**INESCPORTO**

INSTITUTO DE ENGENHARIA DE SISTEMAS
E COMPUTADORES DO PORTO
LABORATÓRIO ASSOCIADO

PLANO DE
ACTIVIDADE
DAS UNIDADES

# ACTIVITY PLAN OF INESC PORTO UNITS

This part of INESC Porto Plan is divided in two main chapters: the plan of scientific and technological activities and the plan of support activities.

The plan of scientific and technological activities begins with a section presenting the Scientific Council, followed by the detailed description of the scientific and technological units of the institute, namely:

- Manufacturing Systems Engineering Unit
- Optoelectronics and Electronic Systems Unit
- Power Systems Unit
- Information and Communications Systems Unit
- Telecommunications and Multimedia Unit
- Innovation and Technology Transfer Unit

The plan of support activities presents in detail a large department – Information and Logistics Department (DIL) – and several other services. For DIL, we use a simplified version of the format used for the operational units. For the other services, we present a list of actions only.

# P1. PLAN OF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES

## P1.1 SCIENTIFIC COUNCIL

*President: Manuel Matos*

The Scientific Council will continue in 2008 to fulfil its statutory duties, regarding:

- analysis and opinion on annual reports and plans prepared by the Board of Directors;
- support to the process of issuing awards to the authors of papers published in scientific journals;
- analysis of other matters requested by the Board of Directors.

Taking into account the changes in the organizational structure of INESC Porto Laboratório Associado, with new groups associating to INESC Porto, the Council will start an assessment of the impact of these changes in its role regarding the institution.

The Council will also continue to monitor the scientific production of the institution and to make efforts regarding the establishment of a mechanism to follow the development of MSc and PhD theses, in conjunction with the Scientific Committees of the Units.

## P1.2 MANUFACTURING SYSTEMS ENGINEERING UNIT

*Managers: Luís Maia Carneiro, Jorge Pinho de Sousa*

### P1.2.1 SHORT DESCRIPTION OF THE UNIT

The main goal of the Manufacturing Systems Engineering Unit is to contribute to the improvement of performance of industrial enterprises through R&D projects, consulting, technology transfer and training services. Along with a strong application focus, the Unit is committed to conduct high quality research projects. The Unit main competences are related to Operations Management and Enterprise Information Systems, applied to industrial companies and enterprise collaborative networks. The Unit main Research and Development areas include:

- Decision Support and Operations Management: Process analysis; modelling and simulation; advanced planning systems; operations scheduling; intelligent automation and logistics; cutting and packing; multi-objective optimization; decision support systems.
- Networked Business Models: Value network design; operations management; advanced planning systems; performance management; information and knowledge management; interoperability.

The Unit promotes and participates in applied research projects, in partnership with software houses and equipment producers, 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 optimization, knowledge management, internal logistics and integration infrastructures.

The Unit's activity is grounded in research in the following scientific domains:

- Inter-organisational Networks: Operations Management; collaboration processes; management and decision support; knowledge management; interoperability.

- Optimization and Decision Support: structuring of decision processes; optimization methods; Combinatorial Optimization and meta-heuristics; optimization for planning and scheduling problems; optimization for cutting and packing problems; simulation; Decision Support Systems.

- Information Systems in Organisations: requirements engineering; advanced applications of information systems; enterprise integration.

The Unit provides consulting services to industrial companies, including the analysis and optimization 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 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 provides R&D services to develop innovative products to technology suppliers, software houses, systems integrators and producers of manufacturing equipment.

*Table of correspondence between know-how and industrial sectors*

| Know-how | Status (*) | Enterprise Collaboration Networks | Manufacturing | Software houses | Equipment producers |
|---|---|---|---|---|---|
| Structuring of decision processes | I | X | X | X | X |
| Business Models | I | X | | | |
| Information Systems Analysis | I | X | X | X | X |
| Socio-organizational Analysis | I | X | X | X | |
| Optimization | I | X | X | X | X |
| Simulation | I | X | X | | X |
| IS development methodologies | I | | | X | |
| IS advanced applications | I | X | X | X | |
| Software development tools | I | | | X | |
| Databases | I | | | X | X |
| Enterprise integration and frameworks | I | X | X | X | |
| Communications | I / O | | X | | X |
| Automation | I | | X | | X |

(*)   I - Internal; O - Existing in another Unit of INESC Porto; E - External; C – To be created

*Coverage of the Innovation Process*

| Activity area | Research | Development | Consulting | Training | Marketing and support | Evolutionary maintenance | Use |
|---|---|---|---|---|---|---|---|
| Enterprise Collaboration Networks | UESP | UESP Sistrade Novabase | UESP | UESP | Sistrade Novabase | Sistrade Novabase | Footwear Metal mechanics Cork Automobile |
| Logistics | UESP | UESP LIREL | UESP | UESP LIREL | LIREL | UESP LIREL | Footwear Metal mechanics Furniture |
| Planning | UESP | UESP, Softi9 | UESP | UESP | Softi9, I68, CPC | UESP | Automobile Abrading agents |
| Optimization | UESP | UESP | UESP | UESP | UESP, Lirel | UESP | Textile Paper Metal mechanics |
| Enterprise engineering and process optimization | UESP | | UESP | UESP | UESP | | All |

## Description of the Unit's organisational structure

The Manufacturing Systems Engineering Unit coordination is jointly assumed by Luís Maia Carneiro and Jorge Pinho de Sousa.

Currently the areas with more significant activity are Enterprise Cooperation Networks, Internal Logistics, Operations Management and Cutting and Packing. Consulting services are structured and provided by a specific group in the Unit.

## Summary of results of the research activities of the team members

- **Projects**

### Summary of projects developed in 2007

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 11 | 4 | | 827.500 |
| D - Development | 4 | | | 76.500 |
| C - Consulting | 3 | | | 100.000 |
| A – Advanced training | | | | |
| T – Technology Transfer | 2 | 2 | | 149.000 |
| O - Other | | | | |
| **TOTAL** | 20 | 6 | | 1.153.000 |

### Summary of relative distribution of sources of income

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG- On-going | C - Concluded | |
| NP – National Programmes | 16,22% | 9,71% | 5,20% | 359.000 |
| EP – European Programmes | | 28,53% | 16,83% | 523.000 |
| CS – Consulting and services | 5,51% | 17,13% | 0,87% | 271.000 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | | |
| **Total** | 21,73% | 55,38% | 22,90% | 1.153.000 |

### Summary of projects developed in 2007

| 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 |
| IRCPortugal | A. C. Alves | T | E | EP | IST | 04-2004 | 03-2008 | OG |
| KOBAS | A. Azevedo | R | E | EP | NMP | 06-2004 | 05-2007 | F |
| I+D+I PME's | A.C. Alves | T | E | EP | Interreg | 09-2004 | 05-2007 | F |
| CEC Made Shoe | Rui Diogo | R | E | EP | IST | 10-2004 | 09-2008 | OG |
| CEC-MadeShoe-Prime | Rui Diogo | R | N | NP | Prime | 10-2004 | 06-2008 | OG |
| ISO-Pross | Paula Silva | R | N | NP | Ideia | 10-2004 | 03-2007 | F |
| DURIT AD | A. C. Alves | C | N | CS | Demtec | 12-2004 | 05-2008 | OG |
| KnowConstruct | Lucas Soares | R | E | EP | C. R. | 01-2005 | 08-2007 | F |
| SONAE | Luís Guardão | D | N | CS | - | 06-2005 | 12-2007 | F |

| Name of the project | Respons. | Type proj. (1) | Degree of intern. (2) | Financ. Type (3) | Financ. Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| META-SIM | J.P. De Sousa | R | N | NP | FCT | 07-2005 | 12-2007 | F |
| RCED | Luis Carneiro | R | N | NP | PON | 07-2005 | 09-2007 | F |
| APIS | J. F. Oliveira | R | N | NP | FCT | 09-2005 | 09-2007 | F |
| PRONIC | Luís Guardão | R | N | CS | - | 01-2006 | 03-2008 | OG |
| SIDAT | Luís Guardão | T | N | NP | SIUPI | 01-2006 | 06-2008 | OG |
| AC/DC | J.P. De Sousa | R | E | EP | IST | 10-2006 | 09-2010 | OG |
| IZARO GREY | Luís Guardão | D | N | CS | - | 01-2007 | 10-2010 | S |
| TecModa | C. Toscano | R | N | NP | ADI | 01-2007 | 07-2008 | S |
| SIMULOG | Paulo Marques | R | N | NP | Prime | 02-2007 | 06-2008 | S |
| RCM | J.P. De Sousa | R | N | NP | Redes Cp. | 06-2007 | 06-2008 | S |
| SAPIR | Rui Diogo | D | N | CS | - | 06-2007 | 06-2008 | S |
| CIFIAL | A. C. Alves | C | N | CS | - | 10-2007 | 06-2008 | S |
| PMCOLNET | A. Soares | R | N | NP | FCT | 11-2007 | 12-2008 | S |
| CROME | J. S. Ferreira | R | N | NP | FCT | 12-2007 | 12-2008 | 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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
|---|---|
| Theses concluded in 2007 by members of the unit | |
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 6 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 21 |
| Other publications (National meetings, local journals, etc.) | 4 |
| Total | 31 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 7 | 10 | 2 | 19 |

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Doctoral | 3 | 13 | 0 | 16 |
| Total | 10 | 23 | 2 | 35 |

- **Summary of Advanced Training Actions**

*Summary of Advanced Training Actions organized for external trainees in 2007*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 4 |
| Training for others *(estágios extra-curriculares)* | |
| Professional training actions *(estágios profissionais)* | 3 |
| Other actions | |
| Total | 7 |

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

*Summary of items*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 1 |
| Collaboration in papers authored by INESC Porto researchers | 7 |
| External persons directly involved in actions organized by INESC Porto | 6 |

- **Human resources in 2007**

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 11 | 5 | 1 | | 17 | -2 |
| *INESC Porto Grant Holders* | | | 5 | | 5 | -3 |
| *Other Grant Holders* | | 2 | | | 2 | +1 |
| *Employees* | 1 | 1 | 9 | 2 | 13 | +1 |
| *Trainees* | | | 3 | | 3 | +2 |
| *Other* | | | | | | |
| **Administrative** | | | 2 | | 2 | 0 |
| Total | 12 | 8 | 20 | 2 | 42 | -1 |

(*)   Relative to 2006, in absolute numbers.

### P1.2.2 SWOT ANALYSIS

*Strengths*
- Good technical and scientific background;
- Good project management skills;
- Good relationships with enterprise associations and technological centres from several industrial sectors;
- Trust relations with a significant number of companies;
- Good network of contacts at the European level.

*Weaknesses*
- Activity scope too wide;
- Insufficient commercial effort.

*Opportunities*
- Companies are aware of the need to innovate and improve productivity;
- Start up phase of the 7th European RTD framework;
- Good relationships with many foreign entities and researchers.

*Threats*
- Reduced number of technology base Portuguese companies, with own products, especially in the software domain;
- National programmes to support RTD finished recently and the programmes that are going to replace them are not yet defined;
- Foreseen future reduction of structural funds for Portugal;
- Dependency of Portuguese companies from structural funds to perform RTD projects.

### P1.2.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

Medium term objectives and management principles include:
- Increase scientific excellence by focusing activities in some specify areas, by participating in research projects with leading research organisations, at a national and an international level, and by promoting PhD and MSc projects;
- Assure critical mass in the Unit's main activity areas;
- Improve the alignment between basic research, applied research and consultancy;
- Maximise the impact of the Unit's activity in the companies, and promote the valorisation of the results of its activity;
- Establish strategic partnerships with software houses and producers of manufacturing equipments, allowing the alignment of the research activities with future industrial projects, for a better valorisation of the developed intellectual property;
- Keep the balance between the income related with national projects, European projects and company projects, through an increase in the RTD and consulting services for companies. These services should represent a minimum of 40% of the total activity volume;
- Improve internal competences by:

- developing the competences and motivation of human resources;

- creating conditions for attracting high level national and international researchers;

- Improve the Unit's external visibility, through the organisation and participation in key national and international scientific and industrial events;

- Develop innovative training courses, increasing the total income of the Unit, and creating a powerful marketing instrument.


## P1.2.4 ACTION PLAN (GLOBAL)

For 2008 a number of structural actions are planned, including:

- Clearly identify and structure the scientific activity. Continue consolidation of the areas of enterprise cooperation networks, meta-heuristics, cutting and packing, and developing the areas of internal logistics and simulation. Create and disseminate doctoral programmes;

- Promote a pragmatic application of the concepts and tools from the area of enterprise cooperation networks in the region's companies;

- Organize a set of innovative courses for companies, leading to a minimum income of 15.000 Euros. These training courses should be specialized in the Unit's main research areas and should be clearly differentiated from then offer currently available on the market. The offer should include areas like enterprise integration and collaboration, advanced planning and scheduling systems, decision support systems, methodologies for IT adoption by SME's.

- Increase the quota of consultancy and technical assistance to companies, to a minimum of 120.000 Euros;

- Develop new partnerships with national and international research organizations, leaders in fields near or complementary to the Unit's activity;

- Consolidate partnerships with software houses and producers of equipments;

- Define and implement a plan to establish and promote contacts with target markets, in Portugal and abroad;

- Improve the professionalism and total quality of the services and projects developed;

- Pursue the work done in the standardization and the improvement of the software development methodologies and practices, with impact on productivity, quality and maintenance;

- Define plans for the valorisation of the intellectual property of the Unit;

- Develop specific actions to strengthen the Institution's image in its main target markets. Special focus on the organization of workshops and discussion panels with local companies and research centres.

## P1.2.5  ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | **N** | **E** | **I** | |
| R – Research | 10 | 6 | | 679.500 |
| D - Development | 5 | | | 125.000 |
| C – Consulting | 4 | 1 | | 192.500 |
| A – Advanced training | 1 | | | 15.000 |
| T - Technology Transfer | 2 | 1 | | 34.500 |
| O – Other | | | | |
| **TOTAL** | **22** | **8** | | **1.046.500** |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 24,80% | | 7,21% | 335.000 |
| EP – European Programmes | 19,88% | | 10,61% | 319.000 |
| CS – Consulting and services | 17,20% | | 20,31% | 392.500 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | | |
| **Total** | **61,87%** | **0,00%** | **38,13%** | **1.046.500** |

*Summary of projects to be developed in 2008*

| 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 |
| IRCPortugal | A. C. Alves | T | E | EP | Innovation | 04-2004 | 03-2008 | OG |
| CEC Made Shoe | Rui Diogo | R | E | EP | Growth | 10-2004 | 09-2008 | OG |
| CEC-MadeShoe-Prime | Rui Diogo | R | N | NP | Prime | 10-2004 | 06-2008 | OG |
| DURIT AD | A. C. Alves | C | N | CS | Demtec | 12-2004 | 05-2008 | OG |
| PRONIC | Luís Guardão | R | N | CS | - | 01-2006 | 03-2008 | OG |
| SIDAT | Luís Guardão | T | N | NP | SIUPI | 01-2006 | 06-2008 | OG |
| AC/DC | J.P. De Sousa | R | E | EP | IST | 10-2006 | 09-2010 | OG |
| IZARO GREY | Luís Guardão | D | N | CS | - | 01-2007 | 10-2010 | OG |
| TecModa | C. Toscano | R | N | NP | Prime | 01-2007 | 07-2008 | OG |

| Name of the project | Respons. | Type proj. (1) | Degree of intern. (2) | Financ. Type (3) | Financ. Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| SIMULOG | Paulo Marques | R | N | NP | Prime | 02-2007 | 06-2008 | OG |
| RCM | J.P. De Sousa | R | N | NP | Redes Cp. | 06-2007 | 06-2008 | OG |
| SAPIR | Rui Diogo | D | N | CS | - | 06-2007 | 06-2008 | OG |
| CIFIAL | A. C. Alves | C | N | CS | - | 10-2007 | 06-2008 | OG |
| PMCOLNET | A. Soares | R | N | NP | FCT | 11-2007 | 12-2008 | OG |
| CROME | J. S. Ferreira | R | N | NP | FCT | 12-2007 | 12-2008 | OG |
| CONSULTORIA2 | A. C. Alves | C | N | CS | - | 01-2008 | 12-2008 | E |
| SONAE | Luís Guardão | D | N | CS | - | 03-2008 | 12-2008 | E |
| e-BIZ-TCF | C. Toscano | C | E | CS | - | 03-2008 | 09-2009 | E |
| e-Bus-IAPMEI | A. C. Alves | R | E | EP | - | 03-2008 | 09-2009 | E |
| FORMAÇÃO | J.P. De Sousa | A | N | CS | - | 03-2008 | 12-2008 | E |
| Desenvolvimento | Luís Guardão | D | N | CS | - | 03-2008 | 12-2008 | E |
| Shuck-shoes | Rui Diogo | R | E | EP | Growth | 06-2008 | 05-2012 | E |
| ESPE | A. Azevedo | R | E | EP | Growth | 06-2008 | 05-2012 | E |
| H-know | A. Soares | R | E | EP | Coll. RTD | 06-2008 | 05-2011 | E |
| CREN | Luís Carneiro | R | N | NP | CREN | 06-2008 | 05-2010 | E |
| PRONIC2 | Luís Guardão | R | N | CS | - | 06-2008 | 05-2010 | E |
| CORNET | A. Azevedo | R | N | NP | Cornet | 06-2008 | 05-2010 | E |

(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: <u>OG – On-going</u>: starting before 2008; <u>G – Guaranteed</u>: activity with a firmly agreed contract, starting in 2008; <u>E – Expected</u>: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.

- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | |
| Books (author) | 1 |
| Chapter/paper in books | 1 |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 12 |
| Papers in National Journals with scientific referees | 2 |
| Conference Proceedings in events with scientific referee and selection | 14 |
| Other publications (National meetings, local journals, etc.) | 4 |
| Total | 34 |

- Summary of post-graduation activities

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 8 | 9 | 8 | 25 |
| Doctoral | 3 | 12 | 4 | 19 |
| Total | 11 | 21 | 12 | 44 |

- Summary of advanced training actions

*Summary of Advanced Training Actions expected for 2008*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 4 |
| Training for others *(estágios extra-curriculares)* | |
| Professional training actions *(estágios profissionais)* | 4 |
| Other actions | |
| Total | 8 |

- Summary of activities of cooperation or dissemination

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 2 |
| Collaboration in papers authored by INESC Porto researchers | 8 |
| External persons directly involved in actions organized by INESC Porto | 16 |

- Human resources in 2008

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 11 | 5 | 1 | | 17 | 0 |
| *INESC Porto Grant Holders* | | 1 | 5 | | 6 | +1 |
| *Other Grant Holders* | | 1 | | | 1 | -1 |
| *Employees* | 1 | 1 | 9 | 2 | 13 | 0 |
| *Trainees* | | | 2 | | 2 | -1 |
| *Other* | | | | | | |
| **Administrative** | | | 2 | | 2 | 0 |
| Total | 12 | 8 | 19 | 2 | 41 | -1 |

(*) Relative to 2007, in absolute numbers.

# P1.3 OPTOELECTRONICS AND ELECTRONIC SYSTEMS UNIT

*Manager: José Luís Santos*

## P1.3.1 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 micro fabrication (thin films and integrated optics). In the framework of its activity it proportionates the adequate 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 adequate 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 optical coherent tomography for medical applications;
- Research and development in multi-axis optical fiber accelerometer;
- Research and development in micropackaging;
- Research and development in photovoltaic cells;
- Research in energy harvesting and scavenging for sensing.

*Table of correspondence between know-how and the Industrial Sectors*

| Know-how | Status(*) | Instrumentation | Telecommunications | Environment | Energy | Health |
|---|---|---|---|---|---|---|
| **Scientific Know-how** | | | | | | |
| Optical fiber sensors | I | X | | X | X | X |
| Microfabrication | I | | | | | |
| Optical fiber sources | I, E | | X | | | |
| Civil engineering structures modelization | E | X | | | | |
| Energy networks management | O | X | | | | X |

| Know-how | Status(*) | Instrumentation | Telecommuni cations | Environment | Energy | Health |
|---|---|---|---|---|---|---|
| Chemical pollutants detection | E | | | X | | |
| Biomedicine | E | | | | | X |
| **Technology Know-how** | | | | | | |
| Electronic systems project and development | I | X | X | X | X | X |
| Electronic systems integration | I | X | X | X | X | X |

(*)  I – Internal; O – Existing in another Unit of INESC Porto; E – External; C – To be created

*Coverage of the Innovation Process*

| Activity Area | Research | Development | Consulting | Training | Marketing and Support | Evolutionary Maintenance | Use |
|---|---|---|---|---|---|---|---|
| Instrumentation | **UOSE**/Lab. Structures FEUP | **UOSE**/Lab. Structures FEUP | **UOSE**/Lab. Structures FEUP | **UOSE**/Lab. Structures FEUP | FiberSensing | FiberSensing | Civil engineering structures instrumentation |
| Telecommunica-tions | **UOSE**, UTM | **UOSE**, UTM | **UOSE**, UTM | **UOSE**, UTM | | | Optical fiber communication systems |
| Environment | **UOSE**/Dep. Química FCUP | **UOSE**/Dep. Química FCUP | **UOSE**/Dep. Química FCUP | **UOSE**/Dep. Química FCUP | | | Pollutants detection and monitoring systems |
| Energy | **UOSE**, UE | **UOSE**, UE | **UOSE**, UE | **UOSE**, UE | | | Energy networks management systems |
| Health | **UOSE**, ITQB | **UOSE**, ITQB | **UOSE**, ITQB | **UOSE**, ITQB | | | Biomedical sensors |

## Description of the Unit's organizational structure

The Unity is organized around technological and scientific competences. Each one of these competences is coordinated by a PhD who, in close collaboration with the Unit's coordinator, defines strategies and partnerships. The motivation to this organizational scheme is rooted on the crucial relevance of scientific competence as the activity thrust.

## Summary of results of the research activities of the team members

- **Projects**

*Summary of projects developed in 2007*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 9 | 4 | | 255.031 |
| D - Development | | | | |
| C - Consulting | | | | |
| A - Advanced training | | | | |
| T - Technology Transfer | 3 | | | 146.290 |
| O - Other | | | | |
| TOTAL | 12 | 4 | | 401.321 |

*Summary of relative distribution of sources of income*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG– On-going | C - Concluded | |
| NP – National Programmes | 12,98% | 10,41% | 6,33% | 119.257 |
| EP – European Programmes | | 42,98% | 4,13% | 189.060 |
| CS – Consulting and Services | | | 23,17% | 93.004 |
| O – Other R&D sources | | | | |
| OS – Other Sources | | | | |
| Total | 12,98% | 53,39% | 33,63% | 401.321 |

*Summary of projects developed in 2007*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. Type (3) | Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| URANUS | F. Araújo | R | E | EP | 6PQ | 07-2004 | 06-2007 | F |
| FIDELIO | M. J. Marques | R | E | EP | 6PQ | 12-2004 | 05-2008 | OG |
| CUTINSHEAR | F. Araújo | R | N | NP | FCT | 03-2005 | 02-2007 | F |
| EVANESCENTE | J. L. Santos | R | N | NP | FCT | 05-2005 | 10-2007 | F |
| OPTOPACK | F. Araújo | R | N | NP | FCT | 05-2005 | 10-2007 | F |
| KAISER | L. A. Ferreira | R | N | NP | FCT | 09-2005 | 08-2008 | OG |
| ESA-ONE | F. Araújo | R | E | EP | ESA | 01-2006 | 12-2008 | OG |
| MICROPACK | F. Araújo | T | N | NP | IDEIA | 01-2006 | 05-2008 | OG |
| NEXTGENPCF | L. A. Ferreira | R | E | EP | 6PQ | 01-2006 | 05-2009 | OG |
| OREO | P. V. Marques | R | N | NP | FCT | 01-2006 | 09-2007 | F |
| OXIGÉNIO | J. L. Santos | R | N | NP | FCT | 01-2006 | 06-2008 | OG |
| CEMICRO | Paulo Marques | T | N | NP | ADI | 01-2007 | 07-2008 | S |
| FIBERSENSING | J. L. Santos | T | N | CS | - | 01-2007 | 12-2007 | F |
| AMDRAPHYD | P. Jorge | R | N | NP | FCT | 03-2007 | 02-2009 | S |
| OPTIC-ALGAE | J. M. Baptista | R | N | NP | FCT | 06-2007 | 05-2010 | S |
| WELDING | O. Frazão | R | N | NP | FCT | 07-2007 | 06-2009 | 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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
|---|---|
| Theses concluded in 2007 by members of the unit | 3 |

| Type of publication | Number |
|---|---|
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 24 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 15 |
| Other publications (National meetings, local journals, etc.) | 13 |
| Total | 55 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | | 2 | 3 | 5 |
| Doctoral | 4 | 8 | | 12 |
| Total | 4 | 10 | 3 | 17 |

- **Summary of Advanced Training Actions**

*Summary of Advanced Training Actions organized for external trainees in 2007*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 1 |
| Training for others *(estágios extra-curriculares)* | |
| Professional training actions *(estágios profissionais)* | 2 |
| Other actions | |
| Total | 3 |

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

*Summary of items*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 1 |
| Collaboration in papers authored by INESC Porto researchers | 57 |
| External persons directly involved in actions organized by INESC Porto | 15 |

- **Human resources in 2007**

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 14 | 2 | | 0 | 16 | +2 |
| *INESC Porto Grant Holders* | | | 5 | 0 | 5 | -1 |
| *Other Grant Holders* | 0 | 6 | 1 | 0 | 7 | -1 |
| *Employees* | 5 | | 4 | 1 | 10 | +4 |
| *Trainees* | | 3 | 4 | 2 | 9 | +9 |
| *Other* | | | 1 | 0 | 1 | +1 |
| **Administrative** | | | | 1 | 1 | 0 |
| **Total** | 19 | 11 | 15 | 4 | 49 | +14 |

(*)   Relative to 2006, in absolute numbers.

## P1.3.2 SWOT ANALYSIS

*Strengths*

- Prestige and image of excellence: as demonstrated by FCT reports and participation in Scientific Committees of International Conferences (example: OFS – Optical Fibre Sensors);

- Connections and partnerships with renowned scientific groups;

- Technological and scientific infrastructure and capability: the Unit has know-how, equipment and laboratorial infrastructure which constitute a competitive resource.

*Weaknesses*

- High costs regarding infrastructure operation and maintenance;

- Critical mass absence concerning some areas and unbalanced distribution of human resources by qualification levels: the Unit has a high number of post-graduation students and a need for recently graduated people for renewal of the training cycle.

*Opportunities*

- Know-how and technologies potential: the application areas for Unit's technologies are vast and diversified and, consequentially, a larger use can be foreseen.

*Threats*

- Inadequate framework of reference concerning valorisation of post-graduate training activity: after concluding their degrees, post-graduate students, generally, don't compensate the Unit's financial and human resource effort on their behalf and, in consequence, they don't contribute to the system; a significant proportion follow college and polytechnic teaching careers or in corporations with few or no connections with Unit's activity.

- Predictable decrease of public funding regarding R&D activities: the supposed and desirable increase of funding of I&D activity by companies doesn't seem easy on the current context.

## P1.3.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

Medium term:

- Strengthening of installed and established scientific and technological capacity;
- Infrastructure re-equipment;
- Increase of participation in European projects (7$^{th}$ Framework Program);
- Integration of Unit's R&D interests with medium term objectives of current and potential corporate partners, for synergies and valorisation of Unit's activity;
- Increase of the economical and social impact of R&D results;
- Attraction of new university investigators;
- Internal cross fertilization of technological and scientific competences;
- Internationalization;
- Integrated policy of intellectual property application and valorisation;
- Participation in scientific committees of conferences related to Unit interests
- Improvement of the publication ratios in the microfabrication area.

Year:

- Increase of integration and development of PhDs in the context of the Associated Laboratory framework;
- Assessment of medium/long term R&D new opportunities: negative refractive index materials; sensor networks; photovoltaic materials;
- Internal project concerning photovoltaic cells based on thin films: technical feasibility evaluation, search of industrial partners and venture capital funding
- Re-equipment investment plan;
- To play an active role in the Associated Laboratory status renewal process;
- Evaluation of new opportunities in technology transfer, specially in the Framework of FP7 and Portuguese QREN.

## P1.3.4 ACTION PLAN (GLOBAL)

- International summer course in Fibre Gratings, including design, project, modelling, implementation and characterization;
- Establishment of new and strengthening of already in place industrial partnerships, both national and international;
- Proposals submission for national R&D projects;
- Proposals submission for European projects (7FP);
- Gradual and progressive internal re-organization.

## P1.3.5 ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 14 | 6 | | 411.226 |
| D - Development | | | | |
| C - Consulting | 1 | | | 9.500 |
| A – Advanced training | | | | |
| T – Technology Transfer | 5 | | | 201.016 |
| O - Other | | 1 | 2 | 24.500 |
| TOTAL | 20 | 7 | 2 | 646.242 |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 12,39% | 8,65% | 17,78% | 250.843 |
| EP – European Programmes | 16,52% | 2,40% | 9,29% | 182.281 |
| CS – Consulting and services | | | 23,34% | 150.820 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | 9,64% | 62.298 |
| Total | 28,91% | 11,05% | 60,05% | 646.242 |

*Summary of projects to be developed in 2008*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| FIDELIO | M. J. Marques | R | E | EP | 6PQ | 12-2004 | 05-2008 | OG |
| KAISER | L. A. Ferreira | R | N | NP | FCT | 09-2005 | 08-2008 | OG |
| ESA-ONE | F. Araújo | R | E | EP | ESA | 01-2006 | 12-2008 | OG |
| MICROPACK | F. Araújo | T | N | NP | IDEIA | 01-2006 | 05-2008 | OG |
| NEXTGENPCF | L. A. Ferreira | R | E | EP | 6PQ | 01-2006 | 05-2009 | OG |
| OXIGÉNIO | J. L. Santos | R | N | NP | FCT | 01-2006 | 06-2008 | OG |
| CEMICRO | Paulo Marques | T | N | NP | AdI | 01-2007 | 07-2008 | OG |
| AMDRAPHYD | P. Jorge | R | N | NP | FCT | 03-2007 | 02-2009 | OG |
| OPTIC-ALGAE | J. M. Baptista | R | N | NP | FCT | 06-2007 | 05-2010 | OG |
| WELDING | O. Frazão | R | N | NP | FCT | 07-2007 | 06-2009 | OG |
| CostActions | J. L. Santos | O | E | EP | 6PQ | 01-2008 | 12-2008 | G |
| BIOPELVIC | L. A. Ferreira | R | N | NP | FCT | 01-2008 | 12-2009 | G |
| ENDURANCE | F. Araújo | R | N | NP | FCT | 01-2008 | 12-2009 | E |
| FiberSensing08 | J. L. Santos | T | N | CS | - | 01-2008 | 12-2008 | E |

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| FS-CAD | Ireneu Dias | C | N | OS | PS | 01-2008 | 12-2008 | E |
| GRICES | J. L. Santos | O | I | NP | - | 01-2008 | 12-2008 | G |
| IMOLDE | F. Araújo | T | N | CS | CIM INOV | 01-2008 | 06-2008 | E |
| MOTION | O. Frazão | R | N | NP | FCT | 01-2008 | 02-2010 | G |
| Nanocrystalline | M. J. Marques | R | N | NP | FCT | 01-2008 | 12-2009 | G |
| OREO2 | P. V. Marques | R | N | NP | FCT | 01-2008 | 12-2009 | G |
| PS1 | Ireneu Dias | T | N | OS | - | 01-2008 | 12-2008 | E |
| ROS | P. Jorge | R | N | NP | FCT | 01-2008 | 12-2009 | E |
| SmartBio | O. Frazão | R | N | NP | FCT | 01-2008 | 02-2009 | G |
| OMNIDIAG | P. Jorge | R | E | EP | 7PQ | 03-2008 | 02-2010 | E |
| PETAPHEST | P. V. Marques | R | E | EP | 7PQ | 03-2008 | 02-2010 | E |
| TEANET | P. V. Marques | R | E | EP | 7PQ | 03-2008 | 02-2010 | E |
| Sschool | Ireneu Dias | O | I | OS | - | 06-2008 | 12-2008 | E |
| AQUA | P. Jorge | R | N | NP | QREN | 07-2008 | 06-2010 | E |
| Fotovoltaicos | J. Cruz | R | N | OS | QREN | 07-2008 | 06-2010 | E |

(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: OG - On-going: starting before 2008; G - Guaranteed: activity with a firmly agreed contract, starting in 2008; E - Expected: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.

- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | 4 |
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 12 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 6 |
| Other publications (National meetings, local journals, etc.) | 10 |
| Total | 32 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|------|----------|----------|-----------|-------|
| Master | | | 2 | 2 |
| Doctoral | 2 | 10 | 2 | 14 |
| Total | 2 | 10 | 4 | 16 |

- **Summary of advanced training actions**

*Summary of Advanced Training Actions expected for 2008*

| Type | Number |
|------|--------|
| Training for graduation students *(estágios curriculares)* | 2 |
| Training for others *(estágios extra-curriculares)* | |
| Professional training actions *(estágios profissionais)* | 2 |
| Other actions | |
| Total | 4 |

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

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|------|--------|
| Organizing conferences or meetings | 1 |
| Collaboration in papers authored by INESC Porto researchers | 24 |
| External persons directly involved in actions organized by INESC Porto | 30 |

- **Human resources in 2008**

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|------|-----------|------|------|-------|-------|---------------|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 13 | 2 | | | 15 | -1 |
| *INESC Porto Grant Holders* | | | 1 | | 1 | -4 |
| *Other Grant Holders* | | 6 | 6 | | 12 | +5 |
| *Employees* | 5 | | 4 | 1 | 10 | 0 |
| *Trainees* | | 1 | 4 | 2 | 7 | -2 |
| *Other* | | | 1 | | 1 | 0 |
| **Administrative** | | | | 1 | 1 | 0 |
| Total | 18 | 9 | 16 | 4 | 47 | -2 |

(*)    Relative to 2007, in absolute numbers.

## P1.4 POWER SYSTEMS UNIT

*Managers: Manuel António Matos, João Peças Lopes*

### P1.4.1 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.

*Table of correspondence between know-how and the Industrial Sectors*

| Know-how | Status (*) | Software Development | GIS Energy Planning | Electricity Markets and Regulation | Wind Power integration | Micro-grids | Advanced Training |
|---|---|---|---|---|---|---|---|
| Static and dynamic network analysis | I | X | | X | X | X | X |
| Soft computing | I | X | X | | | | X |
| Optimization and decision | I+O | X | X | X | X | | X |
| Forecasting | I | | X | | | | X |
| Electric energy systems | I | X | | X | X | X | |
| GIS | I+O | | X | | | | X |
| Programming | I | X | X | | | | |
| Internet and Web | I | | X | X | | | |

(*)   I – Internal; O – Existing in another Unit of INESC Porto; E – External; C – To be created

*Coverage of the Innovation Process*

| Activity Area | Research | Development | Consulting | Training | Marketing and Support | Evolutionary Maintenance | Use |
|---|---|---|---|---|---|---|---|
| Software Development | USE | USE | | USE | EFACEC | USE EFACEC | Utilities |
| GIS Energy Planning | USE | USE | | USE | (USE) | (USE) | Energy Agencies, |

| Activity Area | Research | Development | Consulting | Training | Marketing and Support | Evolutionary Maintenance | Use |
|---|---|---|---|---|---|---|---|
| | | | | | | | Planners |
| Electricity Markets and Regulation | USE | | USE | USE | | | ERSE, DGGE, Utilities |
| Wind Power integration | USE | | USE | USE | | | DGGE, REN, EDP, Promoters |
| Micro-grids | USE | USE | | USE | (USE) | (USE) | EDP, Manufacturers |
| Advanced Training | | | | USE | | | REN, EDP, International market |

## Description of the Unit's Organizational Structure

The following specific areas were identified, along with a "general area" where miscellaneous activities are included. Are definition is still informal and will only be formalized when appropriate.

- *Development of advanced modules for DMS and EMS* – the Unit has been committed to working on this area in the last decade, namely in a successful partnership with EFACEC but also in European projects. Software development has been a drive to basic and applied research.

- *Static and dynamic network analysis* – being one of the bases of the scientific and technological know-how of the Unit, it also corresponds to the specific activity of conducting studies for different entities and generates methodological contributions to software development.

- *Micro-generation and micro-grids* – this is an area of increasing importance, where the Unit has a leading role in Europe.

- *Regional energy planning* – this area resulted from the participation in European projects and has had a sustained international activity through the recent years. It has a strong potential for interaction with other areas, like integrated territorial planning (urban, water, waste, etc.)

- *Electricity Markets and Regulation* – area that covers the support of public entities like ERSE, DGGE and similar entities in the Autonomous Regions of Portugal, but also research about models and methodologies for the different agents of the electric sector.

- *Advanced Training* – horizontal area where the Unit and its members are recognized at an international level (EES-UETP consortium, tutorials in conferences, TEMPUS projects, training projects in Latin America). Development at the national level is intended.

## Summary of results of the research activities of the team members

- **Projects**

*Summary of projects developed in 2007*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 5 | 2 | | 150.500 |
| D - Development | 4 | 1 | | 360.485 |
| C - Consulting | 7 | | 3 | 247.313 |
| A – Advanced training | 1 | | 1 | 26.577 |

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| T – Technology Transfer | | | | |
| O - Other | 1 | | 1 | 235.614 |
| TOTAL | 18 | 3 | 5 | 1.020.489 |

*Summary of relative distribution of sources of income*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG- On-going | C - Concluded | |
| NP – National Programmes | 0,20% | 3,92% | 2,89% | 71.500 |
| EP – European Programmes | 0,88% | 6,86% | 4,53% | 125.243 |
| CS – Consulting and Services | 5,27% | 24,22% | 25,53% | 561.555 |
| O – Other R&D sources | | | | |
| OS – Other Sources | 0,92% | | 24,78% | 262.191 |
| Total | 7,27% | 35,00% | 57,74% | 1.020.489 |

*Summary of projects developed in 2007*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. Type (3) | Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| EFACEC | J. Pereira | D | N | CS | - | 04-2001 | - | OG |
| VENUS | M. P. Leão | R | N | NP | FCT | 04-2004 | 04-2007 | F |
| GENEDIS | J. Fidalgo | R | N | NP | FCT | 05-2004 | 08-2007 | F |
| CarCons | M. Matos | D | N | CS | - | 2004 | 2007 | F |
| EDA_Desp | J. P. Lopes | C | N | CS | - | 2004 | 2008 | OG |
| RISE | C. Monteiro | D | E | EP | INCO | 01-2005 | 11-2007 | F |
| ONS | J. P. Lopes | C | I | CS | - | 05-2005 | 04-2008 | OG |
| EPSO | V. Miranda | R | N | NP | FCT | 07-2005 | 04-2008 | OG |
| MILES | J. Pereira | R | N | NP | FCT | 07-2005 | 06-2008 | OG |
| Ren-Prevc | J. N. Fidalgo | D | N | CS | - | 2005 | 2007 | F |
| Eolica-concurso | J. P. Lopes | C | N | CS | - | 2005 | 2007 | F |
| More-MGrids | J. P. Lopes | R | E | EP | NNE | 2006 | 12-2009 | OG |
| PrevEol | C. Monteiro | D | N | CS | - | 2006 | 2008 | OG |
| TSO-reservas | M. Matos | C | I | CS | - | 2006 | 2007 | F |
| ENERGIA | M. Matos | O | N | OS | | 2007 | 2007 | F |
| CONSULTORIA | J. P. Lopes | C | N | CS | - | 2007 | 2007 | F |
| Conf.Microg. | J. P. Lopes | A | N | OS | - | 2007 | 2007 | F |
| Anemos Plus | J. P. Lopes | R | E | EP | TREN | 2007 | 2008 | S |
| RAVE | J. P .Lopes | C | N | CS | - | 2007 | 2008 | S |
| REN-Recep | J. P. Lopes | C | N | CS | - | 2007 | 2008 | S |
| Coord. EES-UETP | J. P. Lopes | O | I | OS | - | 2007 | 2009 | S |
| PLASM | V. Miranda | R | N | NP | FCT | 2007 | 09-2010 | S |
| InovGrid | J. P. Lopes | C | N | CS | - | 2007 | 2009 | S |

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| HEO- wind | J. P. Lopes | C | I | CS | - | 2007 | 2008 | S |
| ENERCOM | J. P. Lopes | C | N | CS | - | 2007 | 2008 | S |
| EES-UETP | J. T. Saraiva | A | I | OS | - | 2007 | 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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
|---|---|
| Theses concluded in 2007 by members of the unit | 3 |
| Books (author) | |
| Chapter/paper in books | 1 |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 24 |
| Papers in National Journals with scientific referees | 1 |
| Conference Proceedings in events with scientific referee and selection | 29 |
| Other publications (National meetings, local journals, etc.) | |
| Total | 58 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 5 | 12 | 2 | 19 |
| Doctoral | 3 | 10 | 4 | 17 |
| Total | 8 | 22 | 6 | 36 |

(*) This number may be very different under the new Bologna Integrated Master Courses.

- **Summary of advanced training actions**

*Summary of Advanced Training Actions organized for external trainees in 2007*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 4 |
| Training for others *(estágios extra-curriculares)* | 1 |

| Type | Number |
|---|---|
| Professional training actions *(estágios profissionais)* | 1 |
| Other actions | |
| Total | 6 |

(*) This number may be very different under the new Bologna Integrated Master Courses

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

*Summary of items*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 1 |
| Collaboration in papers authored by INESC Porto researchers | 45 |
| External persons directly involved in actions organized by INESC Porto | |

- **Human resources in 2007**

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 10 | 3 | | | 13 | +1 |
| *INESC Porto Grant Holders* | 1 | 6 | | 2 | 9 | -2 |
| *Other Grant Holders* | 9 | 2 | | 4 | 15 | +5 |
| *Employees* | 1 | 1 | | 1 | 3 | +2 |
| *Trainees* | 2 | | 2 | 2 | 6 | +4 |
| *Other* | 3 | | | 2 | 5 | +1 |
| **Administrative** | | | | 1 | 1 | 0 |
| Total | 26 | 12 | 2 | 12 | 52 | +11 |

(*) Relative to 2006, in absolute numbers.

## P1.4.2 SWOT ANALYSIS

*Strengths*

- Stable basis of university researchers, enhanced in the framework of Associated Laboratory contract, and a well defined scientific and technical program that eases the integration of grantees and trainees.

- Strong recognition in Portugal in the areas of regulation, electricity markets and renewable energy integration, in particular regarding wind power.

- Credibility as an independent entity and contractually responsible.

- Leading research activity in emergent technological areas, like microgeneration, microgrids and wind energy conversion.

- European and international activity, with some ability to participate at a strategic level in the European Union.

*Weaknesses*

- Excessive contractual responsibility of a reduced number of researchers.
- Some lack of diversity in the basic scientific interests.
- Medium-term increase of the fixed costs with human resources due to aging.

*Opportunities*

- Present and futures changes in the organization of the electric sector, at the national, Iberian (Iberian Market) and European level.
- Emergence of new paradigms for the organization of electric networks.
- Beginning of the activity of the wind energy cluster that came out of the public tender for new wind generation in Portugal (1500 MW).
- Beginning of the activity of a new industrial cluster related with microgeneration and smart metering.

*Threats*

- Possible globalization of the consulting activity, increasing competition.
- Difficulties regarding the financial support of the European Union for projects (non recognition of third party costs)

## P1.4.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

- Continuation of a balanced activity regarding high level research and development, technology transference to industry and support to industry and public administration, while contributing to the financial viability of INESC Porto.
- Consolidation of the present scientific and technologic areas of intervention through national and international contracts, supported by the human resources contracted in the framework of Associated Laboratory.
- Development of the international scientific partnerships, namely regarding European projects in new areas.
- Intensification of the international exchange of researchers, both by receiving foreign researchers and by motivating the members of the Unit to go abroad.
- Investment in the development of new partnerships in the economic area, in order to merge know-how adequate to the electricity markets area.
- Promotion of the penetration of micro-generation in low-voltage grids, through the development of proposals for new regulatory policies, new technical standards and industrial applications.
- Development of new tools for the evaluation of the security of supply and reserve definition, in power systems with a large penetration of wind power.
- Promotion of the integration of the concepts of microgrids and smart metering and development of related industrial solutions.
- Increasing the advanced training actions activity.

## P1.4.4 ACTION PLAN (GLOBAL)

- Definition of specific targets regarding the development of decision-aid tools in the area of Electricity Markets

- Characterization of the international situation of the Unit, through the identification of similar institutions and benchmarking.

- Evaluation of the software developed internally in the framework of projects and contracts in order to detect opportunities for the conception of innovative software products.

- Establishment of contracts for the intervention in the area of aggregated dispatch centers for wind power.

- Establishment of partnerships with utilities and manufacturers to develop standards and innovative products for smart metering and active management of distribution grids with large scale integration of microgeneration.

- Definition of a portfolio for advanced training actions.

## P1.4.5 ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 3 | 2 | | 161.527 |
| D - Development | 2 | | | 100.000 |
| C - Consulting | 8 | | 2 | 505.000 |
| A – Advanced training | | | 1 | 30.000 |
| T – Technology Transfer | | | | |
| O - Other | 1 | | 1 | 248.524 |
| TOTAL | 14 | 2 | 4 | 1.045.051 |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 5,89% | | | 61.527 |
| EP – European Programmes | 9,57% | | | 100.000 |
| CS – Consulting and services | 40,86% | 9,57% | 7,46% | 605.000 |
| O – Other R&D sources | | | | |
| OS – Other sources | 4,40% | 22,25% | | 278.524 |
| Total | 60,72% | 31,82% | 7,46% | 1.045.051 |

*Summary of projects to be developed in 2008*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. Type (3) | Financ. Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| EFACEC | J. Pereira | D | N | CS | - | 04-2001 | - | OG |
| EDA_Desp | J. P. Lopes | C | N | CS | - | 2004 | 2008 | OG |
| ONS | J. P. Lopes | C | I | CS | - | 05-2005 | 04-2008 | OG |
| EPSO | V. Miranda | R | N | NP | FCT | 07-2005 | 04-2008 | OG |
| MILES | J. Pereira | R | N | NP | FCT | 07-2005 | 06-2008 | OG |
| Anemos Plus | J. P. Lopes | R | E | EP | TREN | 2007 | 2008 | OG |
| More-MGrids | J. P. Lopes | R | E | EP | NNE | 2006 | 12-2009 | OG |
| PrevEol | C. Monteiro | D | N | CS | - | 2006 | 2008 | OG |
| RAVE | J. P. Lopes | C | N | CS | - | 2007 | 2008 | OG |
| REN-Recep | J. P. Lopes | C | N | CS | - | 2007 | 2008 | OG |
| PLASM | V. Miranda | R | N | NP | FCT | 2007 | 09-2010 | OG |
| Coord. EES-UETP | J. P. Lopes | O | I | OS | - | 2007 | 2009 | OG |
| InovGrid | J. P. Lopes | C | N | CS | - | 2007 | 2009 | OG |
| HEO-wind | J. P. Lopes | C | I | CS | - | 2007 | 2008 | OG |
| ENERCOM | J. P. Lopes | C | N | CS | - | 2007 | 2008 | OG |
| EES-UETP | J. T. Saraiva | A | I | OS | - | 2007 | 2008 | OG |
| Eneop2 | J. P. Lopes | C | N | CS | - | 2008 | 2009 | G |
| CONSULTORIA | J. P. Lopes | C | N | CS | - | 2008 | 2008 | G |
| ENERGIA | M. Matos | O | N | OS | | 2008 | 2008 | G |
| P. Negociação | M. Matos | C | N | CS | - | 2008 | 2008 | E |

(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: <u>OG – On-going</u>: starting before 2008; <u>G – Guaranteed</u>: activity with a firmly agreed contract, starting in 2008; <u>E – Expected</u>: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.

- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | 10 |
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 20 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 30 |
| Other publications (National meetings, local journals, etc.) | |
| Total | 60 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|------|----------|----------|-----------|-------|
| Master | 10 | 2 | 15 | 27 |
| Doctoral | 3 | 3 | 10 | 16 |
| Total | 13 | 5 | 25 | 43 |

- **Summary of advanced training actions**

*Summary of advanced training actions expected for 2008*

| Type | Number |
|------|--------|
| Training for graduation students *(estágios curriculares)* | 6 |
| Training for others *(estágios extra-curriculares)* | 2 |
| Professional training actions *(estágios profissionais)* | |
| Other actions | |
| Total | 8 |

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

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|------|--------|
| Organizing conferences or meetings | |
| Collaboration in papers authored by INESC Porto researchers | 37 |
| External persons directly involved in actions organized by INESC Porto | |

- Human resources in 2008

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 10 | 3 | | | 13 | 0 |
| *INESC Porto Grant Holders* | 2 | 6 | | 2 | 10 | +1 |
| *Other Grant Holders* | 9 | 2 | | 4 | 15 | 0 |
| *Employees* | | 1 | | 1 | 2 | -1 |
| *Trainees* | 2 | | 2 | 2 | 6 | 0 |
| *Other* | 3 | | | 2 | 5 | 0 |
| **Administrative** | | | | 1 | 1 | 0 |
| Total | 26 | 12 | 2 | 12 | 52 | 0 |

(*) Relative to 2007, in absolute numbers.

# P1.5 INFORMATION AND COMMUNICATIONS SYSTEMS UNIT

*Managers: António Gaspar*

## P1.5.1 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 and Central and Regional Government.

The Unit is composed by a heterogeneous team, with skills in diversified areas: computer systems, office automation, telecommunications, computing sciences, software engineering and geographic engineering.

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.

*Table of correspondence between know-how and the Industrial Sectors*

| Know-how | Status (*) | Public Administration | Telecommunications | Healthcare | Others |
|---|---|---|---|---|---|
| Design, Analysis and Development of Information Systems | I | X | X | X | X |
| Specification, Development and Deployment of GIS Solutions | I | X | X | | |
| Analysis, Specification and Set-up of Communication Systems | I | X | | X | X |

(*)   I – Internal; O – Existing in another Unit of INESC Porto; E – External; C – To be created

*Coverage of the Innovation Process*

| Activity Area | Research | Develop | Consulting | Training | Marketing and Support | Evolutionary Maintenance | Use |
|---|---|---|---|---|---|---|---|
| Public Admin. | USIC | USIC | USIC | USIC MEDIDATA PH Informatics | MEDIDATA PH Informatics | MEDIDATA PH Informatics | Local Adm. Regional Adm. |
| Telecom. | | USIC | USIC | USIC PT IN | PT IN | PT IN | PT Group |
| Healthcare | | | USIC | USIC | | | Ministry of Health |
| Others | | USIC | USIC | USIC | | | Transportation |

## Description of the Unit's organizational structure

The Unit is structured into coordination, secretarial support and three scientific areas (Location Based Information Systems, Software Engineering and Advanced Information Systems Engineering).
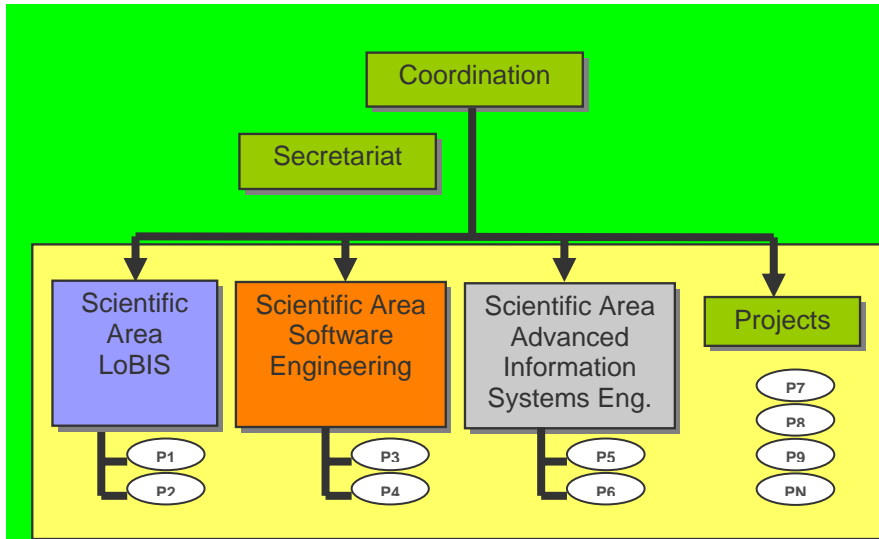


USIC's organigram.

Specific projects are linked to any of the scientific areas or directly to the coordination.
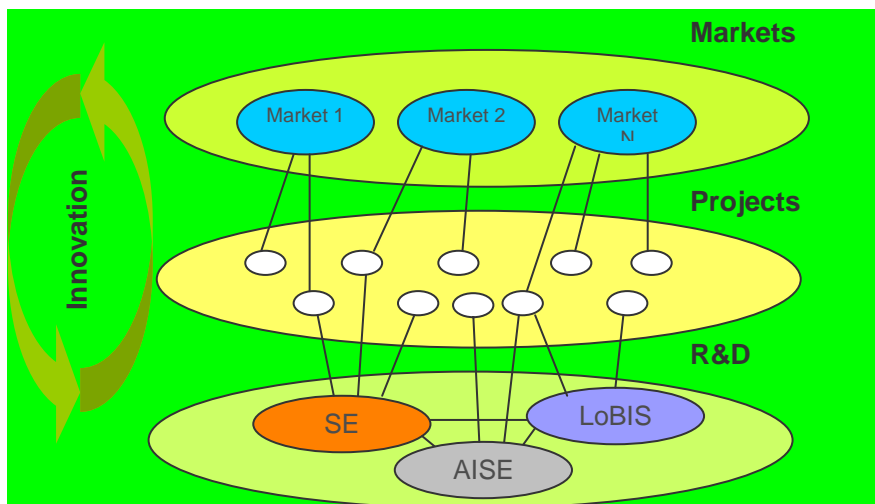


USIC's positioning.

The Unit has a multidisciplinary team made of 22 elements with heterogeneous training, involving areas like: computer systems, office automation, telecommunications, computing sciences, software engineering and geographic engineering.

## Summary of results of the research activities of the team members

- **Projects**

### Summary of projects developed in 2007

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 1 | 2 | | 149.018 |
| D - Development | 5 | | | 76.495 |
| C - Consulting | 8 | 1 | | 285.308 |
| A - Advanced training | | | | |
| T - Technology Transfer | | | | |
| O - Other | | | | |
| TOTAL | 14 | 3 | | 510.821 |

### Summary of relative distribution of sources of income

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG– On-going | C - Concluded | |
| NP – National Programmers | 1,96% | 0,70% | | 13.600 |
| EP – European Programmers | 22,51% | | 5,95% | 145.418 |
| CS – Consulting and Services | 3,94% | 23,53% | 41,40% | 351.803 |
| O – Other R&D sources | | | | |
| OS – Other Sources | | | | |
| Total | 28,41% | 24,24% | 47,35% | 510.821 |

### Summary of projects developed in 2007

| Name of the project | Response. | Type Prom. (1) | Degree of Intern. (2) | Finance. Type (3) | Finance. Prog. | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| IMOPPI | Rui Barros | C | N | CS | IMOPPI | 03-2003 | 12-2008 | OG |
| e-ASLA | Rui Barros | R | E | EP | Interreg | 02-2005 | 06-2007 | F |
| IVY | Pascoal Faria | R | N | NP | FCT | 07-2005 | 06-2008 | OG |
| Consultadoria | P. Monteiro | C | N | CS | | 01-2006 | - | OG |
| PROT-OVT | A.Gaspar | C | N | CS | CCDR-LVT | 07-2006 | 12-2007 | F |
| SIVIDA | José Correia | C | N | CS | ACS | 07-2006 | 06-2007 | F |
| SEGALAB | A Gaspar | C | N | CS | Segalab | 10-2006 | 03-2008 | OG |
| PORTMOS | Rui Barros | C | N | CS | FORDESI | 12-2006 | 12-2007 | F |
| CCDRN-TIC | Artur Rocha | C | N | CS | CCDR-N | 12-2006 | 12-2008 | OG |
| CAALYX | Artur Rocha | R | E | EP | IST | 01-2007 | 12-2008 | S |
| Cabo Madeira | A Gaspar | C | E | CS | IDATE | 01-2007 | 09-2007 | F |
| IVDP | Artur Rocha | C | N | CS | IVDP | 01-2007 | 12-2007 | F |
| PORTO 3D | A. Carvalho | D | N | CS | IRIC-UP | 06-2007 | 08-2007 | F |
| GEXP | R. Henriques | D | N | CS | METRO P | 07-2007 | 12-2007 | F |
| RCM | A. Gaspar | D | N | NP | CE-ADI | 07-2007 | 12-2008 | S |

| Name of the project | Response. | Type Prom. (1) | Degree of Intern. (2) | Finance. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| SAGAWeb | Rui Barros | D | N | CS | Medidata | 07-2007 | 07-2008 | S |
| SIGEP | R.Henriques | D | N | CS | GCP | 08-2007 | 12-2007 | F |

(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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
|---|---|
| Theses concluded in 2007 by members of the unit | |
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | 2 |
| Papers in International Journals with scientific referees | 1 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 6 |
| Other publications (National meetings, local journals, etc.) | 1 |
| Total | 10 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 4 | 9 | 6 | 19 |
| Doctoral | 2 | 3 | 1 | 6 |
| Total | 6 | 12 | 7 | 25 |

- **Summary of advanced training actions**

*Summary of advanced training actions organized for external trainees in 2007*

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

| Type | Number |
|---|---|
| Total | 5 |

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

*Summary of items*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 4 |
| Collaboration in papers authored by INESC Porto researchers | |
| External persons directly involved in actions organized by INESC Porto | |

- **Human resources in 2007**

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 4 | 1 | | | 5 | -2 |
| *INESC Porto Grant Holders* | | | 4 | | 4 | +2 |
| *Other Grant Holders* | | | | | | |
| *Employees* | | 2 | 9 | | 11 | -1 |
| *Trainees* | | | | | 0 | -1 |
| *Other* | | | 1 | | 1 | 0 |
| **Administrative** | | | 1 | | 1 | 0 |
| Total | 4 | 3 | 15 | | 22 | -2 |

(*)   Relative to 2006, in absolute numbers.

## P1.5.2 SWOT ANALYSIS

*Strengths*

- Large experience in ICT consulting, development and project management activities, ranging from Contracted Services to R&D&TT projects in European and National funding programs.

- Integrated and encompassing offer of consulting services, development, demonstration and technology transfer in the area of ICT.

- Strong technical ability in the GIS and Software Engineering areas, particularly in some emerging fields like GI interoperability, Wikis, Aspect Oriented Programming and Software Quality.

- eGovernment domain knowledge.

*Weaknesses*

- Limited number of academic researchers.
- Lack of funded research projects.
- Not very diversified partnerships.
- Short projects.
- Limited marketing activity.
- Limited cooperation with national software industry.
- Unbalanced economic situation.

### Opportunities

- Various funding opportunities, at national and international level, with QREN, FP7 and improved national economic situation.
- Membership of LIAAD and CRACS R&D groups in Rede INESC Porto Laboratório Associado.
- Increased use of ICT due to modernization need of institutions and enterprises.
- Growing national software industry.

### Threats

- Reduced public investment.
- Dependence on grants mindset.
- Increased competition in funding programs, particularly European.

## P1.5.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

The two main strategic objectives for 2008 and for the next few years are:

- Develop the Unit's scientific activity;
- Achieve a sustainable balanced economic performance.

## P1.5.4 ACTION PLAN (GLOBAL)

- Take advantage of various funding opportunities, at national and international level, and of large experience in consulting, development and project management to submit diversified proposals to different programs and partners, in cooperation with other Units, LIAAD and CRACS groups and involving national software industry.
- New projects should be based on key competences, to guarantee differentiation regarding other Units, R&D groups and enterprises, as well as guaranteeing added value to partners.
- eGovernment domain knowledge and track record will be used as a base to promote USIC's activities and create new partnerships.
- Involve private companies in consortia, taking advantage of new funding opportunities for the private sector.
- Proposal submission in diversified funding programs, selecting partners with successful track records.
- Use key competences in proposals to guarantee added value and ROI for partners.

- Leverage academic core team, in proposal submission, with internal and external scientific partnerships, like other Units, LIAAD, CRACS and Hillside Group.

- Use funding opportunities to diversify partnerships, internally and externally, with institutions and enterprises, particularly software houses, focusing in medium and long term projects.

- Develop website, focusing on success stories, key competences and their added value, particularly for the software industry. Approach software houses using funding opportunities or through service contracts with added value proposals.

## P1.5.5 ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 2 | 4 | | 255.000 |
| D - Development | 12 | | | 258.933 |
| C - Consulting | 9 | | | 153.055 |
| A - Advanced training | 1 | | | 2.500 |
| T - Technology Transfer | 1 | | | 37.500 |
| O - Other | | | | |
| TOTAL | 25 | 4 | | 706.988 |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 2,83% | | 7,07% | 70.000 |
| EP – European Programmes | 16,27% | | 18,03% | 242.500 |
| CS – Consulting and services | 18,27% | | 37,53% | 394.488 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | | |
| Total | 37,37% | 0,00% | 62,63% | 706.988 |

*Summary of projects to be developed in 2008*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| IMOPPI | Rui Barros | C | N | CS | IMOPPI | 03-2003 | 12-2008 | OG |
| IVY | Pascoal Faria | R | N | NP | FCT | 07-2005 | 06-2008 | OG |
| Consultadoria | P. Monteiro | C | N | CS | - | 01-2006 | - | OG |
| Geoforum | Artur Rocha | D | N | CS | Medidata | 02-2006 | 12-2008 | OG |
| SEGALAB | A Gaspar | C | N | CS | Segalab | 10-2006 | 03-2008 | OG |
| CCDRN-TIC | Artur Rocha | C | N | CS | CCDR-N | 12-2006 | 12-2008 | OG |

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| CAALYX | Artur Rocha | R | E | EP | IST | 01-2007 | 12-2008 | OG |
| RCM | A. Gaspar | D | N | NP | CE-ADI | 07-2007 | 12-2008 | OG |
| SAGAWeb | Rui Barros | D | N | CS | Medidata | 07-2007 | 07-2008 | OG |
| EOLOS | A. Gaspar | C | N | CS | ENEOP2 | 12-2007 | 12-2008 | OG |
| APDL | Rui Barros | C | N | CS | APDL | 01-2008 | 12-2008 | E |
| CCDRN-SIQREN | Rui Barros | D | N | CS | CCDRN | 01-2008 | 12-2008 | E |
| e-Asla AUT | Rui Barros | D | N | CS | Várias autarquias | 01-2008 | 12-2008 | E |
| ITAU | Rui Barros | C | N | CS | ITAU | 01-2008 | 12-2008 | E |
| Metropolis | Artur Rocha | T | N | NP | POSC | 01-2008 | 12-2008 | E |
| MIGRAPORT | Rui Barros | R | E | EP | - | 01-2008 | 12-2008 | E |
| SIVIDA II | José Correia | C | N | CS | ACS | 01-2008 | 12-2008 | E |
| RAVE | A Gaspar | C | N | CS | RAVE | 01-2008 | 12-2008 | E |
| SIGCMP | Alexandre Carvalho | D | N | CS | CM Porto | 03-2008 | 12-2008 | E |
| E-Capacity | Rui Barros | R | E | EP | - | 06-2008 | 12-2008 | E |
| Formação | A Gaspar | A | N | CS | Vários | 06-2008 | 12-2008 | E |
| iPortal+ | Rui Barros | D | N | CS | iPortal+ | 06-2008 | 12-2008 | E |
| LBAdvert | Artur Rocha | D | N | CS | Mobicomp | 06-2008 | 12-2008 | E |
| MobileToolKit | Rui Barros | D | N | CS | Mobicomp | 06-2008 | 12-2008 | E |
| Nautilus | Rui Barros | D | N | CS | Nautilus | 06-2008 | 12-2008 | E |
| PMOTool | Artur Rocha | D | N | CS | CM Maia | 06-2008 | 12-2008 | E |
| Salmonela | Alexandre Carvalho | R | N | NP | FCT | 06-2008 | 12-2008 | E |
| SIGEP II | R.Henriques | D | N | CS | GCP | 06-2008 | 12-2009 | E |
| VALEST | A Gaspar | R | E | EP | - | 06-2008 | 12-2008 | E |

(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: <u>OG – On-going</u>: starting before 2008; <u>G – Guaranteed</u>: activity with a firmly agreed contract, starting in 2008; <u>E – Expected</u>: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.

- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | 1 |
| Books (author) | |
| Chapter/paper in books | |
| Publications (editor) | 1 |
| Papers in International Journals with scientific referees | 3 |

| Type of publication | Number |
|---|---|
| Papers in National Journals with scientific referees | 1 |
| Conference Proceedings in events with scientific referee and selection | 10 |
| Other publications (National meetings, local journals, etc.) | |
| Total | 16 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 3 | | 10 | 13 |
| Doctoral | 1 | 4 | | 5 |
| Total | 4 | 4 | 10 | 18 |

- **Summary of advanced training actions**

*Summary of advanced training actions expected for 2008*

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

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

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 4 |
| Collaboration in papers authored by INESC Porto researchers | |
| External persons directly involved in actions organized by INESC Porto | |

- Human resources in 2008

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 4 | 1 | | | 5 | 0 |
| *INESC Porto Grant Holders* | | | 4 | | 4 | 0 |
| *Other Grant Holders* | | | | | | |
| *Employees* | | 2 | 9 | | 11 | 0 |
| *Trainees* | | | | | | |
| *Other* | | | 1 | | 1 | 0 |
| **Administrative** | | | 1 | | 1 | 0 |
| Total | 4 | 3 | 15 | | 22 | 0 |

(*) Relative to 2007, in absolute numbers.

## P1.6 TELECOMMUNICATIONS AND MULTIMEDIA UNIT

*Manager: José Ruela*

### P1.6.1 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 audiovisual and multimedia services.

The Unit is organized in 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. Until recently this organization was based on three main Areas:

- 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.

By the end of 2007, the topics covered by the first Area (*Network Architectures and Services*) were split, giving rise to two distinct Areas. The first (*Mobile and Wireless Networks*) deals mainly with the problems of mobile communications, which were already the main focus of the existing Area, and therefore keeps its structure. The second (*Internet Architectures and Networking*) has just been created under the leadership of two senior PhD researchers who have recently joined the Unit, in the scope of the Associate Laboratory contract; the focus of the activity of this Area is on future Internet design and community services, and it is expected that it will grow during the next two years.

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 was carried out under contract and in partnership with network operators and service providers, television broadcasters and manufacturers of communications systems and test equipment. The successful participation in past and current projects funded by European R&D programmes has a high strategic value, since it allowed 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. The exploitation of results obtained in these projects by different means (research contracts, technology transfer, consulting, advanced training, incubation of spin-off companies, etc.) is now the main challenge of the Unit as a whole and of each one of its Areas.

*Table of correspondence between know-how and the Industrial Sectors*

| Know-how | Status (*) | Digital Television | Communic. Networks | Telecomm. Services | Digital Video | Digital Audio |
|---|---|---|---|---|---|---|
| **Scientific Know-how** | | | | | | |
| Digital Communications | I | X | X | X | | |
| Computer Networks | I | X | X | X | | |
| Image and Vídeo Processing | I | X | | X | X | |
| Audio Processing | I | X | | X | | X |
| Computer Graphics | I | | | | X | |
| **Technology Know-how** | | | | | | |
| Multimedia Applications | I | X | X | X | X | |
| Design of Networks and Network Elements | I | | X | X | | |
| Mobile Networks | I | | | X | | |
| Speech processing | C | X | X | | | X |
| Product Engineering | E | X | X | X | X | X |
| Services and product marketing | E | X | X | X | X | X |
| Project management | I | X | | X | X | X |
| Information Systems | I | X | X | X | | |
| Specification and test of protocols | I | | X | X | | |
| Distributed Systems | I | X | X | X | | |
| Man-machine interfaces | I | X | | X | X | X |
| Image synthesis | I | | | | X | |
| Virtual Reality | I | | | | X | |
| Development of DSP based systems | I | | X | | | X |
| Design of Electronic Systems | O | | X | | | X |
| Software Radio | I | | X | | | |

(*) I - Internal; O - Existent in another Unit of INESC Porto; E - External; C – To be created

*Coverage of the Innovation Process*

| Activity Area | Research | Development | Consulting | Training | Marketing and Support | Evolutionary Maintenance | Use |
|---|---|---|---|---|---|---|---|
| Network Planning and Operation | UTM | UTM | UTM | UTM | | | Network Operators |
| Communication Systems | UTM | UTM | UTM | UTM | | | Telecom operators Manufacturers |
| Audiovisual Services | UTM | UTM | UTM | UTM | | | Broadcasters Network and Service Providers |
| Multimedia Content | UTM | UTM, MOG Solutions, XAREVISION | UTM, MOG Solutions, XAREVISION | UTM | MOG Solutions, XAREVISION | MOG Solutions, XAREVISION | Broadcasters Content Producers |

## Description of the Unit's organizational structure

The Telecommunications and Multimedia Unit is now organized in four Areas, as a result of a process that has been matured during the last years, but still needs to be consolidated in the future, in particular as a result of the creation of a new Area.

The *Mobile and Wireless Networks* Area (formerly *Communications Networks and Services*) has reached a stable structure, as far as leadership, the nucleus of its research team and the main goals of its research activity. The latter is focused on the emerging fourth generation mobile networks and addresses innovative architectural solutions (e.g., Quality of Service, mobility, security) required by these networks, as well as new communications paradigms that they make possible. This activity has been strengthened with the participation in projects of the Sixth Framework Programme of the EC and constitutes a natural framework for post-graduate students to carry out their research work (mainly at PhD level); both aspects have contributed to the creation of critical mass within this area.

The *Internet Architectures and Networking* Area has just been created, as explained. For this reason the characterization of this area, its main goals and the roadmap for the first two years are presented in detail in this document (section on medium term strategic objectives).

The *Multimedia Technologies and Systems* Area was created to integrate and coordinate well established R&D activities in Audio, Video and Image Processing and Multimedia Distributed Systems. This was mainly driven by the need to allow a broader and unified scope of intervention in all aspects related with multimedia content value chains, namely generation, description, manipulation, adaptation, transmission and distribution of multimedia content over heterogeneous platforms. This activity has been and still is mainly carried out in projects of the Sixth Framework Programme of the EC and is also tightly connected to ongoing post-graduate research programmes.

The *Optical and Electronics Technologies* Area was created with the main goal of defining and pursuing a strategy that could leverage existing and promising R&D activities with a technological intensive basis, namely in Optical Communications and Microwaves, Microelectronics and Micro-optics. The activities in this Area are supported in a recently equipped Photonics and Microwave laboratory and in existing know-how and facilities in micro-fabrication. Besides basic research and academic work, they are also oriented towards the development of pre-industrial prototypes for different application fields and will allow a strategical positioning in emerging areas, such as nano-technologies.

The activities in the four Areas are not carried out independently and isolated from each other; synergies between them have been and will continue to be exploited, when possible and necessary. Similarly, there are examples of successful collaboration with other Units in the past.


## Summary of results of the research activities of the team members

- **Projects**

*Summary of projects developed in 2007*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 10 | 8 | | 571.000 |
| D - Development | 3 | | | 89.800 |
| C - Consulting | | | | |
| A - Advanced training | | | | |
| T - Technology Transfer | | | | |
| O - Other | | | | |
| TOTAL | 13 | 8 | | 660.800 |

*Summary of relative distribution of sources of income*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG- On-going | C - Concluded | |
| NP – National Programmes | 1.63% | 0.30% | 3.51% | 36.000 |
| EP – European Programmes | 1.82% | 70.37% | 8.78% | 53.5000 |
| CS – Consulting and Services | | | 13.59% | 89.800 |
| O – Other R&D sources | | | | |
| OS – Other Sources | | | | |
| Total | 3.45% | 70.67% | 25.88% | 660.800 |

*Summary of projects developed in 2007*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| Target | V. Tavares | R | E | EP | 6PQ | 01-2004 | 12-2007 | F |
| IAMA | V. Tavares | R | N | NP | FCT | 06-2004 | 01-2008 | OG |
| DOMIR | C. Ribeiro | R | N | NP | FCT | 03-2005 | 12-2007 | F |
| CFD | J. C. Alves | R | N | NP | FCT | 05-2005 | 11-2007 | F |
| EBGCOM | H. Salgado | R | N | NP | FCT | 09-2005 | 12-2007 | F |
| DAIDALOS 2 | M. Ricardo | R | E | EP | 6PQ | 01-2006 | 12-2008 | OG |
| WWI AN 2 | J. Ruela | R | E | EP | 6PQ | 01-2006 | 12-2007 | F |
| MOSAICA | M.T. Andrade | R | E | EP | 6PQ | 06-2006 | 11-2008 | OG |
| UROOF | H. Salgado | R | E | EP | 6PQ | 07-2006 | 12-2008 | OG |
| VISNET II | J. Ruela | R | E | EP | 6PQ | 07-2006 | 12-2008 | OG |
| ENTHRONE 2 | M.T. Andrade | R | E | EP | 6PQ | 09-2006 | 08-2008 | OG |
| UPMEDIA 1 | S. Macedo | D | N | CS | - | 01-2007 | 03-2007 | F |
| MicroMassMedia | S. Macedo | D | N | CS | - | 03-2007 | 12-2007 | F |
| Multicast | M. Ricardo | D | N | CS | - | 03-2007 | 12-2007 | F |
| VOCAL | A. Ferreira | R | N | NP | FCT | 09-2007 | 09-2010 | S |
| EDCINE | J. Cardoso | R | E | EP | 6PQ | 07-2007 | 06-2009 | S |
| OMR | J. Cardoso | R | N | NP | FCT | 10-2007 | 09-2010 | S |
| BCCT | J. Cardoso | R | N | NP | FCT | 10-2007 | 09-2010 | S |
| DR-VidS | J. C. Ferreira | R | N | NP | FCT | 11-2007 | 05-2010 | S |
| DBPreserve | G. David | R | N | NP | FCT | 10-2007 | 09-2009 | S |
| ROFWDM | H. Salgado | R | N | NP | FCT | 10-2007 | 09-2009 | 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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
|---|---|
| Theses concluded in 2007 by members of the unit | 4 |
| Books (author) | |
| Chapter/paper in books | 2 |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 15 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 41 |
| Other publications (National meetings, local journals, etc.) | 12 |
| Total | 74 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 20 | 12 | 18 | 50 |
| Doctoral | 7 | 31 | 2 | 40 |
| Total | 27 | 43 | 20 | 90 |

- **Summary of advanced training actions**

*Summary of advanced training actions organized for external trainees in 2007*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 23 |
| Training for others *(estágios extra-curriculares)* | 2 |
| Professional training actions *(estágios profissionais)* | 2 |
| Other actions | |
| Total | 27 |

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

*Summary of items*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 6 |
| Collaboration in papers authored by INESC Porto researchers | > 60 |
| External persons directly involved in actions organized by INESC Porto | |

- Human resources in 2007

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 29 | 6 | | | 35 | +2 |
| *INESC Porto Grant Holders* | | 4 | 7 | | 11 | +4 |
| *Other Grant Holders* | | 7 | 17 | | 24 | +4 |
| *Employees* | 3 | | 1 | | 4 | +2 |
| *Trainees* | | | | | | |
| *Other* | | | | | | |
| Administrative | | | | 1 | 1 | 0 |
| Total | 32 | 17 | 25 | 1 | 75 | +12 |

(*) Relative to 2006, in absolute numbers.

## P1.6.2 SWOT ANALYSIS

### *Strengths*

- Existing know-how and practical experience in a broad scope of scientific and technological domains (signal processing, networks and services, multimedia systems and applications, optical and electronics technologies, etc.).
- Capability to integrate know-how and technologies, applied to multidisciplinary and innovative projects.
- Flexibility to accept new challenges, to adapt to changes and to launch new areas of work.
- Well established participation in prominent European R&D projects.
- Capacity to attract young researchers and to engage them in post-graduate programmes.

### *Weaknesses*

- No active involvement of many senior researchers affiliated to the Unit in scientific supervision as well as in negotiation and management of R&D projects and contracts.
- Difficulty to establish stable and diversified strategical partnerships.
- Lack of a well proven and solid model and business oriented staff for the transfer of know-how and technology to industry.

### *Opportunities*

- The 7th Framework Programme of the EC opens the possibility of strengthening existing partnerships or creating new ones, as well as launching new research areas.
- Exploitation of partnerships at national level in the framework of QREN (*Quadro de Referência Estratégico Nacional*).
- Emergence of new business models and acting roles in the multimedia sector, which exploit the convergence between the Internet and the traditional broadcast services.

- Creation of spin-off companies (under way).

- Exploitation of synergies with other Units (in particular with USIC and UOSE).

- Recent admission (contract) of senior researchers at post-doctoral level.

### *Threats*

- Lack of strategical and sizeable contracts and partnerships (R&D, consulting or technology transfer) creates an undesirable unbalance in the sources of funding and constitutes a risk in case there is a sudden decrease in European projects.

## P1.6.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

In spite of differences in composition and specific goals of each Area, some strategic objectives will be pursued at Unit level and thus under a common coordination, namely:

- Reinforce management and leadership skills as well as the links between the Areas.

- Continue to pursue a high-level of scientific excellence, widely recognized.

- Acquire knowledge and expertise in advanced or emerging technologies, as a means of adding value and differentiating the offer in highly competitive markets.

- Establish strategical partnerships, combining existing scientific and technological skills, and benefiting from the capacity to design, develop and integrate innovative solutions and systems.

Some new research projects submitted to the call launched by FCT (*Fundação para a Ciência e a Tecnologia*) in 2006 are starting during the third quarter of 2007 or early in 2008. Most of them are led by senior researchers of the Unit and some of them will be carried out in cooperation with other academic and research institutions and industrial companies. Six new projects have also been submitted under the call to the *Plano de Inovação do Grupo PT 2008-2010*, and are currently being evaluated.

Some proposals submitted to *7th Framework Programme* are still pending decision and it is planned to participate in the next calls to be launched by the EC.

The other R&D activities planned for 2008 will be carried out in projects of the *6th Framework Programme*, which have started in 2006 and will conclude in 2008. It is expected to exploit the results achieved in these projects and in other internal projects in new partnerships with industrial companies to be established in the framework of QREN (*Quadro de Referência Estratégico Nacional*).

It is expected to increase the offer in advanced professional training actions, covering most of the topics in which the Unit has excelled.

Finally, it is expected that the process of incubation of two spin-off companies will be concluded with success during 2008, and to continue to give support to the start-up of new companies.

The specific objectives of each Area are detailed next.

### Mobile and Wireless Networks

The research activities in this Area are currently focused on the field of mobile communications. Problems are approached from a network point view, and new architectural solutions for the challenges placed by the new communication scenarios are being investigated. The main topics under research are:

- Mobility of devices and networks, aiming at the development of mechanisms that support the mobility of terminals between heterogeneous access networks (managed from the user's perspective) and the seamless handover of entire networks.

- Quality of Service (QoS) in wireless mobile networks, in particular mechanisms for providing QoS in networks composed of moving terminals and moving networks, which need to be connected to the Internet. Network congestion control mechanisms are also being researched.

- Mesh and ad-hoc networks, including techniques and mechanisms for supporting the realization of optimized networks composed of network elements deployed arbitrarily; auto-configuration, multi-radio and routing aspects are being addressed.

- Multicast, with a focus on mechanisms that support multicast sessions whose participants are mobile terminals, mobile network elements, and mobile networks.

- Cross-layer optimization, that is, optimization of routing, QoS, multicast, and security by taking advantage of similar mechanisms available at multiple protocol layers.

The group includes eleven PhD students, most of them holding grants from FCT and doing research on the above topics, which are also jointly addressed by students completing their MSc theses.

In the last years most of the research activities were carried out in the framework of research projects funded by EC programmes. This strategy has been somehow criticized by the INESC Porto Scientific Advisory Board, which considered that the group was creating value for other companies, namely the big European telecom companies. This critical view was acknowledged and a change of strategy is under way. However, it must be stressed the participation in those projects played an essential role in the launching of advanced research programmes, the raising of the scientific level of the group and the establishment of fruitful cooperation links with renowned partners.

The new strategy consisted in defining a set of objectives of an internal project that simultaneously considers the know-how and prototypes available in the group and the communications interests identified for the Porto metropolitan region (as an immediate driving force). This vision project, named WIMETRONET, aims at exploiting a new communications paradigm for private mobile operators. The long term objective (2-3 years) is to develop and validate this concept and to implement a particular network element (*rbridge*). This strategy is being progressively pursued, since there are other research projects still in course and PhD work not related with this vision. The challenges are to motivate partners, mainly national partners, to collaborate in such project and to get the funds required to run the projects. Until now it was possible to involve or get the attention of two national players. Future actions include finding partners to develop other components of the proposed vision, or to participate in research projects where parts of that vision can be deployed.

Simultaneously leadership of the *Thematic Network on Mobile Communications* (RTCM – *Rede Temática de Comunicações Móveis*) will pursue; this is a research network comprising the main Portuguese research groups and companies working in the field. A proposal for extending this thematic network to Spain and Latin American countries has been submitted. The proposal of the new thematic network (*Rede Temática de Comunicações Móveis - Ibero Americana*) has 23 partners from 9 countries.

IAN: Internet Architectures and Networking

The recently founded Internet Architectures and Networking (IAN) area relates to two main aspects: future Internet design and community services. Future Internet concepts imply adjusting the current Internet architectures and services to the growing demands of end-users, including disruptive communication models, where a perfect combination of broadband access and content-based interactive services is the main goal. Moreover, the Internet is starting to be seen as a group of communities where the main purpose is sharing and where end-user intervention is a key topic. In addition, the notion of sharing has expanded beyond information, being now connoted with human experience.

New type of community services (e.g. YouTube, E-Bay, Twitter), which are now being placed under the umbrella of Web 2.0, are strongly reshaping electronic commerce. Not only that, but these services are also affecting the historic business models for access providers, where both the service provider and the access provider roles were bundled.

Today, we assist to the rise of new types of business models where the service provider is completely unbundled from the access provider. Nonetheless, the required networking functionality which depends on these roles has not evolved. In such context, community networking means support to community services from a networking perspective in a way that makes such services reliable and trustable from an end-user's perspective, and economically challenging from a provider's perspective. These are topics that IAN is focused upon.

<u>Goals</u>

As a new area in UTM, IAN aims mainly at expanding UTM's knowledge and portfolio into fields related with advanced Internet architectures. The goals to be pursued are two-fold:

- To pursue innovation by means of exploring new technologies (e.g., network coding) and futuristic architectures (e.g., mobile Internet) on the long-run, supported by means of interested customers, partnerships or other sources of financing.
- To develop applied research concepts (e.g., multi-access interoperability) aligned with customer demands providing short/mid-term results.

Trend scouting is consequently a key piece of IAN which is to be pursued throughout the whole lifetime of the area. Trend scouting includes but is not limited to:

- Analysis of advanced topics that may be key within a range of 10 years.
- Voluntary interaction with external partners of relevance to specific research topics.
- Host/organization of internal workshops to strengthen the internal links to other sub-units, including invitation of internationally renowned peers.
- Host/organization of events to strengthen the international position of INESC Porto.
- Participate in activities such as COST initiatives to be able to interact with peers.

<u>Roadmap</u>

The IAN working plan contemplates the period of 15.11.2007-31.12.2009. The roadmap is split into three phases: exploration, consolidation, and expansion.

The initial phase (six months) aims at establishing contacts with potential customers/partners both in Portugal and abroad. A second topic to pursue during this phase is a framework for the remainder phases, based on the potential contacts and projects. Results expected relate to the set up of project proposals, as well as required testbed(s). The outcome of this phase will be presented to interested colleagues of INESC Porto and FEUP, as well as other interested parties.

The second phase (nine months) covers consolidation of the agreements established during the first phase and will involve the initial 2PY staff effort, as well as students and eventual cooperation with other UTM areas. Results expected are the acquisition of at least one industrial project and one research cooperation (e.g., participation in an EU IST project). A minimum of two patents are expected, as well as a minimum of two scientific publications in events (e.g., conferences, magazines, and journals) considered to be of interest and with a reasonably high quality level.

Finally, the third phase (twelve months) is dedicated to the expansion of IAN. Consequently, the work developed during this phase will be focused in successfully finishing previously established projects, as well as in strengthening research areas according to the framework devised during the first phase. Finally, a review of the working plan is expected, in order to understand how to better develop IAN in the future. The results obtained will cover patents and publications of interest. It is also expected to host a conference and/or workshop during this phase.

**Multimedia Technologies and Systems**

Research and development activities in this Area are carried out in topics related to audio, video and image processing, with application to different domains, notably context-aware adaptable multimedia services in heterogeneous networked environments, video surveillance, multimedia archives and databases, and digital cinema and television. Designing and specifying these kinds of services requires also considerable knowledge and investment in distributed technologies and middleware platforms, as well as metadata and data models.

To accomplish these goals, it is foreseen to continue research in the following topics:

- Music and audio analysis, including segmentation, aiming at developing efficient and automatic tools for classifying and describing these signals.

- Audiovisual (A/V), video and image analysis focusing on aspects related to spatial segmentation and to multimodal analysis, to take advantage of combining information extracted from different media signals.

- Distributed video coding and its application to video surveillance systems.

- Context-awareness, studying and specifying types of relevant contextual information, how to generate, collect and use it and how to evaluate the impact of using different types of contextual information in different context-aware adaptable multimedia services; use of ontologies and concepts of the Web 2.0, to express context and to build intelligent and interoperable systems that automatically react to varying contexts and maximise the user satisfaction.

- Peer-to-peer and other distribution technologies such as Web Services, and their use to build efficient and interoperable networked multimedia services.

- Digital Rights Management (DRM) in the context of adaptable multimedia networked services and suitable business models for these services, notably in loosely-coupled environments such as the Internet.

- Semantic and ontology-based content search. In line with major ongoing efforts within the research community to solve the semantic-gap problem, the proposed plan in this field is to address strategies that include the extended use of semantic concepts, dictionaries or ontologies, the use of relevance feedback and to investigate how to transform from low level descriptions to high level semantics.

- Data models able to capture the metadata requirements along the complete content value chain, aiming at the reusability of metadata and increased efficiency in the archival, search and editing processes.

These activities are being carried out in projects of the *6 th Framework Programme – ENTHRONE* 2, *MOSAICA and EDCINE*, and of a Network of Excellence of the same programme – *VISNET* II. The above listed research topics are also object of several ongoing PhD theses.

Common to all these action lines is the need to deepen the relationships with strategic partners, both at national and international level, and to detect and exploit the opportunities to promote and transfer the technology developed in the context of past and current projects. It is in particular envisaged to establish partnerships with SMEs in the area of video surveillance and of A/V applications for recreational purposes, reacting to the user context and also in the area of metadata for professional A/V production environments.

### Optical and Electronics Technologies

The reorganization of this Area started with the combining of research activities in "Microwave and Optical Communications" and Microelectronics. This was felt as the right approach since these areas share a common laboratory infrastructure that has recently been setup with direct funding from FCT, and thus could benefit from a common strategy and coordination The first steps leading to the reorganization of this Area were given and during 2007 both groups have combined their skills and jointly participated in a proposal for an EC FP7 project (ACEOLE - *Data Acquisition, Electronics, and*

*Optoelectronics for LHC Experiments*) of the Marie Curie Initial Training Network (ITN) programme, with CERN as the main partner. Additionally, also during 2007, a laboratory in Micro-optics was setup sharing a common infrastructure with the previous described activities. The latter area provides an infrastructure that is believed may open further research directions in the Optical Communications and Electronics fields, besides Sensor Technology, which is its main target.

The activity in Microelectronics is organized in three main domains: dynamic reconfigurable logic and custom computing hardware; analogue and RF circuits design; test and design-for-testability of analogue, mixed-signal and RF circuits.

- Research on dynamic reconfigurable logic (DRL) will continue to address the area of application development support. Run-time assembly of reconfigurable modules (including on-line routing) is currently being investigated on a PhD programme, and will be followed by the integration of DRL-related services with conventional operating systems (Linux). The last part will be performed in the context of an MSc thesis. A 2.5-year research project has been financed by FCT and started on November 2007; the aim is to apply and extend the expertise in DRL-based systems to real-time video segmentation (involving another group of the Unit).

  An effort to apply network coding to integrated circuit layout has been started, with an MSc student carrying out preliminary work in this area. This effort complements another on-going activity that investigates the physical implementation of irregular reconfigurable fabrics for SoCs.

- The main research effort on analogue and RF circuits design is focused on the design of effective low power and area circuits for signal processing systems, especially those that are biologically plausible. Another line of research, being pursued in the context of a PhD work plan, addresses methods to minimize transceiver power consumption, through parameterization, for wireless sensor applications.

- Concerning the design for testability and built-in self test domain, the activity foreseen for 2008 includes, on one hand, the work being carried-out on the optimization of RF amplifiers' linearity, which is under investigation in the framework of a PhD work plan. On the other hand it is expected to participate in the ITN ACEOLE project, in collaboration with CERN, in the development of a low-phase noise low-bandwidth Phase-Locked Loop (PLL) to synthesize clocks with high spectral purity, to be designed using radiation-tolerance-by-design methods and built-in self test features.

The activity in "Microwave and Optical Communications" embraces the following topics:

- The line of research Fibre Supported Microwave/Radio Technology is a strategic objective for the following 3 years and will continue to be sought. A new Photonics and Microwave laboratory was set-up at INESC Porto, with funds from *Programa de Reequipamento* of FCT. The acquisition of equipment is now almost complete. The choice of this field of work was justified by the experience acquired in past PhD programs, the advice given by external scientific panels and the possibility of integration of young PhD students. Moreover, being a multidisciplinary topic, it is particularly suited to establishing the interaction with other fields of work, namely microwave techniques and the design of high-frequency circuits aimed by the Microelectronics group. Activities currently going on include the participation in the EC project UROOF (*Photonic components for Ultra-Wideband radio over optical fiber*), with a PhD student carrying out his research work in this area, and a new project recently approved for funding by FCT, in partnership with IT and Nokia-Siemens, SA. The objective to be pursued is the design and optimization of fibre supported microwave and radio systems.

- In the microwave field, work is currently under way in the area of EBG (Electromagnetic Band-Gap) design, in the context of an FCT funded project (EBGCOM - *Electromagnetic bandgap antennas and components for broadband communications*). A PhD student is currently doing his postgraduate studies in this field. The objective is the theoretical modeling of EBG structures and identification of applications for this technology. As such, during 2008 a new PhD student will initiate his studies in the design of EBG antennas. Work is also under way for establishing

design criteria and techniques for compensation of dispersion in optical fiber systems using microstrip EBG technology. A collaboration with Nokia-Siemens is being planned in this area.

- A new topic of research is begin pursued, namely Signal Processing in Optical Communications. This activity is targeting signal processing techniques for coherent optical communication systems and is being the object of a PhD thesis. Signal processing is also being applied to combat nonlinear distortion in radio-over-fiber systems. The objective is to reinforce this area during 2008 through funding from research projects. Specifically, the design of high speed MMIC equalizers for coherent optical systems for operation above 40 Gbit/s, and the implementation of a hybrid receiver are being pursued. The latter involves the use of micro-optics technology to achieve the required phase and polarization diversity at the receiver.

- In the context of ITN ACEOLE project, work is planned for collaboration in developing a radiation tolerant, multi-Gigabit/s optoelectronic data transmission link suitable for several distinct functions at an upgraded SLHC detector. Specifically, INESC Porto will be responsible for the experimental characterization of semiconductor laser devices and in the optimization of their electrical matching to the laser driver ASIC. This will take advantage of the facilities made available by the Microwave and Optical Communications laboratory, and will involve hosting an experienced researcher (ER) for 9 months to conduct this work.

The above mentioned activities will require in the near future strengthening of the research staff at a senior level. This will be made possible through research grants within the Associate Laboratory program. It is believed that this area of research besides its importance from an academic point of view has also a high value in applications of interest to high-tech companies, with a turn-around in terms of contracts with industry.


## P1.6.4 ACTION PLAN (GLOBAL)

The main strategical objectives previously outlined, both at Unit and Area level, will be pursued during 2008, as explained, and therefore the associated actions are only briefly mentioned here:

- Continuation of ongoing R&D projects funded by EC programmes.

- Start or continuation of recently approved R&D projects funded by FCT.

- Preparation and submission in partnership with industrial companies of new projects in the framework of QREN (*Quadro de Referência Estratégico Nacional*).

- Participation in the elaboration and submission of new projects to the *7th Framework Programme*.

- Creation of better conditions for a stronger cooperation between the Areas (at scientific, technical and management level).

- Reinforcement of cooperation with other Units (in particular, USIC and UOSE), especially for establishing strong external partnerships.

- Support to MSc and PhD theses in progress and to new ones to be proposed.

- Support to the incubation of spin-off companies and engagement in joint projects and actions.

- Active participation in activities organized by the *Mobile Communications Thematic Area* (RTCM – *Rede Temática de Comunicações Móveis*).

The current practice of organizing regular internal sessions for presenting and discussing ongoing research work and results (associated to theses, projects, published papers, etc.) will be kept; these sessions are widely announced and open to external participants.

The results of research activity will be presented by the usual means: in events organized by the Unit (workshops, demo sessions, etc.), publications in journals and magazines, presentations in international conferences, as well as in ordinary meetings of projects.

## P1.6.5 ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 7 | 7 | | 606.900 |
| D - Development | 1 | | | 106.000 |
| C - Consulting | | | | |
| A – Advanced training | 1 | | | 10.000 |
| T – Technology Transfer | | | | |
| O - Other | | | | |
| TOTAL | 9 | 7 | | 722.900 |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 14.86% | | | 107.400 |
| EP – European Programmes | 65.98% | | 3.11% | 499.500 |
| CS – Consulting and services | | | 14.68% | 106.000 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | 1.38% | 10.000 |
| Total | 80.84% | 0.00% | 19.16% | 722.900 |

*Summary of projects to be developed in 2008*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| IAMA | V. Tavares | R | N | NP | FCT | 06-2004 | 01-2008 | OG |
| DAIDALOS 2 | M. Ricardo | R | E | EP | 6PQ | 01-2006 | 12-2008 | OG |
| MOSAICA | M.T. Andrade | R | E | EP | 6PQ | 06-2006 | 11-2008 | OG |
| UROOF | H. Salgado | R | E | EP | 6PQ | 07-2006 | 12-2008 | OG |
| VISNET II | J. Ruela | R | E | EP | 6PQ | 07-2006 | 12-2008 | OG |
| ENTHRONE 2 | M.T. Andrade | R | E | EP | 6PQ | 09-2006 | 08-2008 | OG |
| VOCAL | A. Ferreira | R | N | NP | FCT | 09-2007 | 09-2010 | OG |
| EDCINE | J. Cardoso | R | E | EP | 6PQ | 07-2007 | 06-2009 | OG |
| OMR | J. Cardoso | R | N | NP | FCT | 10-2007 | 09-2010 | OG |
| BCCT | J. Cardoso | R | N | NP | FCT | 10-2007 | 09-2010 | OG |
| DR-VidS | J. C. Ferreira | R | N | NP | FCT | 11-2007 | 05-2010 | OG |
| DBPreserve | G. David | R | N | NP | FCT | 10-2007 | 09-2009 | OG |
| ROFWDM | H. Salgado | R | N | NP | FCT | 10-2007 | 09-2009 | OG |
| Formação | - | A | N | OS | - | - | - | E |
| PS | - | - | N | CS | - | - | - | E |

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| PE | - | - | E | EP | 7PQ | - | - | E |

(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: <u>OG - On-going</u>: starting before 2008; <u>G - Guaranteed</u>: activity with a firmly agreed contract, starting in 2008; <u>E - Expected</u>: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.

- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | 8 |
| Books (author) | |
| Chapter/paper in books | 2 |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 10 |
| Papers in National Journals with scientific referees | |
| Conference Proceedings in events with scientific referee and selection | 35 |
| Other publications (National meetings, local journals, etc.) | 10 |
| Total | 65 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 45 | 7 | 25 | 77 |
| Doctoral | 8 | 29 | 9 | 46 |
| Total | 53 | 36 | 34 | 123 |

- **Summary of Advanced Training Actions**

*Summary of Advanced Training Actions expected for 2008*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 30 |
| Training for others *(estágios extra-curriculares)* | 2 |
| Professional training actions *(estágios profissionais)* | 2 |
| Other actions | |

| Type | Number |
|------|--------|
| Total | 34 |

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

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|------|--------|
| Organizing conferences or meetings | 6 |
| Collaboration in papers authored by INESC Porto researchers | > 40 |
| External persons directly involved in actions organized by INESC Porto | |

- **Human resources in 2008**

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|------|-----------|------|------|-------|-------|-----------|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 31 | 4 | | | 35 | 0 |
| *INESC Porto Grant Holders* | | 5 | 8 | | 13 | +2 |
| *Other Grant Holders* | | 6 | 14 | | 20 | -4 |
| *Employees* | 3 | | 1 | | 4 | 0 |
| *Trainees* | | | | | | |
| *Other* | | | | | | |
| **Administrative** | | | | 1 | 1 | 0 |
| Total | 34 | 15 | 23 | 1 | 73 | -2 |

(*)   Relative to 2007, in absolute numbers.

## P1.7 INNOVATION AND TECHNOLOGY TRANSFER UNIT

*Managers: Alexandra Xavier, Aurora Teixeira*

### P1.7.1 SHORT DESCRIPTION OF THE UNIT

R&D Institutions that intend to take advantage of the economic opportunities of their R&D programmes should leverage their innovation potential through appropriate strategies and management processes which might allow them to manage and promote their R&D results outside the organization, in order to create economic value.

The purpose of the Unit is to consolidate last years' investments and experience of INESC Porto in the development of internal processes and tools to manage their R&D results, and organize this knowledge and competences in a transversal Unit that can take responsibility and leadership of the process of knowledge valorisation.

In this context, the main goal of the UITT is to develop and promote innovation management practices, acting directly in the internal processes, supporting entrepreneurship activities helping business development as well as incubation.

The Unit also plays a role in the creation and increase of knowledge in the scientific area of Innovation Management, Technology Transfer and Entrepreneurship. Thus, advanced training - MSc and PhD level training -constitutes a major objective aiming at creating internal excellence in the relevant research areas and to provide the industry with highly qualified professionals, capable of dealing with the challenges of entrepreneurial innovation.

The Unit main Research and Development areas and activities are:

- The Innovation Management:

  o Act directly in the internal innovation process and practices, by developing, in collaboration with other R&D Units, processes and tools that enable an efficient management of R&D projects results in order to maximize the valorisation opportunities.

  o Provide consulting services to companies, concerning the implementation of R&D+I management systems according to NP 4457:2007. These services follow a proprietary methodology, developed in the context of COTEC Portugal project.

  o Provide training to companies in order to increase awareness and knowledge concerning the NP R&D+I management systems and methodologies.

  o Development research projects in order to increase emergent knowledge that supports internal and external activities.

- Entrepreneurship:

  o Promote an entrepreneurship culture behind academic researchers

  o Create entrepreneurial awareness through the organization of training actions, development of tools, and giving direct support to promoters in the process of turning ideias into business.

  o Supply of incubation services through the recently created incubator LET-IN.

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*Table of correspondence between know-how and External and Internal application*

| Know-how | Status (*) | Internal Units | Companies | Entrepreneurs |
|---|---|---|---|---|
| NPD | I/E | X | X | X |
| R&D + Innovation Management System | I | X | X | |
| Creativity | E | X | | X |
| Business Concept Development | I/E | X | X | X |
| Business Plan Development | I/O/E | X | | X |
| Management of "proof of concept" projects | I | X | X | X |
| Commercial Feasibility studies | I | X | | X |
| Technology Feasibility studies | O | X | X | X |
| Technology Transfer | C | X | X | |
| Innovation Metrics | I/E | X | X | |
| Open Innovation | I/E | X | X | X |

(*)   I - Internal; O – Existing in another Unit of INESC Porto; E - External; C – To be created

*Potential Coverage of the Innovation Process*

| Activity Area | Research | Development | Consulting | Training | Internal Use |
|---|---|---|---|---|---|
| Development of R&D + innovation management systems | X | X | X | X | X |
| Implementation of innovation processes | | | X | X | X |
| Business Plan methodologies and tools | | | X | x | X |
| Definition and development of methodologies to analyse and protect R&D results | X | X | | X | X |
| Definition and development of methodologies to analyse and control R&D+I management systems | X | X | X | X | X |
| Technology Feasibility studies | | | X | X | X |
| Commercial Feasibility studies | | | X | X | X |
| Innovation Metrics | X | | X | X | X |
| Open Innovation | X | | | X | X |
| Technology transfer Practices | X | X | | X | X |

## Description of the Unit's organizational structure

The Unit's management is jointly assumed by Alexandra Xavier e Aurora Teixeira with direct support of the Board of Direction.

The Unit is focused on the areas: Innovation Management, Business Development and Entrepreneurship, and Technology Transfer.

The main activities are:

- Training actions.

- Consulting services for companies in order to increase their potential for Innovation.

- Helping entrepreneurs and R&D Units in the process of evaluation of opportunities and in the development of "Commercial Feasibility Studies" and "Business Plans".

- Implementing process and tools for an efficient management of R&D projects concerning IP protection, evaluation and technology transfer.

- Development of R&D activities in order to increase Knowledge and sustain the overall activity.

The Unit works in collaboration with the others R&D Units, with the Board of Directors, and with entrepreneurs.

## Summary of results of the research activities of the team members

- **Projects**

*Summary of projects developed in 2007*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 1 | | 2 | 0 |
| D - Development | | 1 | | 42.000 |
| C - Consulting | 1 | | | 6.800 |
| A – Advanced training | 1 | | | 61.957 |
| T – Technology Transfer | | | | |
| O - Other | 2 | | | 6.300 |
| TOTAL | 5 | 1 | 2 | 117.057 |

*Summary of relative distribution of sources of income*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | S - Started | OG– On-going | C - Concluded | |
| NP – National Programmes | | 52,93% | | 61.957 |
| EP – European Programmes | | | 35,88% | 42.000 |
| CS – Consulting and Services | 11,19% | | | 13.100 |
| O – Other R&D sources | | | | |
| OS – Other Sources | | | | |
| Total | 11,19% | 52,93% | 35,88% | 117.057 |

*Summary of projects developed in 2007*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | Type (3) | Prog. | | | |
| LEADERSHIP | J.C. Caldeira | D | E | EP | 6 PQ | 02-2006 | 10-2007 | F |
| CIFIAL R&D+I | Alex. Xavier | C | N | CS | - | 06-2007 | 01-2008 | S |
| FORMINOV | Alex. Xavier | A | N | NP | ON Norte | 10-2006 | 04-2008 | OG |
| Tomorrow Options | Alex. Xavier | O | N | CS | - | 03-2007 | 12-2008 | S |
| XAREVISION | Alex. Xavier | O | N | CS | - | 04-2007 | 03-2008 | S |
| CALÇADO | R. Madureira | R | N | OS | - | 11-2007 | 03-2008 | S |
| I&D UTEN | A. Teixeira | R | I | CS | - | 11-2007 | 06-2008 | S |
| OPEN | A. Teixeira | R | I | EP | - | 11-2007 | 12-2008 | 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 2007 and continuing in 2008; OG – On-going: activities started earlier than 2007 and continuing in 2008; F – Finished: activities ending in 2007.

- **Summary of publications**

*Summary of publications in 2007*

| Type of publication | Number |
| --- | --- |
| Theses concluded in 2007 by members of the unit | |
| Books (author) | 1 |
| Chapter/paper in books | 1 |
| Publications (editor) | |
| Papers in International Journals with scientific referees | 6 |
| Papers in National Journals with scientific referees | 1 |
| Conference Proceedings in events with scientific referee and selection | 9 |
| Other publications (National meetings, local journals, etc.) | 6 |
| Total | 24 |

(*)   papers co-authored with researchers of other Units

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2007*

| Type | Starting | On-going | Concluded | Total |
| --- | --- | --- | --- | --- |
| Master | 4 | 4 | 6 | 14 |
| Doctoral | 2 | 1 | 0 | 3 |
| Total | 6 | 5 | 6 | 17 |

- Summary of advanced training actions

*Summary of advanced training actions organized for external trainees in 2007*

| Type | Number |
|---|---|
| Training for graduation students *(estágios curriculares)* | 2 |
| Training for others *(estágios extra-curriculares)* | |
| Professional training actions *(estágios profissionais)* | |
| Other actions | 1 |
| Total | 3 |

- Summary of activities of cooperation or dissemination

*Summary of items*

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

- Human resources in 2007

*Summary of Unit personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 2 | | | | 2 | 0 |
| *INESC Porto Grant Holders* | | | 3 | | 3 | 0 |
| *Other Grant Holders* | | | | | | |
| *Employees* | 1 | | 1 | | 2 | 0 |
| *Trainees* | | | | | | |
| *Other* | | | | | | |
| **Administrative** | | | | | | |
| Total | | | | | 7 | 0 |

(*) Relative to 2006, in absolute numbers.

## P1.7.2 SWOT ANALYSIS

### *Strengths*

- Past experience in the implementation of processes and tools concerning innovation process.
- Competences in the area of IP and technology transfer process.
- Competences in the area of R&D + Innovation management systems.
- Experience and competence concerning business development process.
- Experience and competence in advanced training in the area of innovation, technology transference and entrepreneurship.
- Good relationship between the Unit and researchers.
- Good relationships between the Unit and some entrepreneurship advanced training courses.
- Good relationships between the Unit and pilot companies that implemented the certification on innovation management (NP 4457:2007).

### *Weaknesses*

- Incipient international networking for the development of R&D projects.
- Inefficient commercial approach and lack of adequate staff to meet the expected increase of consulting activities in the area of innovation management systems.

### *Opportunities*

- Collaboration with other International Research Unit in European Projects (Lappeenranta University of Technology, Texas Austin University, IC2, WIFO), which will foster the Unit scientific output.
- Increasing awareness by public (Portuguese Government – QREN) and private (COTEC and Portuguese largest firms) entities of the need of innovation and R&D+I management training and certification.

### *Threats*

- Relative scarcity of entrepreneurial culture and empowerment of Portuguese economic agents in general and researchers in particular.
- Increasing competition in the area of R&D+I related training and consulting.


## P1.7.3 MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

The main strategic objectives for 2008 are:

- Develop an internal document containing an explicit and formal scientific policy.

- Consolidate our offer of consulting services in the R&D+I area through a careful selection process of key clients.

- Attract high quality MSc and PhD researchers in order to increase our critical mass both at scientific and consulting levels.

- Implement visible and high quality training actions, namely by initiating a North-Galiza network, in order to reinforce and create competences to sustain Unit's future activity.

- Organize high quality events that financially support and give visibility to the Unit's scientific and technology resources.

- Enlarge our international collaborations through the participation in EU (and other international) projects.

- To diffuse the 'Open Innovation' paradigm within the Portuguese economy.

## P1.7.4 ACTION PLAN (GLOBAL)

- Reinforcing the scientific activity of the Unit.

- Implementation of the training action plan in the areas of Innovation Management and Technology Transfer.

- Implementation of training actions concerning the dissemination of an entrepreneurial culture among researchers.

- Identification and development of strategic collaborations and formal partnerships that might seem important to the development of the main areas of activities.

- To become a privilege consulting partner of Portuguese companies in the implementation and certification of Innovation management systems.

- To become a nationally and internationally renowned unit in the R&D+I Management area.

## P1.7.5 ACTIVITIES EXPECTED FOR 2008

- **Projects**

*Summary of the projects to be developed in 2008*

| Type of Activity (1) | No. Projects (2) | | | Total Income (€) |
|---|---|---|---|---|
| | N | E | I | |
| R - Research | 1 | | 2 | 60.000 |
| D - Development | | | | |
| C - Consulting | 4 | | | 130.200 |
| A – Advanced training | 6 | | | 269.543 |
| T – Technology Transfer | | | | |
| O - Other | 4 | | | 18.100 |
| TOTAL | 15 | | 2 | 477.843 |

*Summary of the percentage distribution of budgetary revenue*

| Financing (3) | Status (4) | | | Total Income (€) |
|---|---|---|---|---|
| | OG- On-going | G - Guaranteed | E - Expected | |
| NP – National Programmes | 40,61% | | | 194.043 |
| EP – European Programmes | 10,46% | | | 50.000 |
| CS – Consulting and services | 5,17% | | 39,57% | 213.800 |
| O – Other R&D sources | | | | |
| OS – Other sources | | | 4,19% | 20.000 |
| Total | 56,24% | 0,00% | 43,76% | 477.843 |

*Summary of projects to be developed in 2008*

| Name of the project | Respons. | Type Proj. (1) | Degree of Intern. (2) | Financ. | | Starting date | Conclusion (prediction) | Status (4) |
|---|---|---|---|---|---|---|---|---|
| | | | | Type (3) | Prog. | | | |
| FORMINOV | Alex. Xavier | A | N | NP | ON Norte | 10-2006 | 04-2008 | OG |
| Tomorrow Options | Alex. Xavier | O | N | CS | - | 03-2007 | 12-2008 | OG |
| XAREVISION | Alex. Xavier | O | N | CS | - | 04-2007 | 03-2008 | OG |
| CIFIAI I&D+I | Alex. Xavier | C | N | CS | - | 06-2007 | 01-2008 | OG |
| CALÇADO | A. Teixeira | R | N | OS | - | 11-2007 | 03-2008 | OG |
| I&D UTEN | A. Teixeira | R | I | CS | - | 11-2007 | 06-2008 | OG |
| OPEN | A. Teixeira | R | I | EP | - | 11-2007 | 12-2008 | OG |
| PIN 1 | Alex. Xavier | O | N | CS | - | 01-2008 | 12-2008 | E |
| Workshop 3 | A. Teixeira | A | N | CS | - | 01-2008 | 03-2008 | E |
| Formação IPP | Alex. Xavier | A | N | CS | - | 01-2008 | 02-2008 | E |
| CONSULTORIA | Alex. Xavier | C | N | CS | - | 02-2008 | 12-2008 | E |
| LET-In | Alex. Xavier | O | N | CS | - | 02-2008 | 12-2008 | E |
| Sistema de Avaliação de IDI | Alex. Xavier | C | N | CS | - | 02-2008 | 04-2008 | E |
| Conferência | A. Teixeira | A | N | CS | - | 03-2008 | 12-2008 | E |
| Certificação INESC NP4457 | Alex. Xavier | C | N | OS | - | 03-2008 | 06-2008 | E |
| Workshop 2 | Alex. Xavier | A | N | CS | - | 03-2008 | 06-2008 | E |
| Workshop 1 | A. Teixeira | A | N | CS | - | 06-2008 | 12-2008 | E |

(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: <u>OG – On-going</u>: starting before 2008; <u>G – Guaranteed</u>: activity with a firmly agreed contract, starting in 2008; <u>E – Expected</u>: Activity with expected achievement, corresponding to a level of achievement proposed as a goal by the Unit.


- **Publications**

*Summary of the publications expected for 2008*

| Type of publication | Number |
|---|---|
| Theses concluded in 2008 by members of the unit | 3 |
| Books (author) | 2 |
| Chapter/paper in books | 0 |
| Publications (editor) | 1 |
| Papers in International Journals with scientific referees | 6 |
| Papers in National Journals with scientific referees | 1 |
| Conference Proceedings in events with scientific referee and selection | 10 |
| Other publications (National meetings, local journals, etc.) | 8 |
| Total | 31 |

- **Summary of post-graduation activities**

*Summary of theses supervised by members of the unit in 2008*

| Type | Starting | On-going | Concluded | Total |
|---|---|---|---|---|
| Master | 6 | 0 | 7 | 13 |
| Doctoral | 2 | 2 | 1 | 5 |
| Total | 8 | 2 | 8 | 18 |

- **Summary of Advanced Training Actions**

*Summary of Advanced Training Actions expected for 2008*

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

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

*Summary of cooperation and dissemination actions expected for 2008*

| Type | Number |
|---|---|
| Organizing conferences or meetings | 4 |
| Collaboration in papers authored by INESC Porto researchers | |
| External persons directly involved in actions organized by INESC Porto | |

- **Human resources in 2008**

*Summary of Unit personnel at the end of 2008*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | 2 | | | | 2 | 0 |
| *INESC Porto Grant Holders* | | | 3 | | 3 | 0 |
| *Other Grant Holders* | | | | | | |
| *Employees* | | | 1 | | 1 | -1 |
| *Trainees* | | | 1 | | 1 | +1 |
| *Other* | | | | | | |
| **Administrative** | | | | | | |
| Total | | | | | 7 | 0 |

(*)    Relative to 2007, in absolute numbers.

# P2. SUPPORT ACTIVITIES PLAN

## P2.1 DEPARTMENT OF INFORMATION AND LOGISTIC

*Manager: Maria da Graça Barbosa*

### P2.1.1  SHORT DESCRIPTION OF THE DEPARTMENT

The Information and Logistics Department's main objective is to guarantee, in an integrated way, the information, administration and logistic support necessary to INESC Porto's good functioning. Comprehending the majority of the support functions and combining administrative/executive functions with research, analysis and advice, DIL strongly contributes to the instruction and fundamentation of the decisions made by the authorised persons.

Currently, DIL seeks to take full advantage of the Intranet's potentialities, aiming to offer more complete and updated information of relevance to the institution, as well as the rules and procedures in force.

It is also DIL's objective to increase the efficiency of the services rendered upon the simplification and automation of the processes.

### *Description of the Department's organizational structure*

The current structure is reasonably stable, corresponding to the functions required by the type of activity that has been carried out by INESC Porto. Since October 2004, there has been a change in the Responsibility for the Human Resources Area, which has been assumed directly by the Department's manager. This change demanded the reinforcement of the now called "General Coordination" of the department, with the allocation of a person to support the coordination functions. Since January 2007, the General Coordination took also charge of the organization of the Board of Directors' meetings, dispatch and follow-up of its decisions.

Thus, apart from General Coordination, DIL covers six main functional areas: Human Resources, Accountancy and Finance, Management Control, Legal Support, Logistic Support and Secretarial Coordination, with the following specific missions:

Human Resources: Coordination and execution of all the activities concerning administrative management of human resources, as well as the actions necessary to the fulfillment of the legal and budgetary obligations. Follow-up and management of INESC Porto's insurances related to people, namely Health Insurance, Personal Accidents and Work Accidents, as well as the follow-up and control of the services rendered by the hired company in the area of Health, Hygiene and Occupational Safety.

*Manager: Maria da Graça Barbosa*

Accountancy and Finance: Coordination and execution of the activities of general accountancy and financial management, as well as the necessary actions to the fulfillment of the tax obligations.

*Manager: Paula Faria*

**Management Control:** Coordination and execution of the activities regarding planning and budgetary control and management information. Support to the submission of applications of financed projects and administrative, economical and financial management of these projects.

*Manager: Marta Barbas*

**Legal Support:** Juridical support to the institution, in terms of information, advice, prevention and solving of problems and verification of the legal and statutory conformity of acts and contracts, maintenance and update of the institutional documentation. It also supports the functioning of the associative bodies of INESC Porto, particularly the Board of Directors and the General Council.

*Manager: Maria da Graça Barbosa*

**Logistic Support:** aims to guarantee the copy services, internal mail, external services and logistic support.

**Secretarial Coordination:** coordination of the Units', Services' and Departments' Secretaries, in order to guarantee the coherence of the typical procedures of those functions, as well as to ensure homogeneity and control the compliance with the internal rules and procedures. The person in charge of these functions is allocated to it in part-time, maintaining her previous functions as Unit's secretary (Lídia Vilas Boas).

- **Human resources of the Department**

*Summary of Department personnel at the end of 2007*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | | | | | | |
| *INESC Porto Grant Holders* | | | | | | |
| *Other Grant Holders* | | | | | | |
| *Employees* | | | | | | |
| *Trainees* | | | | | | |
| *Other* | | | | | | |
| **Administrative** | | 1 | 10[1] [2] | 8 | 19[1] [2] | +2[2] |
| **Total** | | 1 | 10 | 8 | 19 | +2 |

(*)   Relative to 2006, in absolute numbers.

(1)   The person that guarantees the function of Secretarial Coordination is allocated to the Department only by 25% of her working hours.

(2)   One person is a non-paid Trainee.

## P2.1.2 SWOT ANALYSIS

### *Strengths*

- The integration and inter-disciplinarity under a common coordination has proved to enable a more coherent, informed and effective response;

- The engagement in the continuous improvement of the key-elements' work methods, as well as the investment in training, whether professional or post-graduate directly related with the function, enables a global increase of DIL's response capacity, reducing the need to resort to external advisory to the minimum;

- The fine organization of information and its adaptation to several purposes has been recognized even as a of best practice model.

### *Weaknesses*

- Some difficulties in identifying, conceiving and implementing measures of rationalization and automation of processes;

- Some discrepancies in terms of qualifications and capacity of response and, consequently, in terms of amount of work and level of responsibility assigned to each employee.

### *Opportunities*

- The exploring of partnerships with external entities, from which improvements in procedures and implementation of best practices may result. Furthermore, the institution itself may become a reference of good practices in certain areas;

- The possibility of including DIL's services and competences in the array of services and competences offered by the institution to its stakeholders and, consequently, be an additional source of revenue.

### *Threats*

- The unavailability to take the opportunities that may arise;

- The current dimension of DIL proving to be too heavy in a scenery of reduction of the institution's activity;

- The increasing complexity and burden of the management of funded projects, may consume too much time and energy of several persons in the department, deviating them from their value-added core functions.


## P2.1.3  MEDIUM TERM STRATEGIC OBJECTIVES AND OBJECTIVES FOR THE YEAR

<u>Involvement in the several aspects and strategic guidelines:</u> due to its positioning in the organizational structure and its knowledge and specific competences, DIL is capable of collaborating, in a small or large scale, in the following strategic aspects:

- *Economic value of knowledge:* the Legal Support area intends to intensify its intervention, mainly in the technology transfer processes, advanced training and protection of intellectual property;

- *Relation with the economic and social environment*: The area of Management Control intends to collaborate in the definition of sectoral strategies and in the definition of a coherent image in the market as well as to improve the monitoring of the degree of compliance with those

strategic objectives; in collaboration with the Board of Directors, the area of Accountancy and Finance will seek strategic partnerships with Financial Institutions for the provision of audit services in the different technological areas of INESC Porto;

- *Internationalization*: According to its specific competences, DIL proposes to collaborate in the initiatives that may be developed; in the scope of Secretarial Coordination, DIL also hopes to collaborate in the organization of international congresses;

- *Institutional Positioning*: DIL proposes to collaborate in the creation or development of institutional partnerships, stressing the external offer of internal competences that have been created (namely in project management and information management), that may place INESC Porto as a reference institution;

- *Definition of the policies and financing sources*: The areas of Management Control and Accountancy and Finance in particular, propose to intensify their contribution to the search and diversification of INESC Porto's financing sources;

- *Management of Human Resources:* the area of Human Resources proposes to study the ways of carrying out the diagnosis of INESC Porto's factors of attraction for the several types of collaborators, as well as to contribute to the redefinition of the collaborators' regulation;

- *Internal Organization*: within this strategic aspect, DIL will maintain the achievement of objectives defined previously. They are:

  o Promotion of the inter-units articulation: DIL aims to promote initiatives involving unit and area managers, with the objective of fomenting the articulation between the several productive units, concerning the issues of the department's competence.

  o Simplification and automation of processes: DIL intends to identify, propose and implement effective measures of simplification and active collaboration in the automation of processes, as a way of obtaining efficiency gains, without control or rationality loss and ensuring the compliance with the applicable laws; especially, DIL will take on the dynamization and development of the Workflow project and its extension to other processes;

  o Creation of an Integrated Information System: DIL proposes to actively collaborate in the specification of a system that satisfies INESC Porto's needs and that may be also applicable to institutions of the same kind.

- Acquirement of new competences: DIL is constantly updating knowledge and adapting its competences to the institution's evolution, in a way as to maintain or increase the capacity of response to new problems and situations, by means of research, adequate training, benchmarking etc.

- Collaboration in the management of the enlargement process of INESC Porto – Associated Laboratory, in terms of articulation of scientific and contractual activities, budgets and accountability, procedures, human resources, etc. between INESC Porto and the Groups that have adhered to the Associated Laboratory, without prejudice of their autonomy (so far LIAAD and CRACS). Organization of the INESC Porto-LA Coordinator Council's meetings and follow-up of its decisions.

## P2.1.4  DEPARTMENT'S ACTION PLANS

All the actions mentioned below, most of which already started, aim to contribute to a better management and value/valorization of resources (human, material, financial and intellectual) and to a greater efficiency of the processes, as well as to the carrying out of the strategic guidelines established by the Board of Directors.

**General (in general coordination or involving one or more areas)**

- Management of the execution of PRIME multiannual training plan (2007-2008), in articulation with the area of Management Control;

- Search for new opportunities of funding of continuous training in the framework of QREN;

- Implementation of the proposed model of INESC Porto as an Accredited Training Entity, in case the accreditation by IQF is deferred;

- Periodic revision and updating of the Welcome Guide; implementation of a systematic and effective procedure of welcoming of new collaborators;

- Reviewing of the information offered by DIL in the new Intranet and Internet sites: improve accessibility and the organization of the information, within the general reforming of Intranet and Internet process, managed by SIG;

- Participation in the definition of an Integrated Information System for INESC Porto;

- Continuing the participation in the internal project of automation of processes (collection and modelling of processes and specification of test and validation sceneries);

- Provide training or information sessions, periodically or whenever it is necessary, whether for the project managers or for the secretaries.

**Human Resources Area**

- Redefinition of the status of the several categories of collaborators;

- Extension of the automated process of Recruitment, Selection and hiring of human resources to other categories of collaborators and other stages of the process;

- Improvement of the automated process of Performance Assessment;

- Implementation of a process of extracting the information on training needs from the individual auto-assessment forms, in order to support the elaboration of the training needs diagnosis and the training planning;

- Improvement of the processes of collection, integration and processing of the information with the purpose of the Social Report/Balance and, in general, facilitating the supply of information for several purposes;

- Collaboration with SIG in the creation of a system for the electronic submission of applications and creation of a collective database.

**Accountancy and Finance Area**

- Continuing the study of the behavior of certain financial parameters throughout time, aiming to define a financial management policy;

- Adaptation of the internal rules for the purchasing of goods and services to the new Law of Public Procurement, implementation of the new rules and procedures and, in collaboration with SIG, improve the respective automatic processes;

- Integration of the process of Publishing Awards in SACA, in collaboration with SIG;

- Promotion of the establishment of partnerships with Financial Institutions, in the technological areas, in articulation with the Board of Directors.

**Management Control Area**

- Implementation of an automatic process of Time-Cards recording;

- Creation and development of an Internal Audit Plan;

- Start a record of the proposals of provision of services that, together with the control of the billing of the existing bilateral contracts, will make it possible to feed operational performance indicators;

- Creation of a Handbook on procedures for funded projects.

- Development and implementation of a Balanced Scorecard for INESC Porto that enables the monitoring of the strategy's execution.

**Legal Service**

- Collaboration in the implementation of the Handbook on Intellectual Property, written by an external specialized company, in articulation with the new Innovation and Technology Transfer Unit (UITT):
  - o definition of the policy and approval and application of the Regulation of Intellectual Property;
  - o Revision of contracts with collaborators and creation of new drafts;
  - o creation of drafts for several kinds of agreements/contracts with the purpose of defending INESC Porto's rights;
  - o Articulation with the external company of intellectual property in the handling of real cases of protection of intellectual property, centralization, follow-up and filing of the processes.
- Legal support to the Business Incubation Projects and new Spin-offs of INESC Porto;
- Legal support to the institution's internationalization project;
- Study and advice on the legal issues of the Seventh R&D Framework Programme;
- Revision and enriching of the information and documentation available on the intranet, namely drafts of documents (contracts, declarations, etc.), relevant legislation, updating of the frequently asked questions, as well as relevant institutional documentation.

**Secretarial Coordination**

- Verify and support the use of applications such as ULTIMUS, SACA and other process management applications by the secretaries, suggesting changes and improvements, namely integrating the Intranet reservations process of services and equipment, allowing multiple requests and confirmations.

- Continuous finding of possible integrations of the management application processes to the secretarial daily tasks;

- Continuous planning of the Secretaries' training:

  - o Proposals for single individual participations;
  - o Proposals for the group's training based on the assessment of lacunas

- Formulation of a chart that compares the tasks performed by the several secretaries as a way to evidence the different types of use of these human resources in the different Units and make the coordinators aware of a more efficient use of them.

## Human resources of the Department

*Summary of Department personnel at the end of 2008 (estimate)*

| Type | Education | | | | Total | Variation (*) |
|---|---|---|---|---|---|---|
| | PhD. | MSc. | BSc. | Other | | |
| *R&D* | | | | | | |
| *University or Polytechnic Staff* | | | | | | |
| *INESC Porto Grant Holders* | | | | | | |
| *Other Grant Holders* | | | | | | |
| *Employees* | | | | | | |
| *Trainees* | | | | | | |
| *Other* | | | | | | |
| **Administrative** | | 1 | 9 [1] | 8 | 18 [1] | -1 |
| **Total** | | 1 | 9 | 8 | 18 | -1 |

(*)   Relative to 2007, in absolute numbers.

(1)   The person that guarantees the function of Secretarial Coordination is allocated to the Department only by 25% of her working hours.

## P2.2 SERVICES

### P2.2.1 COMMUNICATIONS AND COMPUTER SERVICE

*Summary of actions expected for 2008*

| Action | Description | Schedule |
|---|---|---|
| VoIP | Conclusion of the VoIP systems and services implementation. | First Semester |
| IPv6 | Conclusion of the IPv6 infrastructure implementation. | Second Semester |
| Electronic mail (E-mail) | Implementation of a new Email Web client for INESC Porto users. | First Semester |
| | Introduction of new engines for SPAM filtering. | |
| | Reorganization and refinement of the mail servers' management tools and procedures. | |
| New network services | Development, configuration, installation and deployment of new services in INESC Porto network | Annual Task |
| Systems Backup | Restructuring of the network backups service, with the beginning of operation of a new robot drive. | First Quarter |
| Users support | Support services (help-desk) for all INESC Porto users. | Annual Task |
| | Technical support service for internal IT purchase processes. | |
| | Development of a new version of the Communications and Computer Service web site, supporting more user interactivity and facilities to access the software and network databases. | |
| IT infrastructure management and maintenance | IT infrastructure management and maintenance and related services. | Annual Task |
| | Maintenance and support contract management, covering the IT infrastructure and software applications. | |
| | Periodic auditing of systems installed software and network access. | |
| Specialized consulting services | Specialized consulting services and tasks, in cooperation with other Units or by request of external entities. | Sporadic Tasks |
| | Organization of short term training actions and traineeships. | |

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## P2.2.2  MANAGEMENT INFORMATION SERVICE

*Summary of actions expected for 2008*

| Action | Description | Schedule |
|---|---|---|
| Development of business workflow solutions. | Conversion of the existing forms to electronic format. | First semester |
|  | Collection and specification of the business processes in INESC Porto in articulation with the work group created for that purpose. | During the whole year |
|  | Automation of procedures in the workflow tool. |  |
| Enhanced of INESC Porto Website | Implementation of BIP in the content management system. | First quarter |
|  | Development of new functionalities for content management system. | The whole year |
| Collaboration in the development of the Units' projects and conferences websites. | Support to the units and services in the creation of the necessary websites. All must have common nuclear functionalities. | The whole year |
| Development of the concept of database in INESC Porto for management. | Structuring an integration model of INESC Porto's databases. | The whole year |
|  | Proposing a model for administration of database servers in INESC Porto (Oracle, SQL, Server). Service to provide to the units. |  |
| Development of applicational units to support internal management functions. | Re-structuring SACA in a way as to integrate it with the content management system and with FEUP's database. | First quarter |
|  | Assessing Project Management tools in the market. Start specification process. | The whole year |
| Coordination of a work group for document management. | Specification on document management and digital archive. | The whole year |
|  | Implementation of the document management system, digital archive and test phase. A dedicated server may be necessary. |  |
| Maintenance of services of management applications, integration of information among applications, etc. | Maintenance of the Website, Ultimus, Workflow, SACA, PHC Personal, etc. | The whole year |

## P2.2.3 COMMUNICATION SERVICE

*Summary of actions expected for 2008*

| Action | Description | Schedule |
|---|---|---|
| Development of the POCI/FEDER PROTET project – Promotion of the Electronic and Telecommunications Technologies. | The aim is to promote and make students of the Fontes Pereira de Melo School and other schools aware of Electronic and Telecommunication Technologies. This will be achieved by carrying out experimental work at INESC Porto and in the companies that use its technologies. | First quarter |
| Promote other initiatives to young people in the area of Science Communication. | Looking for opportunities to establish relationships of cooperation with other high schools in order to develop initiatives related to Science and New Technologies which are appealing to students. | The whole year |
| Development of a Common Strategy in order to promote Communication with the Rectory of the University of Porto and associated Faculties and Institutes. | Promoting several initiatives which result from combining efforts and benchmarking activities from several institutions belonging to this work group. | The whole year |
| Dynamization of INESC Porto's new website in Portuguese and in English. | Translation and inclusion of news on projects and events as well as clippings on the website. Weekly update. | The whole year |
| Production of INESC Porto's new institutional video. | Collection of images and script writing in order to update INESC Porto's institutional video. English version for subtitling. | Second quarter |
| Intensification of external communication: news and opinion articles in the most relevant newspapers, radio and television. | The aim is to guarantee the publication or release of (at least) one news item per month regarding the activities in INESC Porto. | The whole year |
| Organization of the institution's internal and external communication activities. | Includes organization of events, participation in Exhibitions, and propaganda of initiatives, among others. | The whole year |
| Production of BIP – INESC Porto's Bulletin. | Collecting and processing information and images to include in BIP. Production of 11 editions in Portuguese and 4 in English. | The whole year |
| Production of a bilingual communication piece to present INESC Porto's activities. | Coordinating the production of an e-book that introduces INESC Porto and promotes its image, its activities and its innovative projects. | First quarter |
| Photo and video coverage of events. | Photo and video coverage of internal and external events, at the Units' request. | The whole year |
| Updating and offering of a photo and video archive. | Updating of the historical footage archive and multimedia in the intranet and its advertisement to all the collaborators. | The whole year |
| Organization of visits to INESC Porto. | Supporting visits from students who are interested in our areas of activity. | The whole year |

## P2.2.4 INFRASTRUCTURE MAINTENANCE SERVICE

*Summary of actions expected for 2008*

| Action | Description | Schedule |
|---|---|---|
| Buildings' management and maintenance | Management of the provision of services associated with the operation and maintenance of the buildings.<br><br>Buildings maintenance | The whole year |
| Support to the Units' electronic production activities. | Offering of infrastructures and material for the electronic production (in collaboration with UOSE) | The whole year |

## P2.2.5 LIBRARY AND DOCUMENTATION SERVICE

*Summary of actions expected for 2008*

| Action | Description | Schedule |
|---|---|---|
| Management and operationalization of the interface with FEUP's library. | Support to the operationalization of the agreement between INESC Porto and FEUP for the management of the library and documentation services. | The whole year |
| Inventory of INESC Porto's documental heritage | Cataloguing of the institution's publications including books, magazines, theses and multimedia material. | The whole year |