005.

COSTA, M.T., OLIVEIRA, J.F., "A Comparison between different approaches to the large-scale regular packing of irregular shapes in a limited sheet", *VI Cutting and Packing 05 - VI International Workshop on Cutting and Packing and Related Topics*, September 2005, Lauterbad, Germany.

MOURA, A., "Metaheuristic approaches to vehicle routing and container loading problems", VI Cutting and Packing 05 - VI International Workshop on Cutting and Packing and Related Topics, September 2005, Lauterbad, Germany.

PINTO FERREIRA, M.E.; OLIVEIRA, J.F., "Algorithm based on graphs for the non-guillotinable two-dimensional packing problem", VI Cutting and Packing 05 - VI International Workshop on Cutting and Packing and Related Topics, September 2005, Lauterbad, Germany.

SELADA, C., CARNEIRO, L., PEREIRA, J.P., MOREIRA, A.C., "Por um Sistema Regional de Inovação no Norte de Portugal", Actas do 11º Congresso da Associação Portuguesa para o Desenvolvimento Regional, Faro, Portugal, September 2005.

CALDEIRA, H., SOEIRO FERREIA, J., "Container Loading by GRASP", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

CORREIA, H., SOEIRO FERREIA, J., "Modelling and optimising in the paper industry", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

MOURA, A., OLIVEIRA, J.F., "Meta heuristics approaches to vehicle routing and loading problems.", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

OLIVEIRA, J.F., CARRAVILLA, M.A., RIBEIRO, M.C., GOMES, A., "A XML format for data representation in Nesting Problems.", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

COSTA, M.T., GOMES, A., OLIVEIRA, J.F., "A new approach to the large-scale regular packing of irregular patterns in a limited sheet.", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

PINTO FERREIRA, M.E.; OLIVEIRA, J.F., "Algorithm based on graphs for the non-guillotinable two-dimensional packing problem.", ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, England.

PEREIRA, C., SOARES, A.L., "Tecnologias de colaboração em organizações de I&D: Uma abordagem por redes sociais", 6ª Conf. da Associação Portuguesa de Sistemas de Informação. Bragança, Portugal, 2005.

PINHO, A., SOARES, A.L., "Teoria Actor-network na análise de requisitos de sistemas de informação", 6ª Conf. da Associação Portuguesa de Sistemas de Informação. Bragança, Portugal, 2005.

R4.5 LIST OF JOURNALS

Journal	Number of papers
International Journal of Computer Integrated Manufacturing	1
IEEE Intelligent Systems	1
Revista Produção	1

	TOTAL	3

R4.6 LIST OF PATENTS

Distribution and temporary storage system of transport units
Developed under (Project Name): CICLOP/FATEC
Demo Place: Lirel, S.J. da Madeira, Portugal
Development Period: 2002-2004
Type (National or International): PCT
Submission Date: 12 April 2005

R4.7 LIST OF PROTOTYPES

Design and development of several innovative manufacturing equipments and intra-company logistic systems for the shoe industry
Developed under (Project Name): FATEC
Demo Place: Several Portuguese Shoe companies
Development Period: January 2003 to December 2005

An optimisation software tool for scheduling problems
Developed under (Project Name): Softi9, FATEC
Demo Place: INESC Porto
Development Period: June 2003 to December 2005

A support system for cooperation in the ship building industry, including engineering and production phases and link with association portals (advanced prototype)
Developed under (Project Name): Coopnav
Demo Place: Several companies in the North or Portugal and North of Spain
Development Period: June 2004 to December 2005

Benchmarking system for the foundry industry
Developed under (Project Name): Benchmarking
Demo Place: Associação Portuguesa da Industria de Fundição
Development Period: January 2004 to December 2005

GlobalNest Viewer – Viewer for nesting applications
Developed under (Project Name): GlobalNest
Demo Place: available online (password needed)
                http://globalnest.fe.up.pt/~globalnest/globalnest_visualizer/index.php
Development Period: 2004-2005

HybridNesting - Solving Irregular Strip Packing problems by hybridising simulated annealing and linear programming
Developed under (Project Name): CPackMO
Demo Place: FEUP

Development Period: 2002-2005

R3.8 LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT DURING 2005

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ana Maria Pinto Moura	FEUP	José Fernando Oliveira	INESC Porto/FEUP	Heuristic approaches to the vehicle routing and vehicle packing problems	2005
Maria Helena Correia	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Optimisation in the Paper Industry	2005
Teresa Galvão Dias	FEUP	Jorge Pinho de Sousa João Falcão e Cunha	INESC Porto/FEUP FEUP	Interactive Multi-objective Genetic Algorithms for the Bus Driver Scheduling Problem	2005
António Miguel Gomes	FEUP	José Fernando Oliveira	INESC Porto/FEUP	Raw material optimization in irregular cutting processes	2006
José Paulo Angeiras de Sousa Santos	FEUP	Maria A. Carravilla Carlos Costa	INESC Porto/FEUP FEUP	Support system for the evaluation of higher education courses.	2006
Maria Eduarda Cunha e Silva Pinto Ferreira	FEUP	José Fernando Oliveira	INESC Porto/FEUP	Graph based approach for the n-dimensional Rectangular packing problem	2006
Maria Teresa do Valle Moura da Costa	FEUP	José Fernando Oliveira	INESC Porto/FEUP	New approaches to the periodic placement of irregular shapes	2006
Abailardo Lucilio de Natividade Silva Moreira	FEUP	Américo Azevedo	INESC Porto/FEUP	Dinamic evaluation of production capacity in Enterprise Networks	2007
Bernardo Sobrinho Simões de Almada-Lobo	FEUP	José Fernando Oliveira	INESC Porto/FEUP	Scheduling problems in the glass containers industry	2007
Célia Talma Matins	FEUP	Eugénio Oliveira António Lucas Soares	FEUP INESC Porto/FEUP	Collaborative Business in Enterprise Networks: Inter-organisational processes.	2007
Claudia Melania Chituc	FEUP	Américo Azevedo	INESC Porto/FEUP	Self-organization in enterprises and business networks and behavior semantics	2007
Dora Simões	FEUP	António Lucas Soares	INESC Porto/FEUP	Socio-technical Models for the formation and dissolution of Cooperation Networks of Small and Medium Enterprises.	2007
Henrique José Amorim da Silva	FEUP	José Fernando Oliveira	INESC Porto/FEUP	Heuristics and Meta-heuristics for rectangular 2D cutting problems	2007
João Claro	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Strategic Planning in Collaborative Commerce Networks	2007
José Crispim	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Contributions for a multi-criteria model for supporting the creation of collaborative enterprise networks	2007
Paulo Veloso Gomes	FEUP	António Lucas Soares	INESC Porto/FEUP	Meta-processes in Socio-technical Networks	2007
Adília Alves	FEUP	António Lucas Soares	INESC Porto/FEUP	Collaborative technologies for strategic decision making in enterprise networks: Development of the High Performance Collaborative Enterprise Networks concept	2008
Maria do Rosário Moreira	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Combinatorial Optimisation in Graph Problems	2008
Manuel Fernando Silva	FEUP	Rute Costa António Lucas Soares	UNL INESC Porto/FEUP	Terminology contributions for the development and operation of semantic platforms supporting knowledge communities	2008
1	*2*	*3*	*4*	*5*	*6*

1 – Name of the post-graduation student
2 – Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester
3 – Name of supervisor or supervisors
4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid
5 – Title of the thesis
6 – Predicted year of conclusion and delivery – will be taken in account in summary tables

MSc Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ana Maria Rodrigues	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Memetic Algorithms for the Rural Postman Problem.	2005
Anabela Pinho	FEUP	António Lucas Soares	INESC Porto/FEUP	Information Systems and inter-organizational relationship patterns.	2005
António Ribeiro	FEUP	Américo Azevedo	INESC Porto/FEUP	Business Models and processes in the printing industry	2005
Cristóvão Sousa	FEUP	António Lucas Soares	INESC Porto/FEUP	Information management in the work organisation in enterprise networks	2005
Gil Alexandre Oliveira Vieira	UA	Américo Azevedo	INESC Porto/FEUP	Requirements in the technical support of the implementation of Balanced ScoreCards	2005
João Carlos Gomes da Silva	UA	Américo Azevedo	INESC Porto/FEUP	Evaluation of the organizational performance	2005
João Pinho	FEUP	António Lucas Soares	INESC Porto/FEUP	Collaborative and multidisciplinary inter-organisational process design	2005
Jonas André Lima	FEUP	Maria Antónia Carravilla	INESC Porto/FEUP	Terrorism impact in the Supply-Chain	2005
Jorge Albuquerque	FEUP	António Lucas Soares	INESC Porto/FEUP	Collaboration support system in projects management in a bank institution	2005
Marta Tavares	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Decoupling points in production systems: strategy evaluation through simulation	2005
Miguel Teixeira	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Mobility studies in a metropolitan area: information management and support to alternative strategies impact evaluation	2005
Teresa Marques	FEUP	Maria Antónia Carravilla	INESC Porto/FEUP	Decision Support System for the Production Planning of Quimigal, S.A's Chlorine-alcalis.	2005
Tiago Pinto	FEUP	António Lucas Soares	INESC Porto/FEUP	Contents Management System in a Finance Department.	2005
Zulmira Pinho Teixeira	FEUP	Américo Azevedo	INESC Porto/FEUP	Enterprise integration based on electronic contracts.	2005
Ana Patrício Vale	FEUP	Américo Azevedo	INESC Porto/FEUP	Management Systems integration – according with standard references	2006
Ana Santos	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Parallel Machine Scheduling	2006
Eduardo Martins Pires Moreira	EGP (UP)	Américo Azevedo	INESC Porto/FEUP	Balanced ScoreCard computer support	2006
Hélder Tiago de Resende Gomes	EGP (UP)	Américo Azevedo	INESC Porto/FEUP	Decision Support system for the management of production activities in a make-to-order of complex products environment	2006
Hugo Caldeira	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Logistic Pallet and Packing problems	2006
Inês Souto e Castro	EGP	Jorge Pinho de Sousa Américo Azevedo	INESC Porto/FEUP	Definition of a cost model: application to the cork transforming industry	2006

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
João Pimentel Peixoto Coentro	FEUP	Américo Azevedo	INESC Porto/FEUP	Service Quality Management Model in Information Systems Development	2006
João Sabino Vilaça	EGP	Américo Azevedo	INESC Porto/FEUP	Balanced ScoreCard application to the definition of organizations' strategic course particularly to the Portuguese model of multi-municipal enterprises.	2006
José Pedro Fernandes	FEUP	Jorge Pinho de Sousa António Lucas Soares	INESC Porto/FEUP	The concept of optimization in current industrial environments: perspectives and requirements	2006
José Raúl Luís	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Distributed component production for the automotive industry: modeling and optimization	2006
Luísa Faria	UA	Américo Azevedo	INESC Porto/FEUP	Business Networks: The Case of Nova Friburgo (Brasil)	2006
Pedro Cruz	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Task Scheduling in a Paint Factory	2006
Pedro Lobo	UA	Américo Azevedo	INESC Porto/FEUP	Business and Process Models in Hospital Facilities	2006
Ricardo Almeida	UA	Américo Azevedo	INESC Porto/FEUP	Definition of Capacity Models for supporting Order Negotiation	2006
Teresa Mota	FEUP	Américo Azevedo	INESC Porto/FEUP	Information systems' evolution and their relationship with management and organization models.	2006
Tiago Gomes	EGP	Américo Azevedo	INESC Porto/FEUP	Decision Support System for Production Management Operations	2006
1	*2*	*3*	*4*	*5*	*6*

1 – Name of the post-graduation student

2 – Institution holding the course where this student in enrolled in; if the host institution is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester

3 – Name of supervisor or supervisors

4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid

5 – Title of the thesis

6 – Predicted year of conclusion and delivery – will be taken in account in summary tables

R4.9 ORGANISATION OF INTERNATIONAL SCIENTIFIC EVENTS

ESICUP 2005 - EURO Special Interest Group on Cutting and Packing, April 2005, Southampton, Inglaterra.

Organized by:

- José Fernando Oliveira (FEUP/INESC Porto), ESICUP coordinator;
- Julia Bennel, Local organiser.

R4.10 ADVANCED TRAINING

Blank.

R4.11 OTHER CONTRIBUTIONS TO THE OBJECTIVES OF THE ASSOCIATE LABORATORY

UNIT: UESP – MANUFACTURING ENGINEERING SYSTEMS	Thematic Line
• A support system for cooperation in the ship building industry, including engineering and production phases and link with association portals (advanced prototype). • Design of an inter-enterprise integration platform for the shoe industry, using workflow mechanisms and XML documents. • Design of a platform for knowledge management and requirements specification in the Construction Industry, through the creation and activation of virtual communities. • Start of an important project that will evaluate the enterprise fabric in the Nort of Portugal and will define strategies for its improvement through the implementation of High Performance Enterprise Cooperation Networks. • Publication of 15 articles in relevant international journals and reference international conferences.	Enterprise cooperation networks

R4.12 AWARDS, RECOGNITIONS

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R4.13 ANALYSIS AND ASSESSMENT OF DEVIATIONS RELATIVE TO FORMER PLANNING

R4.13.1 Comparison with strategic actions or policy lines defined in the plan of the previous year

Concerning the objectives defined in the plan for 2005, we might emphasize the following aspects:

- A significant increase in the volume of activity directly funded by companies was achieved, result of a large commercial effort. This was mainly achieved through consulting and technology transfer projects. However it was not yet possible to achieve the goals set for the training activities.

- Several actions were taken to improve the Unit image and internal information. The web site was improved.

- The activity of the Unit Scientific Council was increased, with the organization of regular meetings.

- An important level of activity has been pursued or started, thus guaranteeing that high quality research results will be achieved.

- The start of the RCED project, along with the activity in other projects related to "cooperation networks" is fully in line with our strategic objectives, in particular in what concerns the regional impact of our activity.

- Although the number of publications has been lower than expected, a significant set of research activities has been started (e.g. several FCT projects) that will hopefully result in important research work and scientific publications.

R4.13.2 Cases of success, problems met, internal and external conditioning factors

Important scientific and technological results have been achieved, especially:

- Conclusion of the national mobilisation project for the shoe industry - FATEC, with the design, development and demonstration in industrial environment of several innovative manufacturing equipments and intra-company logistic systems for the shoe industry.

- Several results were achieved in the field of optimisation for scheduling problems, opening perspectives for an important scientific and technological area in the near future.

- Conclusion of four PhD's (two during 2005 and two defended in January 2006) in the field of Cutting and packing. Also, important systems were made available, namely the GlobalNest Viewer – Viewer for nesting applications and HybridNesting - Solving Irregular Strip Packing problems by hybridising simulated annealing and linear programming.

- Start of an important study aiming at identifying the potential and defining strategies to build High Performance Enterprise Cooperation Networks in the North of Portugal.

- A large number of PhD's and MSc's under supervision during the year of 2005 (19 PhD's and 30 MSc's).

The number of publications has been somehow lower than expected, mainly due to the delay in the revision of several publications. Nevertheless, the significant set of research activities started recently (e.g. several FCT projects) as well as the large number of supervisions, will strongly contribute to important research work and scientific publications.

During the year of 2005 it was also difficult to identify candidates with the needed profile for several scholarships opened by the Unit. This led to some delay and difficulties in several projects.

R5 UNIT: USE – POWER SYSTEMS

R5.1 SHORT DESCRIPTION OF THE UNIT

The Power Systems Unit focuses his activity in some of the key (emerging) areas of the electric sector: regulatory issues and electricity markets, integration of distributed independent producers (namely wind power and other renewable energy sources), technical and economic management of distribution systems, use of GIS and other IT in regional energy planning. The unit develops basic and applied research in different topics and integrating the results in models that address high level problems in a way suitable for technology transfer to vendors, utilities and companies.

The researchers developed existing know-how in techniques and methodologies like Artificial Neural Networks, Fuzzy Sets, Machine Learning techniques, Evolutionary Programming, Meta-Heuristics, Negotiation and Decision-aid methodologies etc., most of the times outside formal projects and contracts. At the same time, MSc and PhD level training remain a major objective, in order to create internal excellence in the salient research areas and to provide the industry with highly qualified professionals, capable of dealing with the challenges of new electricity sector organization. Finally, consulting activities allow the unit to promote the use of modern and efficient methodologies to manage power systems, thus contributing to the dissemination of research and development results, namely in the areas of renewable energy sources and integration of independent dispersed generation.

R5.2 ACTIVITIES DEVELOPED IN 2005

R5.2.1 National programmes

In 2005, several FCT funded projects were concluded: COMPETE (who had a prorrogation), DIPTUNE and RETMU, already described in previous reports. Three projects (Reweb, Venus e Genedis) continued and the new Project MILES, in the area of electricity markets began, in collaboration with the Faculty of Economics of the University of Porto. A new project was approved (EPSO), in the area of Evolutionary Particle Swarm Optimization.

R5.2.2 European programmes

The MICROGRIDS project ended, with excellent results about the integration of microgeneration in LV networks, including the concepts of islanding and black start that enable the autonomous operation of LV microgrids in emergency situations. The RESPIRE project did not continue, and OPET-OIa also ended. The new project RISE, dedicated to the identification of renewable energy resources in the Balkans using GIS, initiated. In the area of training, a new TEMPUS project (CEFES) began. This project aims at helping three Balkan countries developing an integrated and common MSc programme in advanced power system topics.

R5.2.3 Other programmes, consulting, services

The main consulting and development activities in 2005 were the following:

- Extension of the contract with EDP Distribution to build the profiles for LV consumers that will be used in the settlement process of the electricity market.

- Support to the public tender for the new Dispatch Center of EDA (Electricity of Azores), in particular regarding the renewable sources generation management.

- Support to DGGE (General Directorate of Energy) in the definition of the technical and decision conditions for the public tender regarding the authorization for the connection of new 1800 MW of wind generation in Portugal mainland.

- Contract with EDP Production for the identification of optimal strategies for the combined operation of wind-hydro-pumping stations.

- Support to ONS (National System Operator of Brazil) regarding the effects of wind power integration in the transmission network and definition of technical conditions for wind generator conection to the grid.

- Participation as international experts in the discussion of a new code for the distribution systems of Brazil, promoted by ANEEL (the regulatory authority for the electricity sector of Brazil).

R5.3 SUMMARY OF RESULTS OF THE RESEARCH ACTIVITIES OF THE TEAM MEMBERS

- **Projects**

Summary of projects developed in 2005

Type of Activity (1)	No. Projects (2)			Total Income (€)
	N	E	I	
R - Research	6	2		142.697
D - Development	4	1	1	189.635
C - Consulting	8		2	254.223
A – Advanced training		1		5.000
T – Technology Transfer				
O - Other				
TOTAL	17	4	3	591.555

Summary of relative distribution of sources of income

Financing (3)	Status (4)			Total Income (€)
	S - Started	OG- On-going	C - Concluded	
NP – National Programmes		7,14%	3,13%	60.746
EP – European Programmes	1,33%	4,42%	13,52%	114.017
CS – Consulting and Services	2,54%	19,79%	48,13%	416.792
O – Other R&D sources				
OS – Other Sources				
Total	3,87%	31,35%	64,78%	591.555

Summary of projects developed in 2005

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
Opet - OLA	M. P. Leão	D	I	EP	NNE	-	-	OG
EFACEC	J. Pereira	D	N	CS	-	04-2001	-	OG
COMPETE	J.C. Pereira	R	N	NP	-	04-2002	03-2005	F
ReTMU	M. Matos	R	N	NP	FCT	06-2002	05-2005	F
Diptune	J. P. Lopes	R	N	NP	FCT	07-2002	06-2005	F
EDIS/PRE	J. P. Lopes	C	N	CS	-	10-2002	05-2005	F
Morecare-EDA	J. P. Lopes	D	N	CS	-	10-2002	05-2005	F
Microgrids	J. P. Lopes	R	E	EP	NNE	01-2003	12-2005	F
Respire	J. P. Lopes	R	E	EP	NNE	01-2003	02-2006	OG
Reweb	C. Monteiro	R	N	NP	FCT	03-2004	02-2006	OG
Servsis - Ener	J. P. Lopes	C	N	CS	-	04-2004	01-2005	F
Venus	M. P. Leão	R	N	NP	FCT	04-2004	04-2007	OG
Bombagem	J. P. Lopes	C	N	CS	-	05-2004	03-2005	F
Genedis	J. Fidalgo	R	N	NP	FCT	05-2004	04-2007	OG

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
APREN	J. P. Lopes	C	N	CS	-	10-2004	01-2005	F
CarCons	M. Matos	D	N	CS	-	2004	2006	OG
EDA_desp.	J. P. Lopes	C	N	CS	-	2004	2006	OG
AREAM-RENOV	J. P. Lopes	C	N	CS	-	01-2005	12-2005	F
Consultoria	J. P. Lopes	C	N	CS	-	01-2005	12-2005	F
Eolica-conc.	J. P. Lopes	C	N	CS	-	01-2005	12-2005	F
PRODIST	M. Matos	C	I	CS	-	01-2005	12-2005	F
RISE	C. Monteiro	D	E	EP	INCO	01-2005	12-2008	S
ONS	J. P. Lopes	C	I	CS	-	05-2005	04-2006	S
TEMPUS_CEFES	V. Miranda	A	E	EP	TEMPUS	2005	2006	S

(1) Type of Project: R – Research; D – Development; C – Consulting; A – Advanced Training; T – Technology Transfer; O - Other

(2) Degree of internationalization: N – National; E – European; I – International *(Select one)*

(3) Source of financing: NP – National Programmes; EP – European Programmes; CS – Consulting and services; O – Other R&D financing sources; OS – Other sources

(4) Status: S – Starting: activities initiated in 2005 and continuing in 2006; OG – On-going: activities started earlier than 2005 and continuing in 2006; F – Finished: activities ending in 2005.

- **Summary of publications**

Summary of publications in 2005

Type of publication	Number
Theses concluded in 2005 by members of the unit	5
Books (author)	
Chapter/paper in books	1
Publications (editor)	
Papers in International Journals with scientific referees	16
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	30
Other publications (National meetings, local journals, etc.)	6
Total	58

- **Summary of post-graduation activities**

Summary of theses supervised by members of the unit in 2005

Type	Starting	On-going	Concluded	Total
Master	3	4	6	13
Doctoral	2	13	2	17
Total	5	17	8	30

- **Summary of Advanced Training Actions**

Summary of Advanced Training Actions organized for external trainees in 2005

Type	Number
Training for graduation students *(estágios curriculares)*	1
Training for others *(estágios extra-curriculares)*	1
Professional training actions *(estágios profissionais)*	0
Other actions	3
Total	5

- **Summary of activities of cooperation or dissemination**

Summary of items

Type	Number
Organizing conferences or meetings	0
Colaboration in papers authored by INESC Porto researchers	27
External persons directly involved in actions organized by INESC Porto	1

- **Human resources in 2005**

Summary of Unit personel at the end of 2005

Type	Education				Total	Variation (*)
	PhD.	MSc.	BSc.	Other		
R&D						
University or Politechnic Lecturers	9	3			12	+1
Grantees INESC Porto		2	6	1	9	+9
Other Grantees	1	5	1		7	-11
Contracted				1	1	-1
Trainees		1	2	1	4	0
Other	1	2			3	0
Administrative				1	1	0
Total	11	13	9	4	37	-2

(*)   Relative to 2004, in absolute numbers.

R5.4 LIST OF PUBLICATIONS

R5.4.1 Theses concluded in 2005 by members of the unit

Madureira, A. G., "Definition of Control Strategies and Stability Assessment of Low Voltage Networks with Microgeneration in Islanded Mode", MSc Thesis, FEUP, December, 2005.

Marques, M. A. M., "Characterization of LV Consumer's Contribution to Network Losses", MSc Thesis, FEUP, October, 2005.

Aguiar, M. J., "Models for Distributed Generation", MSC Thesis, EUP, June, 2005.

Fonseca, N. M. A., "Inter-Relation of Electricity Markets and Volatility", MSc Thesis, FEP, April, 2005.

Ginet, C., "Analysis of the Operation of Small Isolated Autonomous Electrical Systems in Rural Areas", MSC Thesis, EPFL (Switzerland), February, 2005.

R5.4.2 Books (Author)

Blank.

R5.4.3 Chapter/paper in Books

LOPES, J.A.P., MATOS, M., "Portugal – Searching for a Model for the Energy Sector" 2005, European Electricity Review 2005, H. Edwardes-Evans, M. Burdett (ed.), Platts, McGraw-Hill.

R5.4.4 Publications (Editor)

Blank.

R5.4.5 International Journals with scientific referees

MIRANDA, V., HANG, P.S., "Economic Dispatch Model With Fuzzy Wind Constraints and Attitudes of Dispatchers", IEEE Transactions on Power Systems, November 2005, Letters, vol.20, no.4, p.2143-2145.

MIRANDA, V., CASTRO, A.R.G., "Improving the IEC Table for Transformer Failure Diagnosis with Knowledge Extraction from Neural Networks", IEEE Transactions on Power Delivery, October 2005, vol.20, no.4, p.2509-2516.

MONTEIRO, C., MIRANDA, V., RAMIREZ-ROSADO, I., ZORZANO-SANTAMARÍA, P.J., et al. , "Compromise Seeking for Power Line Path Selection Based on Economic and Environmental Corridors", IEEE Transactions on Power Systems, August 2005, 0885-8950, vol.20, no.3, p.1422-1430.

SILVESTRE BRAGA, A., SARAIVA, J.T., "A Multiyear Dynamic Approach for Transmission Expansion Planning and Long-Term Marginal Costs Computation", IEEE Transactions on Power Systems, August 2005, vol.20, no.3, p.1631-1639.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., KHODR, H.M., YUSTA LOYO, J.M., URDANETA, A.J., "Uniform Marginal Pricing for the Remuneration of Distribution Networks", IEEE Transactions on Power Systems, August 2005, vol.20, no.3, p.1302-1310.

LOPES, J.A.P., MOREIRA, C. L., RESENDE, F., "Control Strategies for MicroGrids Black Start and Islanded Operation", International Journal of Distributed Energy Resources, July 2005, vol.1, no.3, p.241-261.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., "Comparative Analysis of Different Cost Loss Allocation Methodologies in Distribution Networks with Distributed Generation (in Spanish)" [Análisis Comparativo de los Métodos de Asignación de Pérdidas Eléctricas en Redes de Distribución con Generación Distribuida], IEEE Transactions Latin America, June 2005, vol.3, p.74-79.

PAPADOGIANNIS, K.A., HATZIARGYRIOU, N., SARAIVA, J.T., "Short active/reactive operation planning in a market enviroment using simulated annealing", International Journal on Engineering Intelligent Systems, June 2005, vol.13, no.2, p.89-96.

KONJIC, T., MIRANDA, V., KAPETANOVIC, I., "Fuzzy Inference Systems applied to LV Substation Load Estimation", IEEE Transactions on Power Systems, May 2005, vol.20, no.2, p.742-749.

CASTRO, A.R.G., MIRANDA, V., "Knowledge Discovery in Neural Networks with Application to Transformer Failure Diagnosis", IEEE Transactions on Power Systems, May 2005, vol.20, no.2, p.717-724.

RAMIREZ-ROSADO, I., MONTEIRO, C., GARCÍA-GARRIDO, E., MIRANDA, V., et al., "Negotiation Aid System to Define Priority Maps for Wind Farm Development", IEEE Transactions on Power Systems, May 2005, vol.20, no.2, p.618-626.

RAMIREZ-ROSADO, I., FERNÁNDEZ-JIMÉNEZ, L.A., MONTEIRO, C., MIRANDA, V., et al. , "Powerful Planning Tools", IEEE Power & Energy Magazine, April 2005, vol.3, no.2, p.56-63.

MONTEIRO, C., RAMIREZ-ROSADO, I., MIRANDA, V., ZORZANO-SANTAMARÍA, P.J., et al. , "GIS Spatial Analysis Applied to Electric Line Routing Optimization ", IEEE Transactions on Power Delivery, April 2005, vol.20, no.2, p.934-942.

FIDALGO, J.N., LOPES, J.A.P., "Load forecasting performance enhancement when facing anomalous events", IEEE Transactions on Power Systems, February 2005, vol.20, no.1, p.408-415.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., "Integrated Framework for Energy Cost Allocation of Distribution Systems in Liberalised Markets", International Journal of Global Energy Issues 2005.

CASTRO, A.R.G., MIRANDA, V., "An interpretation of neural networks as inference engines with application to transformer failure diagnosis", International Journal of Electrical Power & Energy Systems 2005, vol.27, no.9, p.620-626.

R5.4.6 National Journals with scientific referees
Blank.

R5.4.7 Conference Proceedings with scientific referees

MIRANDA, V., OO, N.W., "Evolving Agents in a Market Simulation Platform – a Test for Distinct Meta-Heuristics", *Proceedings of ISAP'2005 - Intelligent System Applications to Power Systems*, November 2005, Washington DC, USA.

SECA, L. M., **LOPES, J.A.P.**, Intentional Islanding for reliability improvement in distribution networks with high DG penetration, *Proceedings of FPS 2005 - International Conference on Future Power Systems*, Amsterdam, The Netherlands, October, 2005.

MIRANDA, V., OO, N.W., "Evolutionary Algorithms and Evolutionary Particle Swarms (EPSO) in Modeling Evolving Energy Retailers", *Proceedings of PSCC'05 - 15th Power Systems Computation Conference*, August 2005, Liège, Belgium.

MENDONÇA, Â., LOPES, J.A.P., "Impact of Large Scale Wind Power Integration on Small Signal Stability", *Proceedings of FPS 2005 - International Conference on Future Power Systems*, November 2005, Amsterdam, The Netherlands.

MONTEIRO, C., MIRANDA, V., RIBEIRO, L.F., BERNAL-AGUSTÍN, J.L., et al., "Geographic Web Service for Evaluation of Small Renewable Energy Projects", *ICREPQ'05 - International Conference on Renewable Energy and Power Quality* 2005, Zaragoza, Spain.

BERNAL-AGUSTÍN, J.L., DUFO-LÓPEZ, R., RIVAS-ASCASO, D.M., MONTEIRO, C., et al., "Evolutionary Computation Application to Design Stand Alone Wind/PV Systems", *ICREPQ'05 - International Conference on Renewable Energy and Power Quality* 2005, Zaragoza, Spain.

BRAGA, A.S., SARAIVA, J.T., "LONG TERM MARGINAL PRICES – SOLVING THE REVENUE RECONCILIATION PROBLEM OF TRANSMISSION PROVIDERS", *PSCC'05 - 15th Power Systems Computation Conference* 2005, Liège, Belgium.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., YUSTA LOYO, J.M., KHODR, H.M., "Cost Loss Allocation in Distribution Networks with High Penetration of Distributed Generation – A Comparative Study", *Proceedings of ICREPQ'05 - International Conference on Renewable Energy and Power Quality*, March 2005, Zaragoza, Spain.

LOPES, J.A.P., VASCONCELOS, H., "Security Assessment of Interconnected Systems Having Large Wind Power Production", April 2005, *CIGRE SYMPOSIUM: Power Systems with Dispersed Generation*, Athens, Greece.

LOPES, J.A.P., MENDONÇA, Â., FONSECA, N., SECA, L.M.L.D.S., "Voltage and Reactive Power Control Provided by DG Units", April 2005, *CIGRE SYMPOSIUM: Power Systems with Dispersed Generation*, Athens, Greece.

GUIMARÃES MADUREIRA, A., COELHO LEAL MOREIRA, C., LOPES, J.A.P., "Secondary Load-Frequency Control for MicroGrids in Islanded Operation", *Proceedings of ICREPQ'05 - International Conference on Renewable Energy and Power Quality*, March 2005, Zaragoza, Spain.

COSTA, P. M., MATOS, M., "Reliability of Distribution Networks with Microgrids", Proceedings of IEEE St. Petersburg PowerTech, June 2005, St. Petersburg, Russia.

MIRANDA, V., OO, N.W., "Multi-energy Retail Market Simulation with Intelligent Agents", *Proceedings of IEEE StPPT - IEEE St. Petersburg PowerTech*, June 2005, St. Petersburg, Russia.

MATOS, M., GOUVEIA, E., "The Fuzzy Power Flow Revisited", Proceedings of IEEE St. Petersburg PowerTech, June 2005, St. Petersburg, Russia.

GOMES, M.R., SARAIVA, J.T., "Active / Reactive Dispatch in Competitive Environment", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, June 2005, St. Petersburg, Russia.

LOPES, J.A.P., "Technical and commercial impact of the integration of wind power in the Portuguese system having in mind the Iberian Electricity Market", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, June 2005, St. Petersburg, Russia.

LOPES, J.A.P., COELHO LEAL MOREIRA, C., GUIMARÃES MADUREIRA, A., "Defining Control Strategies for Analysing MicroGrids Islanded Operation", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, June 2005, St. Petersburg, Russia.

PEREIRA, J., G. LUCUS, B., "Component Technology for Modeling Power Networks in an Integrated DMS", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, June 2005, St. Petersburg, Russia.

SÁ, A., SARAIVA, J.T., "Development of a Market Approach to Integrate Microsources in LV Distribution Networks", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, July 2005, St. Petersburg, Russia.

BRAGA, A.S., SARAIVA, J.T., "Dealing with Uncertainties in Long Term Transmission Expansion Planning Problems", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, July 2005, St. Petersburg, Russia.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., "Distribution Loss Allocation Methods Assessment Under Electricity Market Environment", *PowerTech2005 - IEEE St. Petersburg Power Tech 2005*, July 2005, vol.1, no.1, St. Petersburg, Russia.

DOS SANTOS SILVA, S.M., FIDALGO, J.N., LOPES, J.A.P., "Analysis of Micro Generation Impacts in Distribution Networks", *Actas 9 CHLIE'2005 9CHLIE - 9°. CONGRESO HISPANO-LUSO DE INGENIERÍA ELÉCTRICA 2005*, July 2005, Marbella, España.

FIDALGO, J.N., MATOS, M., MARQUES, M., "Estimation and Allocation of Losses in Distribution Networks", Proceedings of 9 CHLIE – Spanish-Portuguese Congress on Electrical Engineering, June – July, 2005, Marbella, Spain.

ALMEIDA, R., LOPES, J.A.P., "Primary Frequency Control Participation Provided by Doubly Fed Induction Wind Generators", *Proceedings of PSCC'05 - 15th Power Systems Computation Conference*, August 2005, Liège, Belgium.

LOPES, J.A.P., COELHO LEAL MOREIRA, C., RESENDE, F., "MicroGrids Black Start and Islanded Operation", *15th PSCC - 15th Power Systems Computation Conference*, August 2005, Liège, Bélgica.

DE OLIVEIRA-DE JESUS, P.M., PONCE DE LEÃO, M.T., "Long Term Cost Allocation Methodology for Distribution Networks with Distributed Generation", *Proceedings of PSCC'05 - 15th Power Systems Computation Conference*, August 2005, vol.1, no.1, Liège, Belgium.

SILVESTRE BRAGA, A., SARAIVA, J.T., "LONG TERM MARGINAL PRICES – SOLVING THE REVENUE RECONCILIATION PROBLEM OF TRANSMISSION PROVIDERS", *Proceedings of PSCC'05 - 15th Power Systems Computation Conference*, August 2005, Liège, Belgium.

DE OLIVEIRA-DE JESUS, P.M., CASTRONUOVO, E.D., PONCE DE LEÃO, M.T., "Optimal Reactive Power Provision of Wind Farms in Liberalized Markets – A Generation Viewpoint ", *IEEE T-D'2005 - 2005 IEEE-PES Transmission & Distribution Conference & Exposition*, October 2005, New Orleans, United States of America.

LOPES, J.A.P., COELHO LEAL MOREIRA, C., GUIMARÃES MADUREIRA, A., RESENDE, F., HATZIARGYRIOU, N., "Control Strategies for MicroGrids Emergency Operation", *Proceedings of FPS 2005 - International Conference on Future Power Systems*, November 2005, Amsterdam, The Netherlands.

MATOS, M., FIDALGO, J.N., RIBEIRO, L., "Deriving LV load diagrams for market purposes using commercial information", *Proceedings of ISAP'2005 - Intelligent System Applications to Power Systems*, November 2005, Washington DC, USA.

R5.4.8 Other Publications

FERREIRA DA SILVA, A.J., ARISTIDES, F., FIDALGO, J.N., "Power Regulation in Pitch-Controlled Variable-speed Wind Turbine Using a Neural Network", May 2005, Coupled Problems 2005 – Computational Methods for Coupled Problems in Science, Santorini, Grécia.

MONTEIRO, C., MIRANDA, V., "GEOCOMPUTATIONAL MODELING OF ELECTRICITY CONSUMPTION WITH FUZZY SYSTEMS", *GISPLANET2005* 2005, Lisboa, Portugal.

MONTEIRO, C., MIRANDA, V., RAMIREZ-ROSADO, I., ZORZANO-SANTAMARÍA, P.J., GARCÍA-GARRIDO, E., "SPATIAL NEGOTIATION AID SYSTEMS FOR PERMITTING ENERGY FACILITIES", *GISPLANET2005* 2005, Lisboa, Portugal.

MARQUES, P. F., LOPES, J.A.P., MENDONÇA, Â., ALMEIDA, R., Avaliação do Comportamento da Rede Eléctrica Portuguesa num Cenário de Grande Integração de Produção Eólica, *Conferência sobre Energias Renováveis e Ambiente em Portugal-A Situação Portuguesa face aos Objectivos da União Europeia* - Maio de 2005, Figueira da Foz, Portugal.

MATOS, M., M. LEITE DA SILVA, A., QUEIRÓS DE AGUIAR, M.J., LOPES, J.A.P., et al. , "Um estudo sobre a segurança de abastecimento de electricidade em Portugal" [A study on the security of electricty supply in Portugal], *1º ENRSF - 1º Encontro Nacional de Riscos, Segurança e Fiabilidade* 2005, Lisboa, Portugal.

NUNES, E., FARIA, J., MATOS, M., "Análise e Avaliação Difuso-Probabilística de Sistemas de Produção Industriais", *Actas do 1ª ENRSF – 1ª Encontro Nacional de Riscos, Segurança e Fiabilidade*, 2005, Lisboa, Portugal.

R5.5 List of Journals

Journal	Number of papers
IEEE Power & Energy Magazine	1
IEEE Transactions Latin America	1
IEEE Transactions on Power Delivery	2
IEEE Transactions on Power Systems	8
International Journal of Distributed Energy Resources	1
International Journal of Electrical Power & Energy Systems	1
International Journal on Engineering Intelligent Systems	1
International Journal of Global Energy Issues	1
TOTAL	16

R5.6 LIST OF PATENTS

Blank.

A5.7 LIST OF PROTOTYPES

DSM modules
Developed under EFACEC-DMS
Demo Place: EFACEC
Development Period: 1999-2005

Micro-Grid dynamic simulation platform
Developed under Micro-Grids
Demo Place: INESC Porto
Development Period: 2004-2005

Tools for wind-hydro-pumping operation optimization
Developed under Prime
Demo Place: INESC Porto
Development Period: 2004-2005

Modules for security of supply monitoring
Developed under Prime
Demo Place: INESC Porto
Development Period: 2004-2005

R5.8 LIST OF THESES SUPERVISED BY MEMBERS OF THE UNIT DURING 2005

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Eusébio Nunes	FEUP	Manuel Matos José Faria	INESC Porto/FEUP FEUP	Reliability evaluation of non-markovian engineering systems with uncertain parameters	2005
Leonidas Chaves de Resende	UFEI	Armando Leite da Silva	INESC Porto	Power System Planning Based on a Well-Being Analysis	2005
António Ferreira da Silva	ISEP	José Nuno Fidalgo Aristides Castro	INESC Porto/FEUP ISEP	Application Techniques of Adaptive Control and Artificial Intelligence	2006
Fernanda Resende	FEUP	João Peças Lopes	INESC Porto/FEUP	Identification of Control Procedures in Micro-Generation Islanding Conditions	2006
Maria Helena Vasconcelos	FEUP	João Peças Lopes José Nuno Fidalgo	INESC Porto/FEUP	Identification of Efficient Preventive Control Procedures Exploiting Security Evaluation Structures Derived using Machine Learning Techniques	2006
Naing Win Oo	FEUP	Vladimiro Miranda José Nuno Fidalgo	INESC Porto/FEUP	Evolving agents in Energy Market Simulation	2006
Paulo Jesus	FEUP	Maria Teresa de Ponce Leão	INESC Porto/FEUP	Remuneration of distributed generation: a holistic approach	2006
Rogério Almeida	FEUP	João Peças Lopes	INESC Porto/FEUP	Evaluation of the Capability of Ancillary Services Delivery by Dispersed Generation Units using Different Technologies	2006
Ângelo Mendonça	FEUP	João Peças Lopes	INESC Porto/FEUP	Development of Robust Control Systems for Stabilizing Power Oscillations in Systems with Large Scale Wind Power Integration	2007
Carlos Moreira	FEUP	João Peças Lopes	INESC Porto/FEUP	Identifying and Developing Emergency Procedures for the Operation of Micro-Generators in Isolated Grids and Participation in Black-Start Strategies	2007
Eduardo Gouveia	FEUP	Manuel Matos	INESC Porto/FEUP	Development and Evaluation of Investment Plans for the Transmission Activity in a Liberalized Environment	2007

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Mário Helder Gomes	FEUP	João Tomé Saraiva	INESC Porto/FEUP	New Mechanisms for Electricity and Ancillary Services Markets	2007
Paulo Mendes da Silva	FEUP	Maria Teresa de Ponce Leão	INESC Porto/FEUP	Integrated Methodologies for Distribution Planning	2007
Paulo Moisés	ESTV	Manuel Matos	INESC Porto/FEUP	Regulation and Planning of Electric Distribution Systems	2007
Pedro Marques	FEUP	João Peças Lopes	INESC Porto/FEUP	Dynamic security assessment in interconnected power systems with large scale integration of wind generation	2007
Mauro da Rosa	FEUP	Vladimiro Miranda	INESC Porto/FEUP	Reliability of Power Systems with distributed generation	2008
Nuno Gil	FEUP	João Peças Lopes	INESC Porto/FEUP	Elaboration of Procedures and Criteria for Definition of Limits of Eligibility of Acceptance of Renewable Production in Isolated Networks	2008
1	2	3	4	5	6

1 – Name of the post-graduation student
2 – Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester
3 – Name of supervisor or supervisors
4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid
5 – Title of the thesis
6 – Predicted year of conclusion and delivery – will be taken in account in summary tables

MSc Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
André Madureira	FEUP	João Peças Lopes	INESC Porto/FEUP	Definition of Control Strategies and Stability Assessment of Low Voltage Networks with Microgeneration in Islanded Mode	2005
Bruno André Gomes	FEUP	João P. Tomé Saraiva	INESC Porto/FEUP	Market and System Simulator In an Electricity Market Including Inter-Temporal Constraints	2005
Constantin Ginet	EPFL	J. Peças Lopes / Rachid Charkaoui	INESC Porto/FEUP / EPFL	Analysis of the Operation of Small Isolated Autonomous Electrical Systems in Rural Areas	2005
Manuel João Aguiar	FEUP	Maria Teresa de Ponce Leão	INESC Porto/FEUP	Models for Distributed Generation	2005
Marco Marques	FEUP	José Nuno Fidalgo	INESC Porto/FEUP	Characterization of LV Consumer's Contribution to Network Losses	2005
Nuno Fonseca	FEUP	João Duque	FEP	Inter-Relation of Electricity Markets and Volatility	2005
João Luís Pinto	FCUP	Eugénio Oliveira / Manuel Matos	FEUP / INESC Porto/FEUP	Multi-agent system for the implementation of an electricity market	2006
Jorge Filipe Gomes Pereira	FEUP	Manuel Matos	INESC Porto/FEUP	Comparing the efficiency of secondary schools using DEA	2006
Luís Miguel Seca	FEUP	João Peças Lopes	INESC Porto/FEUP	Defining Operating Strategies and Service Restoration Procedures for Isolated Distribution Networks with Large-scale integration of Dispersed Generation	2006

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Luís Ribeiro	FEUP	Claudio Monteiro	INESC Porto/FEUP	Geografic Web Services for Evaluation of Small Renewable Energy Project	2006
Maria do Rosário Trindade	FEUP	Manuel Matos Ana Azevedo	INESC Porto/FEUP FEUP	Development of an evaluation tool for Enterprise Web Information Support Services	2006
Paul Brown	FEUP	João Peças Lopes	INESC Porto/FEUP	Evaluation of Integration of Pumped Storage Units in an Isolated Network	2006
Susana Silva	FEP	José Nuno Fidalgo Dalila Fontes	INESC Porto/FEUP FEP	Impact analysis of small dispersed generation under different regulation directives	2006
1	*2*	*3*	*4*	*5*	*6*

1 - Name of the post-graduation student

2 - Institution holding the course where this student in enrolled in; if the host institution is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester

3 - Name of supervisor or supervisors

4 - Affiliation institutions of supervisors - ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid

5 - Title of the thesis

6 - Predicted year of conclusion and delivery - will be taken in account in summary tables

R5.9 ORGANISATION OF INTERNATIONAL SCIENTIFIC EVENTS

Blank.

R5.10 ADVANCED TRAINING

Blank.

R5.11 OTHER CONTRIBUTIONS TO THE OBJECTIVES OF ASSOCIATE LABORATORY

UNIT: USE – POWER SYSTEMS	Thematic Line
Support to public and institutional entities in performing studies and consulting actions related to the development of public policies for energy. Participation in the advisory board of the "Technological Plan", a government initiative.	Electric sector and integrated territorial planning

R5.12 AWARDS, RECOGNITIONS

One member of USE (Vladimiro Miranda) was elevated to Fellow of IEEE.

R5.13 ANALYSIS AND ASSESSMENT OF DEVIATIONS RELATIVE TO FORMER PLANNING

R5.13.1 Comparison with strategic actions or policy lines defined in the plan of the previous year

The objectives for 2005 were generally accomplished. A new European RTD project in the area of microgrids was approved to begin in 2006 and the remaining topics of the 2005 plan were also addressed with good results, namely regarding publication in international journals. It was not possible to organize

a new EES-UETP course due to the application of the new rules of the consortium, but efforts were made to guarantee a new course in 2006.

R5.13.2 Cases of success, problems met, internal and external conditioning factors

The activity of the Unit increased again, with more development projects and consulting services and an increase in the participation in public projects, supporting the administration and the utilities. The economic results were also better than expected.

Internationally, the European project "MicroGrids" was very succefull, leading to a good position in the european research in that area, and the collaboration to ONS (in Brazil) increased and will continue due to the good results obtained.

R6. UNIT: USIC – INFORMATION AND COMMUNICATION SYSTEMS

R6.1 SHORT DESCRIPTION OF THE UNIT

The Information and Communication Systems Unit (USIC) studies, develops and promotes integrated solutions in the communication and information systems fields. The Unit performs several types of activity, namely: research, development, technology transfer, consulting, auditing and advanced training.

These activities are carried out in several sectors. Important partners and clients may be referenced in the following areas: telecommunications, local administration, industry, commerce, healthcare, ship building, Central and Regional Government.

The Unit, in terms of technological competencies, covers globally the information systems and telecommunication fields. This is made possible by a heterogeneous team, with skills in diversified areas: computer systems, office automation, telecommunications, computing sciences and geographic engineering. Some of the collaborators hold MSc and PhDs.

The Unit acts independently from technology suppliers, complementing its partners and enabling them to select and implement the solutions needed for the modernization of their activities.

The Unit is presently structured in three areas:

- Geographic Information Systems
- Information Systems
- Integration (emerging area)

USIC has special skills in GIS – Geographic Information Systems, not only in their applications but also in interoperability of systems from different vendors and technologies. This has allowed successful projects enhancing communication among different actors in the market or public administration, as well as different departments inside the same institution.

The solid know how detained at USIC allows its researchers to cooperate in task forces with the other Units of INESC Porto, giving the institution its recognized strength in building up technically strong teams for projects in all areas, which usually require skills in information systems.

R6.2 ACTIVITIES DEVELOPED IN 2005

R6.2.1 National programmes

CMMaia - Support to Câmara Municipal da Maia in systems development and applications using GIS.

SIGA METRO - Development and structuring of georeferenced information systems for "Metro do Porto S.A."

SCOPE - Electronic Port Community System. This project aims to study and implement mechanisms of electronic communication in the Porto de Leixões Port Community. Essentially consists in the modelization and specification of processes between partners, in the accompaniment of the developments made by the software-houses and the certification of these applications and the verification of its implementation. This project is financed by the program "Investigação em Consórcio" of the Innovation Agency and involves 29 partners, being led by APDL.

SIGDIC - Specification and development of an Integrated System of Management and Diffusion of Contents (SIGDiC), able to integrate some sources of contents (Web, News Agencies, etc.) and provide (semi) automatic contents in the different available communications channels (WAP, Web, interactive television, UMTS, terrestrial digital cable, satellite digital TV, terrestrial digital TV), being compatible with legacy systems (like teletext).

DRE-LVT - Support for the implementation of a strategic plan for the modernisation of the IT infrastructure of Direcção Regional de Economia de Lisboa e Vale do Tejo

NETDOURO - Study on regional broadband infrastructures for an emerging telecom operator (water distribution company).

m-GIS - Development of a technologycal framework that enables the creation of interoperable GIS products or services for mobile platforms for Portugal Telecom Inovação.

IMOPPI - Specification of information systems for the interoperation of the Real Estate and Public Construction Market Regulator with its partners.

R6.2.2 European programmes

MEDSI - MANAGEMENT DECISION SUPPORT FOR CRITICAL INFRASTRUCTURES (IST-2002-506991)

The objective of MEDSI project is to develop a web-based integrated set of software services as a tool to enhance the capabilities of crisis planners and crisis managers in both private and governmental organizations. This project will enable them to utilize various information sources for better monitoring and reduction of potential and actual risks and for more effective response in case of threats imposed especially to the subjects of the critical infrastructure. MEDSI will also be capable to create, maintain and optimise the typical scenarios and procedures how to solve the situations.

COOPNAV - INTERREG III - A project involving partners from Portugal and Spain, Galicia. The objective is to create a trans-border distributed infrastructure for business collaboration in the area of shipbuilding

e-ASLA - INTERREG III B - e-Administration Framework for Small Local Authorities. NTIC implementing in small Local Authorities with less 20000 citizens of a framework for integrating commercial and open source software.

IVY - A model - based usability analysis environment, which will act as a test-bed for the applicability of formal methods and tools to different styles of analysis of interactive systems models. The new tool will be called IVY (Interactors VerifYier).

Linkall - The Link-all Project is funded under the @lis Programme supported by the EC-EuropeAid Co-operation Office. It aims to assist in the uptake of innovative IT practices, to support collaboration, promote exchange of experience, transfer of know-how and improve related skills in three (3) targeted sectors - CRAFTS, ECO-AGRO TOURISM and CULTURE.

R6.2.3 Other programmes, consulting, services

RUP TELECOM - Study on regional broadband services and infrastructures in the Outermost Regions of the European Union for DG INFSO.

R6.3 SUMMARY OF RESULTS OF THE RESEARCH ACTIVITIES OF THE TEAM MEMBERS

- **Projects**

Summary of projects developed in 2005

Type of Activity (1)	No. Projects (2)			Total Income (€)
	N	E	I	
R - Research	4	3	1	345.537
D - Development	2			86.425
C - Consulting	3	1		89.343
A – Advanced training				
T – Technology Transfer				
O - Other				
TOTAL	9	4	1	521.305

Summary of relative distribution of sources of income

Financing (3)	Status (4)			Total Income (€)
	S - Started	OG- On-going	C - Concluded	
NP – National Programmes		12,39%	9,52%	114.190
EP – European Programmes	21,80%		17,78%	206.347
CS – Consulting and Services	4,80%	29,20%	4,51%	200.768
O – Other R&D sources				
OS – Other Sources				
Total	26,60%	41,59%	31,81%	521.305

Summary of projects developed in 2005

Name of the project	Respons.	Type Proj. (1)	Degree of Intern. (2)	Financ. Type (3)	Financ. Prog.	Starting date	Conclusion (prediction)	Status (4)
Consultador	P. Monteiro	C	N	CS	-	01-1996	-	OG
CMMaia	Artur Rocha	D	N	CS	-	07-1999	-	OG
SIGA Metro	Artur Rocha	D	N	CS	-	09-2001	-	OG
SCOPE	A. Gaspar	R	N	NP	I&D Cons.	10-2002	07-2005	F
IMOPPI	Rui Barros	C	N	CS	-	03-2003	03-2006	OG
MEDSI	Artur Rocha	R	E	EP	IST	09-2003	10-2005	F
SIGDIC	José Correia	R	N	NP	PRIME	09-2003	11-2005	F
LinkAll	J. J. P F.	R	I	EP	@LIS	11-2003	08-2005	F
CoopNAV	A. Gaspar	R	E	NP	Interreg	10-2004	03-2006	OG
DRE-LVT	A. Gaspar	C	N	CS	-	11-2004	12-2005	F
RUP Telecom	A. Gaspar	C	E	CS	-	01-2005	09-2005	F
e-ASLA	Rui Barros	R	E	EP	Interreg	02-2005	06-2007	S
mGIS	Artur Rocha	R	N	CS	PTIN	03-2005	04-2006	S
IVY	Pascoal Faria	R	N	NP	FCT	07-2005	06-2008	S

(1) Type of Project: R – Research; D – Development; C – Consulting; A – Advanced Training; T – Technology Transfer; O - Other
(2) Degree of internationalization: N – National; E – European; I – International *(Select one)*
(3) Source of financing: NP – National Programmes; EP – European Programmes; CS – Consulting and services; O – Other R&D financing sources; OS – Other sources
(4) Status: S – Starting: activities initiated in 2005 and continuing in 2006; OG – On-going: activities started earlier than 2005 and continuing in 2006; F - Finished: activities ending in 2005.

- **Summary of publications**

Summary of publications in 2005

Type of publication	Number
Theses concluded in 2005 by members of the unit	1
Books (author)	
Chapter/paper in books	
Publications (editor)	1
Papers in International Journals with scientific referees	3
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	14
Other publications (National meetings, local journals, etc.)	1
Total	**20**

- **Summary of post-graduation activities**

Summary of theses supervised by members of the unit in 2005

Type	Starting	On-going	Concluded	Total
Master	8	9	2	19
Doctoral	1	2		3
Total	**9**	**11**	**2**	**22**

- **Summary of Advanced Training Actions**

Summary of Advanced Training Actions organized for external trainees in 2005

Type	Number
Training for graduation students *(estágios curriculares)*	3
Training for others *(estágios extra-curriculares)*	
Professional training actions *(estágios profissionais)*	
Other actions	1
Total	**4**

- **Summary of activities of cooperation or dissemination**

Summary of items

Type	Number
Organizing conferences or meetings	2
Colaboration in papers authored by INESC Porto researchers	
External persons directly involved in actions organized by INESC Porto	6

- **Human resources in 2005**

Summary of Unit personel at the end of 2005

Type	Education				Total	Variation (*)
	PhD.	MSc.	BSc.	Other		
R&D						
University or Politechnic Lecturers	5	1			6	+1
Grantees INESC Porto			4	1	5	+2
Other Grantees						
Contracted		3	9		12	+1
Trainees						
Other			1		1	+1
Administrative			1		1	0
Total	5	4	15	1	25	+5

(*)   Relative to 2004, in absolute numbers.

R6.4 LIST OF PUBLICATIONS

R6.4.1 Theses concluded in 2005 by members of the unit

RODRIGUES, J.P., "SIGDiC - Sistema Integrado de Gestão e Difusão de Conteúdos" [SIGDiC - Integrated system for content management and distribution], MSc Thesis, FEUP, January 2005.

R6.4.2 Books (Author)

Blank.

R6.4.3 Chapter/paper in Books

Blank.

R6.4.4 Publications (Editor)

PINTO FERREIRA, J.J., (Guest Editor); Editorial of International Journal of Computer Integrated Manufacturing, vol.18, nº 5, pp.341, August, 2005.

R6.4.5 International Journals with scientific referees

ROCHA, A.J.D.S., CESTNIK, B., AMARO OLIVEIRA, M.A., "Interoperable Geographic Information Services to Support Crisis Management", Lecture Notes on Computer Science, December 2005, ISBN:3-540-30848-2, vol.3833, no.2005, p.246-255.

NUNES, Á., PINTO FERREIRA, J.J., MENDONÇA, J.M., "Distributed business process coordination: a functionally oriented infrastructure", International Journal of Computer Integrated Manufacturing, August 2005, vol.18, no.5, p.418-426.

COSTA, R.A., LEITÃO, M.J.M., VILA VERDE, I., "Electronic Voting: An All-Purpose Platform", Lecture Notes on Computer Science, August 2005, vol.3591, p.307-316.

R6.4.6 National Journals with scientific referees

Blank.

R6.4.7 Conference Proceedings with scientific referees

ROCHA, A.J.D.S., CESTNIK, B., AMARO OLIVEIRA, M.A., "Interoperable Geographic Information Services to Support Crisis Management", W2GIS 2005 - 5th International Workshop on Web and Wireless Geographical Information Systems, December 2005, Lausanne, Suiça.

PAIVA, A.C., PASCOAL FARIA, J., TILLMAN, N., "A Model-to-implementation Mapping Tool for Automated Model-based GUI testing", ICFEM 2005 - Seventh International Conference on Formal Engineering Methods, November 2005, LNCS, vol.3785, Manchester, Reino Unido, p.450-464.

SILVEIRA, C., PASCOAL, J., AGUIAR, A., VIDAL, R., "Wiki Based Requirements Documentation of Generic Software Products", AWRE'05 - The Tenth Australian Workshop on Requirements Engineering, November 2005, Proceedings of 10th Australian Workshop on requirements Engineering- AWRE'05, Melbourne, Austrália, p.42-51.

PAIVA, A.C., PASCOAL, J., VIDAL, R.F., TILLMAN, N., "Modeling and Testing Hierarchical GUIs", ASM 2005 - 12th International Workshop on Abstract State Machines, March 2005, Proceedings of 12th International Workshop on Abstract State machines-ASM' 2005, Paris, França, p.329-344.

AGUIAR, A., DAVID, G., "DocIt! Patterns, A Pattern Language for Documenting Object-Oriented Frameworks", VikingPlop'2005 - The Fouth Nordic Conference of Pattern Languages of Programs 2005, Helsinquia, Finlandia.

AGUIAR, A., TORCATO DAVID, G., "WikiWiki Weaving Heterogeneous Software Artifacts", OOPSLA'05 2005, Proceedings of the 2005 International Symposium on Wikis ACM Press, 2005, San Diego, Estados Unidos America, p.67-74.

BERTOCCHINI, J., RODRIGUES, J.P.A.D.S., "O protocolo MOS e o SIGDiC", XATA2005 XML: Aplicações e Tecnologias Associadas, February 2005, Vila Verde - Braga, Portugal, p.176-184.

RODRIGUES, J.P.A.D.S., CORREIA, J.M.D.C., "O Repositório XML do SIGDIC", XATA2005 XML: Aplicações e Tecnologias Associadas, February 2005, Vila Verde - Braga, Portugal, p.28-39.

HENRIQUES, M.R.D.N., "pGML - estudo de um subconjunto "preciso" do GML 2.12", XATA2005 XML: Aplicações e Tecnologias Associadas, February 2005, Vila Verde - Braga, Portugal, p.323-334.

OLIVEIRA, J.L.M.D., "Suporte à Elaboração e Manutenção de PMOT usando tecnologia XML", XATA2005 XML: Aplicações e Tecnologias Associadas, February 2005, Vila Verde - Braga, Portugal, p.335-342.

CESTNIK, B., ROCHA, A.J.D.S., ENDIG, M., "Collaborative Crisis Management for Protecting Critical Infrastructures", TIEMS 2005 - 12th Annual Conference Critical Infrastructures and System Failure 2005, Faroe Island, Islândia.

CESTNIK, B., ROCHA, A.J.D.S., ENDIG, M., "Emergency Response Through Collaborative Crisis Management", Eastern Europe e-Gov Days - Eastern Europe e-Gov Days 2005, Budapeste, Hungria.

FLORES, N., AGUIAR, A., "JFREEDOM: a Reverse Engineering Tool to Recover Framework Design", ECOOP2005 - ECOOP2005 - European Conference on Object-Oriented Programming 2005, Proceedings of ECOOP'05 Workshop on Object-oriented Re-engineering (WOOR'05), Glasgow, Escócia.

FLORES, N., AGUIAR, A., "Reverse Engineering of Framework Design using a Meta-Patterns-based Approach", Proceedings of AICCSA 05 - Workshop on Software Stability: Timeless Architectures and System of Patterns 2005, Cairo, Egipto.

R6.4.8 Other Publications

CARVALHO, A., BÁRTOLO, L., "Geração Expedita de Modelos Virtuais com Base em Informação Geográfica 2D ", 4º SOPCOM - 4ºSOPCOM - Repensar os Media: Novos Contextos da Comunicação e da Informação 2005, Aveiro, Portugal.

R6.5 LIST OF JOURNALS

Journal	Number of papers
Lecture Notes on Computer Science	2
International Journal of Computer Integrated Manufacturing	1
TOTAL	3

R6.6 LIST OF PATENTS

Blank.

R6.7 LIST OF PROTOTYPES

<u>MEDSI - Management Decision Support for Critical Infrastructures</u>
Developed under MEDSI
Demo Place: Holon-Israel
Development Period: 2004-2005

<u>SIGDIC - Specification and development of an Integrated System of Management and Diffusion of Contents</u>
Developed under SIGDIC
Demo Place: RTP-Porto
Development Period: 2003-2005

R6.8 LIST OF THESES SUPERVISED BY MEMBERS OF THE UNIT DURING 2005

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ana Cristina R. Paiva	FEUP	Raúl Vidal João Pascoal Faria	FEUP INESC Porto/FEUP	Aplicação de Métodos Formais ao Desenvolvimento de Interfaces com o Utilizador	2006
Maria Clara S. P. Silveira	FEUP	Raúl Vidal João Pascoal Faria	FEUP INESC Porto/FEUP	A Reutilização de Requisitos no Desenvolvimento e Adaptação de Produto de Software	2006
Artur Rocha	FEUP	Ademar Aguiar	INESC Porto/FEUP	Enabling Cooperative Distributed Support for GI-based Decision Making	2008
1	2	3	4	5	6

1 – Name of the post-graduation student;
2 – Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester;
3 – Name of supervisor or supervisors;
4 – Affiliation institutions of supervisors – ex: INESC Porto/FEUP, FCTUC, P. Univ. Comillas Madrid;
5 – Title of the thesis;
6 – Predicted year of conclusion and delivery – will be taken in account in summary tables.

MSc Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Firmino Oliveira Silva	FEUP	João Pascoal Faria	INESC Porto/FEUP	Integração de Sistemas/Plataformas como solução para a gestão da informação de clientes	2005
Luís Cláudio Barradas	FEUP	João José P. Ferreira	INESC Porto/FEUP	Integração inter-empresarial no negócio em rede	2005
Alexandra Marieiro Cabral	FEUP	Vítor Martins João Correia Lopes	FAP INESC Porto/FEUP	Sistema Digital de Comunicação Urbana	2006
Carlos Torres Quental	FEUP	João Correia Lopes	INESC Porto/FEUP	Acesso distribuído a fontes heterógeneas de dados	2006
Conceição Vilas Boas	FEUP	Ademar Aguiar	INESC Porto/FEUP	Método de avaliação ex-post de projectos de Sistemas de Informação na Administração pública	2006

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Cláudia Simões	FEUP	João Pascoal Faria Ana Cristina Paiva	INESC Porto/FEUP FEUP	Engenharia Reversa de Interfaces Gráficas com o Utilizador	2006
Fernando Monteiro Gomes	FEUP	João José P. Ferreira	INESC Porto/FEUP	Oportunidades de Inovação na Aplicação de redes de comunicação móvel a sistemas de automação de redes de distribuição de energia	2006
Filipe Teixeira Campos	FEUP	Ademar Aguiar	INESC Porto/FEUP	Estudo de arquitecturas e desenvolvimento de ferramentas em plataformas Mobile para sistemas SCADA	2006
Jorge Esparteiro Garcia	FEUP	Rui Camacho João Correia Lopes	FEUP INESC Porto/FEUP	Web assistant for collaborative and automatic data analysis- The WebCAD system	2006
José Rios Fonseca	FEUP	Ademar Aguiar	INESC Porto/FEUP	Descompilação de Código Máquina	2006
Mafalda Vaz Moreira	FEUP	João José P. Ferreira	INESC Porto/FEUP	Gestão de Processo Criativo na Inovação ao nível dos serviços de consultadoria em Sistemas de informação e comunicação	2006
Manuel Magalhães Freire	FEUP	Ademar Aguiar	INESC Porto/FEUP	Gestão de versões num Modelo relacional com aplicação a um configurador de Redes Eléctricas	2006
Nuno Honório Flores	FEUP	Ademar Aguiar	INESC Porto/ FEUP	Engenharia Reversa de Padrões em Arquitecturas Reutilizáveis	2006
Patrícia Barrosa Filipe	FEUP	João Correia Lopes	INESC Porto/FEUP	Biologia Computacional em Haskell	2006
Paulo Fernandes	FEUP	João Pascoal Faria Ademar Aguiar	INESC Porto/FEUP	Desenvolvimento de uma ferramenta do tipo 4GL em ambiente JAVA	2006
Pedro Madureira	Portuca lense	Filomena Lopes Ângelo Martins	Portucalense INESC Porto/ISEP	O sincronismo entre a evolução natural e permanente dos processos e sua representação em sistemas de modelação	2006
Rui Reis Gomes	FEUP	João Pascoal Faria	INESC Porto/FEUP	Testes de interfaces de Voz	2006
Rui Barros	FEUP	Ademar Aguiar	INESC Porto/FEUP	Definição de uma Framework para Municípios de Pequena Dimensão	2006
Sara Campos de Araújo	FEUP	João Pascoal Faria José Magalhães Cruz	INESC Porto/FEUP	Segurança na circulação de Informação clínica	2006
1	2	3	4	5	6

1 - Name of the post-graduation student;

2 - Institution where the thesis is submitted; if the host institution for the student is other than INESC Porto, write the name in brackets. Ex. FEUP, for a student enrolled in a course at FEUP and having INESC Porto as host institution; FCUP (Univ. Manchester), for a student enrolled in a course at FCUP and staying at the University of Manchester;

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5 - Title of the thesis;

6 - Predicted year of conclusion and delivery – will be taken in account in summary tables.

R6.9 ORGANISATION OF INTERNATIONAL SCIENTIFIC EVENTS

31st Euromicro Conference on Software Engineering and Advanced Applications and

8th Euromicro Conference on Digital System Design

Porto, Portugal, August 31st – September 2nd, 2005

João Correia Lopes - Organizing Committee

R6.10 ADVANCED TRAINING

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R6.11 OTHER CONTRIBUTIONS TO THE OBJECTIVES OF ASSOCIATE LABORATORY

UNIT: USIC – INFORMATION AND COMMUNICATION SYSTEMS	Thematic Line
▪ COTEC - Following this project, technical support has been given personally to the Internal Administration Minister in the area of radiocommunications	Electric sector and integrated territorial planning
▪ PhD - Several contacts have been made abroad to recruit PhDs in USIC activity areas.	Electric sector and integrated territorial planning & Enabling technologies for networked audiovisual services
▪ IMOPPI - Support of the Real Estate and Public Construction Market Regulator in the modernization of its interaction processes with Local Authorities and Sectorial Associations.	Enabling technologies for networked audiovisual services

R6.12 AWARDS, RECOGNITIONS

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R6.13 ANALYSIS AND ASSESSMENT OF DEVIATIONS RELATIVE TO FORM ER PLANNING

R6.13.1 Comparison with strategic actions or policy lines defined in the plan of the previous year

During 2005 an effort has been made to internationalize the activities of this Unit. This effort is reflect not only in IST or INTERREG III projects, but also in consultancy activities for DG INFSO.

Nevertheless at the national level it was not possible to diversify activities and partnerships mainly due to the economic situation, which has impacted the consultancy activities and the generation of co-funding.

A substantial public exposition has been obtained with the promotion of the results of projects such as SIGDIC and MEDSI.

The cost structure increased slightly.

R6.13.2 Cases of success, problems met, internal and external conditioning factors

The political and economical situation has strongly impacted this Unit, due to its significant level of consultancy and development activities for the public administration and enterprises. Many proposals were submitted, but few were accepted (or timely accepted). Even on-going projects with public administration were delayed due to the political instability. At the end of 2005 an effort has been made to diversify into new areas and activities using innovative methodologies for creative thinking.