



INESCPORTO

INSTITUTO DE ENGENHARIA DE SISTEMAS
E COMPUTADORES DO PORTO
LABORATÓRIO ASSOCIADO

RELATÓRIO DE ACTIVIDADES DE 2009

INESCPORTO
LABORATÓRIO ASSOCIADO

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PARTE A - Relatório Global de Actividades

1 Introdução

Com o objectivo de relatar a actividade desenvolvida pelo INESC Porto durante o ano de 2009, o presente relatório foi organizado num corpo principal e anexos.

O corpo principal (Parte A) descreve aspectos gerais e de síntese da actividade do INESC Porto em 2009. Assim,

- No capítulo 2, faz-se uma breve apresentação da instituição, referida ao termo de 2009. Explicita-se, ainda, o modelo organizativo em que se sustentou a actividade nesse ano. Esta explicação é incluída com um intuito de dar ao relatório um carácter informativo completo mas, naturalmente, segue as linhas gerais de anteriores relatórios.
- No capítulo 3, destacam-se os aspectos institucionais gerais que marcaram a actividade desenvolvida no ano de 2009.
- No capítulo 4, apresenta-se um resumo consolidado de indicadores globais da actividade de natureza científica e técnica.

A Parte B refere-se à actividade produtiva das diversas Unidades e corresponde na sua forma exacta ao relatório submetido à FCT pelo INESC Porto Laboratório Associado, enquanto instituição de investigação beneficiária do Programa de Financiamento Plurianual. Por imposição daquela entidade, o Relatório está escrito em inglês para permitir suportar a avaliação internacional da instituição. A sua inclusão neste relatório para o Conselho Geral permite a este órgão apreciar de que forma é que a actividade do INESC Porto é reportada à FCT e ao MCTES.

Convém esclarecer que o formato do Relatório é definido pela FCT, bem como o seu preenchimento *on line*. Como o formulário apresenta diversas insuficiências e limitações, nem sempre é possível relatar a actividade com total aderência à realidade nem da forma mais explícita. Limitações de espaço (máximo de caracteres permitido) impedem em muitos casos uma adequada ou completa explicação. Finalmente, para o relatório de 2009 o formulário não permitiu que se apresentasse a estrutura do INESC Porto efectivamente em operação, obrigando a reportar sem alteração da estrutura explicitada em anos anteriores. Desta forma, o INESC Porto ficou impedido de relatar a criação de um novo Grupo em 2009, bem como de identificar alterações nas chefias e coordenações quer de Unidades/Grupos, quer de Linhas de Acção do Laboratório Associado. Relativamente a este último, visto que a FCT ainda não formalizou o reconhecimento da sua nova estrutura, também não foi possível adequar o relatório à exacta realidade.

Na Parte C incluem-se quadros e tabelas complementares de informação sobre a actividade das Unidades, incluindo dados completos que o Formulário da FCT não permitiu adicionar.

Em Anexo reproduz-se o relatório emitido em 2009 pelo Scientific Advisory Board (Comissão de Acompanhamento Científico), solicitado pela FCT para integrar o processo de avaliação do Laboratório Associado.

2 Situação no final de 2009

2.1 Dados institucionais

Tipo de Instituição: Associação privada sem Fins Lucrativos declarada de Utilidade Pública (declaração de utilidade pública em 19/06/2001)

Associados: Universidade do Porto (40%)
INESC-Instituto de Engenharia de Sistemas e Computadores (36%)
Faculdade de Engenharia da Universidade do Porto (18%)
Faculdade de Ciências da Universidade do Porto (4%)
Instituto Politécnico do Porto (2%)

Património Associativo: 1.250.000 €

Site Internet: www.inescporto.pt

2.2 Localização física

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2.3 Objectivos gerais institucionais

O INESC Porto é uma instituição criada para constituir uma interface entre o mundo académico e o mundo empresarial da indústria e dos serviços, bem como a administração pública, no âmbito das Tecnologias de Informação, Telecomunicações e Electrónica, dedicando-se, nestas áreas, às actividades de investigação científica e desenvolvimento tecnológico, transferência de tecnologia, consultoria especializada e formação avançada.

A escolha criteriosa de áreas de intervenção onde possa pautar a sua acção por critérios de excelência científica, inovação, internacionalização e impacto no tecido económico e social, mormente através do estabelecimento de parcerias estratégicas, é encarada pelo INESC Porto como condição fundamental para a realização da sua missão.

Neste enquadramento, o INESC Porto propõe-se:

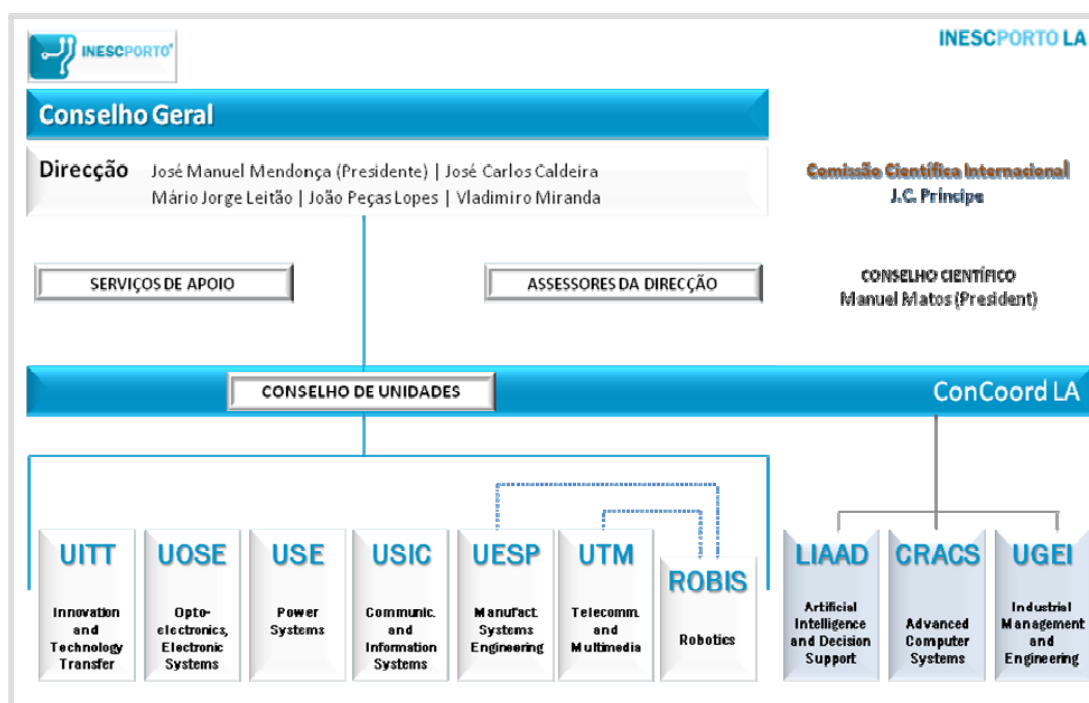
- levar a cabo a produção de ciência e de tecnologia nas suas áreas de competência capazes de competir a nível internacional;
- colaborar na formação de recursos humanos de qualidade científica e técnica, motivados para apostar nas capacidades nacionais e na modernização do País;
- contribuir para a evolução do sistema de ensino científico e tecnológico, modernizando-o e adaptando-o às necessidades e desafios do tecido económico e social;
- assegurar a valorização da tecnologia internamente desenvolvida e apoiar a incubação de novas actividades empresariais em áreas afins aos seus domínios principais de intervenção;
- contribuir, pela realização dos objectivos anteriores, para a construção de um Portugal moderno, de uma economia sólida sustentada por actividades inovadoras e diferenciadas e de uma sociedade de qualidade.

2.4 Laboratório Associado

O INESC Porto é reconhecido como Laboratório Associado pela FCT – Fundação para a Ciência e Tecnologia, abrangendo nesta qualidade Grupos Associados que não estão integrados na instituição jurídica, designando-se nesta qualidade como INESC Porto LA.

2.5 Modelo de organização

A organização operacional do INESC Porto LA inclui a Direcção, Serviços de Apoio Administrativo e Técnico, estruturas produtivas de I&D (seis Unidades, um Grupo considerado como proto-Unidade e três Grupos Associados), o Conselho de Unidades, o Conselho de Formação Avançada, o Conselho Científico, a Comissão de Acompanhamento Científico e o Conselho Coordenador do INESC Porto LA (ver figura).



A actividade é organizada em áreas de intervenção, designadas genericamente como Unidades quando não houver necessidade de explicitar, de acordo com os seguintes princípios:

- cada área de intervenção deverá corresponder a um conjunto estruturado de competências tecnologicamente avançadas, reconhecidas nacional e internacionalmente e, simultaneamente, a uma capacidade real de aplicação dessas competências e tecnologias, de forma inovadora;
- cada unidade deverá ser globalmente sustentável, compreendendo uma combinação de actividades de I&D, de desenvolvimento de tecnologia e de prestação de serviços;
- cada unidade deverá ter capacidade autónoma de definição de estratégias científicas, assim como de angariação, implementação e gestão de projectos.

Os grupos de investigação associados LIAAD, CRACS e UGEI, que integram o INESC Porto Laboratório Associado gozando de autonomia de governo, têm vindo progressivamente a ser acolhidos na organização, passando a estar representados no organograma do INESC Porto LA.

2.5.1 Direcção e Serviços de Apoio

A Direcção coordena globalmente as actividades da instituição, tendo os seus membros pelouros específicos atribuídos nas diversas áreas de intervenção externa e interna, em consequência da remodelação da Direcção, que ocorreu no ano transacto. Foram ainda nomeados dois assessores para apoiar a Direcção em funções específicas.

Os Serviços de Apoio Administrativo e Técnico incluem seis estruturas, com um total de 32 pessoas, contabilizadas a 31 de Dezembro de 2009 (29 com contrato de trabalho, 2 estagiários profissionais e 1 bolseiro):

- Departamento de Informação e Logística (DIL)
- Serviço de Comunicações e Informática (SCI)
- Serviço de Informação de Gestão (SIG)
- Serviço de Gestão de Infraestruturas (SGI)
- Serviço de Comunicação
- Serviço de Biblioteca e Documentação (SBD)

De observar que foi possível fazer face ao crescimento de 40% da instituição no período 2004-2009 – passou de 260 para 403 pessoas (no âmbito do Laboratório Associado), com a actividade a evoluir de cerca de 6 ME para perto de 8,5 ME – mantendo controlada a dimensão dos serviços de apoio administrativo e técnico, apenas com um aumento marginal tornado inevitável pelo acentuado crescimento. Isto foi conseguido apesar do aumento de trabalho gerado pelo excessivo e desnecessário detalhe exigido nos processos de gestão dos programas nacionais de I&D, pela pressão crescente de auditorias externas a pedido das entidades e programas de financiamento e pela complexidade administrativa introduzida pelas novas regras da contratação pública, que, felizmente, vieram mais tarde a ser alteradas na sua aplicação a instituições de I&D.

Departamento de Informação e Logística (DIL)

Responsável: Graça Barbosa

Recursos humanos: 17 pessoas

Assegura as seguintes áreas de apoio administrativo e especializado:

- contabilidade, tesouraria, imobilizado, compras, facturação e controlo de recebimentos;
- informação de gestão, planeamento e controlo orçamental, projectos nacionais e europeus;
- recursos humanos;
- apoio jurídico.

Serviço de Comunicações e Informática (SCI)

Responsável: João Neves

Recursos humanos: 4 pessoas (sendo 1 estagiário profissional)

O Serviço de Comunicações e Informática é responsável pela gestão da rede de comunicações e pelo parque informático.

Serviço de Informação de Gestão (SIG)

Responsável: José Carlos Sousa

Recursos humanos: 3 pessoas (sendo 1 bolseiro)

O Serviço de Informação de Gestão é responsável pela concepção, desenvolvimento e operação das aplicações de gestão e de informação da instituição.

Serviço de Gestão de Infra-estruturas (SGI)

Responsável: Carlos Costa

Recursos humanos: 4 pessoas

Garante as funções genéricas de operação e manutenção dos edifícios, bem como o apoio logístico.

Serviço de Comunicação (SCOM)

Responsável: Sandra Pinto

Recursos humanos: 4 pessoas (sendo 1 estagiário profissional)

Garante as funções de coordenação e gestão da comunicação interna e externa.

Serviço de Biblioteca e Documentação (SBD)

As funções de gestão da documentação são asseguradas pela Biblioteca da FEUP, com o apoio da secretária do DIL.

2.5.2 Estruturas Produtivas

As actividades de I&D desenvolvidas no INESC Porto cobrem sete grandes áreas de intervenção, enquadradas nas Unidades, que combinam as capacidades de I&D e de intervenção no tecido económico (transferência de tecnologia):

- UESP: Unidade de Engenharia de Sistemas de Produção
- UOSE: Unidade de Optoelectrónica e Sistemas Electrónicos
- USE: Unidade de Sistemas de Energia
- USIC: Unidade de Sistemas de Informação e Comunicação
- UTM: Unidade de Telecomunicações e Multimédia
- UITT: Unidade de Inovação e Transferência de Tecnologia
- ROBIS: Grupo de Robótica e Sistemas Inteligentes

Este último Grupo foi criado em 2009, com a admissão no INESC Porto de um conjunto de investigadores da FEUP, ISR Porto, e desenvolve a sua actividade na forma de uma proto-Unidade, estando em fase de aquisição de competências organizacionais e estrutura para poder vir a ser ponderada a formalização, no futuro, de uma Unidade ou de um outro tipo de re-organização.

O modelo organizativo interno de cada uma destas estruturas é diverso, como resultado da diferente sua dimensão, das especificidades das respectivas áreas de intervenção e da qualificação dos seus recursos humanos; tem, contudo, um denominador comum, que é a existência de um ou dois responsáveis, que coordenam com grande autonomia todas as actividades e respondem perante a Direcção por todos os aspectos de gestão operacional, nomeadamente no que se refere ao planeamento e execução orçamental, envolvimento em projectos e produção científica.

A caracterização das Unidades e respectiva actividade é apresentada em detalhe no Relatório de Actividade submetido à FCT e que se inclui como Anexo A.

Além das Unidades de I&D, completamente integradas na organização do INESC Porto, o INESC Porto LA inclui ainda os seguintes Grupos Associados:

- LIAAD - Laboratório de Inteligência Artificial e Apoio à Decisão
- CRACS - Centro de Investigação em Sistemas Computacionais Avançados
- UGEI - Unidade de Gestão e Engenharia Industrial

O LIAAD negociou a admissão ao INESC Porto LA em finais de 2007, o CRACS em 2008 e a UGEI já em meados de 2009. O processo de formalização da inclusão destes grupos no Laboratório Associado, com consequente consolidação científica, continua pendente de decisão da FCT. Prevê-se que, finalmente, em 2010 possa ser oficializado o reconhecimento *de jure* de uma situação que já existe *de facto*.

2.5.3 Conselho de Unidades

O conjunto de responsáveis de Unidades reúne regularmente com a Direcção do INESC Porto, com uma periodicidade quinzenal. Este “Conselho de Unidades” constitui uma das bases da cadeia de decisão adoptada no INESC Porto, conta também com a presença do presidente do

Conselho Científico, dos responsáveis do Departamento de Informação e Logística e das respectivas Áreas de Apoio Administrativo e Técnico, e ainda dos responsáveis de outros serviços indicados pela Direcção.

A este nível são tratados todos os assuntos de despacho corrente, gestão orçamental e assuntos de carácter institucional, tendo a experiência demonstrado ser uma estrutura relativamente leve e eficaz, e um fórum essencial de partilha de informação e de discussão de problemas e desafios da instituição.

2.5.4 Conselho Científico e Comissão de Acompanhamento Científico

O INESC Porto constituiu um Conselho Científico com a seguinte missão:

- apoiar a Direcção na definição de uma estratégia de desenvolvimento científico do INESC Porto;
- implementar procedimentos de estímulo à excelência da produção científica dos Investigadores;
- implementar procedimentos de avaliação da qualidade da actividade das Unidades;
- articular uma política de imagem nacional e internacional para a actividade científica do INESC Porto;
- assistir a Direcção nas matérias do foro científico e estratégico que lhe forem submetidas.

A organização do Conselho Científico resulta directamente da estruturação da actividade pelas seis áreas correspondentes às Unidades. Assim, cada Unidade tem o seu próprio Conselho Científico interno, constituído por todos os doutorados. O Conselho Científico do INESC Porto, por sua vez, é constituído por dois representantes de cada Unidade (apenas um no caso da USIC e da UITT) e três membros designados pela Direcção. O Presidente é eleito pelos membros do Conselho.

Finalmente, o INESC Porto tem uma CAC - Comissão de Acompanhamento Científico (*Scientific Advisory Board*) que, inclui individualidades externas, nomeadamente cientistas portugueses residentes no estrangeiro e outros membros da comunidade científica internacional. Esta Comissão de Acompanhamento analisa criticamente a actividade de I&D, produzindo relatórios periódicos que constituem elementos essenciais de avaliação-correcção da actividade da instituição.

O relatório de actividades do Conselho Científico constitui igualmente uma peça incluída no Relatório de Actividade das Unidades.

O Conselho Científico e a Comissão de Acompanhamento Científico são órgãos estatutários do INESC Porto.

O Conselho Geral aprovou, em 14 de Dezembro de 2007, a extensão dos órgãos consultivos do INESC Porto/Instituição ao INESC Porto Laboratório Associado, por forma a abranger as áreas de actividade do LIAAD e CRACS, consagrando-se a formação da Comissão de Acompanhamento Científico do INESC Porto LA, como extensão da actual Comissão de Acompanhamento Científico do INESC Porto/instituição e do Conselho Científico do INESC Porto LA, como extensão do Conselho Científico do INESC Porto/instituição, mantendo-se os respectivos Presidentes.

2.5.5 Conselho Coordenador do INESC Porto Laboratório Associado

Com o objectivo de assegurar a coesão estratégica e operacional das actividades do INESC Porto Laboratório Associado, foi criado, já em 2007, o Conselho Coordenador do INESC Porto Laboratório Associado, composto pela Direcção do INESC Porto, um representante de cada Grupo autónomo, um representante de cada Unidade e um representante da estrutura administrativa do INESC Porto. O seu funcionamento efectivo aguarda o reconhecimento formal pela FCT da nova arquitectura do Laboratório Associado.

3 Análise global da actividade no ano de 2009

O ano de 2009 foi marcado por um conjunto de acontecimentos e factos relevantes, merecendo destaque as seguintes:

- Registou-se um novo crescimento do INESC Porto, quer em volume de actividade quer em dimensão dos recursos humanos, alcançando-se novos máximos em facturação e em número de colaboradores, nomeadamente de investigadores doutorados.
- Os indicadores de actividade científica também espelham este crescimento: em 2009 o INESC Porto atingiu novo máximo absoluto em número de artigos publicados em revistas internacionais.
- A actividade em projectos revela não só um incremento mas uma mudança de enfoque. Em consequência do período transitório vivido nos programas quadro da Comissão Europeia, a actividade em projectos europeus diminuiu, mas essa redução foi largamente compensada por um acentuado incremento de actividade em projectos nacionais e em serviços de I&D e consultoria especializada.
- Para o crescimento assinalado, contribuiu também o modelo implementado de Laboratório Associado, permitindo a existência autónoma de Grupos Associados; em 2009, verificou-se a negociação e adesão de mais um Grupo que assumiu a designação de UGEI – Unidade de Gestão e Engenharia Industrial, agrupando competências com forte afinidade com as residentes na UESP – Unidade de Engenharia de Sistemas de Produção, do INESC Porto nuclear.
- Por outro lado, verificou-se a migração para o INESC Porto nuclear de um grupo de investigadores anteriormente associados ao ISR Porto, e que se organizaram numa proto-unidade designada ROBIS – Grupo de Robótica e Sistemas Industriais; este movimento constituiu uma aquisição de competências estratégicas numa área de integração de competências científicas e tecnológicas com incidência em soluções de *hardware*, identificando-se sinergias evidentes com as unidades UTM e UESP (com a qual se estabeleceu uma associação inicial), e ainda com a UOSE.
- Face ao aumento substancial da capacidade de I&D da instituição, consolidando-se uma forte interdisciplinaridade, tornou-se necessário estruturar a oferta de cooperação e serviços de I&D e consultoria especializada a entidades públicas e empresas, tendo para esse efeito sido contratado um doutorado no âmbito do Programa Ciência 2008, com larga experiência empresarial. Foi assim constituída, uma pequena estrutura de desenvolvimento de novos negócios, que, logo no primeiro ano de operação, conduziu à negociação e lançamento de diversos contratos de valor significativo, sendo ainda de relevar a expressiva incorporação de competências de diferentes unidades.
- Manteve-se (desde 2007) a indefinição relativamente ao futuro do financiamento do Laboratório Associado, uma vez que não houve, durante o ano de 2009, uma conclusão do processo de avaliação que finalmente a FCT accionou; persistiu, portanto, o factor de incerteza associado à clarificação da renovação do estatuto de laboratório Associado e respectivo contrato.
- Apesar do aumento dos incentivos do lado da procura, registou-se uma importante quebra em financiamentos à dinamização da oferta de novos serviços de I&D às empresas, com uma forte componente de inovação, que em anos anteriores existiram enquadrados no âmbito do PRIME.
- Em compensação, e numa importante reacção da instituição que, de algum modo, evidência as virtudes do nosso modelo de financiamento das actividades, registou-se um notável incremento na concretização de contratos directos de serviços de investigação, desenvolvimento e consultoria especializada (rubrica contabilística designada como *prestação de serviços*), que minimizou o impacto da quebra sentida nos financiamentos ao reforço da oferta.

- Na vertente de expansão internacional, progrediu cautelosamente o projecto de actividade no Brasil, registando-se o envolvimento de várias Unidades em contratos de P&D (pesquisa e desenvolvimento) naquele país cuja execução se deve acentuar em 2010.
- O esforço significativo de submissão de propostas ao 7º PQ de IDT da Comissão Europeia teve resultados positivos com um significativo número de projectos aprovados. Durante 2009, estiveram em execução 19 projectos europeus (4 em progresso, 6 finalizados e 9 iniciados), com vários iniciando-se apenas no final do ano e tem o arranque de novos projectos no início de 2010; isto ainda não se traduziu em aporte significativo de recursos financeiros em 2009, mas terá impacto importante em 2010.
- Aproveitando o lançamento de medidas de apoio do QREN às Entidades do Sistema Científico e Tecnológico, o INESC Porto apresentou um projecto de constituição de uma Infra-estrutura Tecnológica para a Energia Sustentável, implicando a construção de um novo edifício, adjacente à sua sede. Este projecto mereceu aprovação e a atribuição de um financiamento que ultrapassa os 2 milhões de Euros. A obra, que deverá ser iniciada em 2010, constitui simbolicamente um marco na comemoração dos 25 anos do INESC no Porto – a preparação do quarto de século futuro.
- Em 2009 foi aprovado o contrato de incentivos do projecto “REIVE - Redes Eléctricas Inteligentes com Veículos Eléctricos”, submetido em 2008 ao Fundo de Apoio à Inovação. Neste projecto, o financiamento ao INESC Porto, em conjunto com o financiamento dos parceiros industriais, monta a cerca de € 1.800.000. Parte deste financiamento irá permitir montar um laboratório de *e-mobility*, que será um dos primeiros laboratórios europeus nesta área.
- Na sequência da qualificação do INESC Porto para efeitos de Vales I&DT e Vales Inovação, iniciou-se a execução de vários projectos (20 projectos) nos quais o INESC Porto é a entidade do SCTN contratada, numa actividade importante para a saúde económica da instituição através do reforço da interacção com o tecido empresarial. Acresce a isso a actividade desenvolvida de apoio à criação de Núcleos e Departamentos de I&D em empresas (5 projectos) e de apoio à certificação da gestão de IDI.
- Após o lançamento, em 2008 e pelo COMPETE (QREN), do concurso para o reconhecimento de Pólos de Competitividade e Tecnologia e outros *Clusters*, no âmbito do Programa de Estratégias de Eficiência Colectiva, o INESC Porto deu início à sua participação activa em oito Pólos de Competitividade e Tecnologia (PCT) aprovados e dois *Clusters*. No PCT das TICE's foram assumidas responsabilidades na gestão e no PCT PRODUTECH houve um posicionamento claro de liderança por parte da instituição.
- Em 2009, a actividade em projectos em co-promoção no âmbito do COMPETE começou a ter algum significado. Há, contudo, dois grandes problemas que o INESC Porto tem procurado minimizar. Por um lado, é conhecido o facto de não ser aceite o modelo de *third party* de envolvimento de docentes, tal como acontece com os projectos da Comissão Europeia. Esta limitação foi contornada assegurando o envolvimento dos docentes através das respectivas instituições académicas, apesar de os projectos decorrerem no INESC Porto, como nas restantes actividades. No caso da FEUP, existe um acordo concreto relativamente à utilização das verbas obtidas por esta via, enquanto que nos casos da FCUP e FEP apenas existe um acordo de princípio no sentido de ser adoptado um modelo idêntico ao da FEUP. Relativamente ao IPP, será um tema a abordar. O outro lado da questão é o défice total de tesouraria nestes projectos – lamentavelmente, o processo de submissão de relatórios financeiros é de tal modo complexo e desadequado ao fim em vista, que não foi exequível a apresentação de qualquer relatório nem pedido de pagamento. Isto significa que não existe qualquer recebimento dos cerca de 415 k€ que, com prudência, foram especializados em 2009 (dos quais aproximadamente 70 k€ relativos à participação de docentes).
- No decurso do exercício (especificamente no último trimestre), com a alteração do Código dos Contratos Públicos, verificou-se um alívio dos constrangimentos enfrentados desde a segunda metade do ano de 2008 nos procedimentos pré-contratuais para

aquisição de bens e serviços e empreitadas a que o INESC Porto passou a estar sujeito. Esta imposição legal aumentara significativamente as exigências de natureza burocrática, acarretando inúmeros obstáculos à eficiente operação da instituição, nomeadamente no que respeita à carga administrativa necessária para a gestão dos processos de aquisição de bens e serviços, e foi objecto de reclamações concertadas no âmbito do CLA – Conselho dos Laboratórios Associados. Esta razão foi determinante (embora o crescimento da instituição também tenha influenciado) para que o INESC Porto tivesse que reforçar o seu serviço jurídico com um novo elemento.

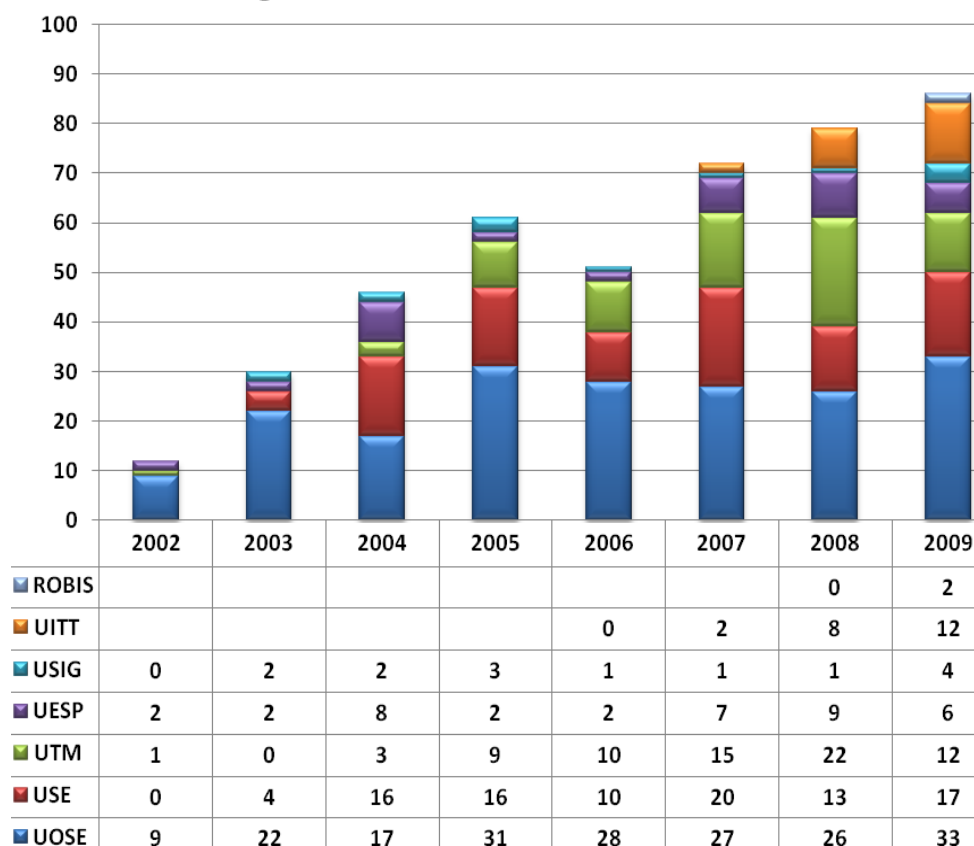
Após estas considerações preliminares, apresenta-se a seguir uma descrição genérica das principais actividades desenvolvidas durante 2009.

3.1 Produtividade científica

Os indicadores de actividade científica reflectem o crescimento da actividade na linha da manutenção de um elevado padrão de qualidade. De entre os vários indicadores, toma-se para exemplo o das publicações em revistas internacionais, que registou novo incremento, atingindo um valor superior a 80 pela primeira vez (86).

O gráfico seguinte ilustra o crescimento, desde 2002, do número de artigos publicados em revistas internacionais, com identificação das Unidades de investigação contribuintes. Mais detalhes encontram-se na secção 4.3.

Artigos em revistas internacionais



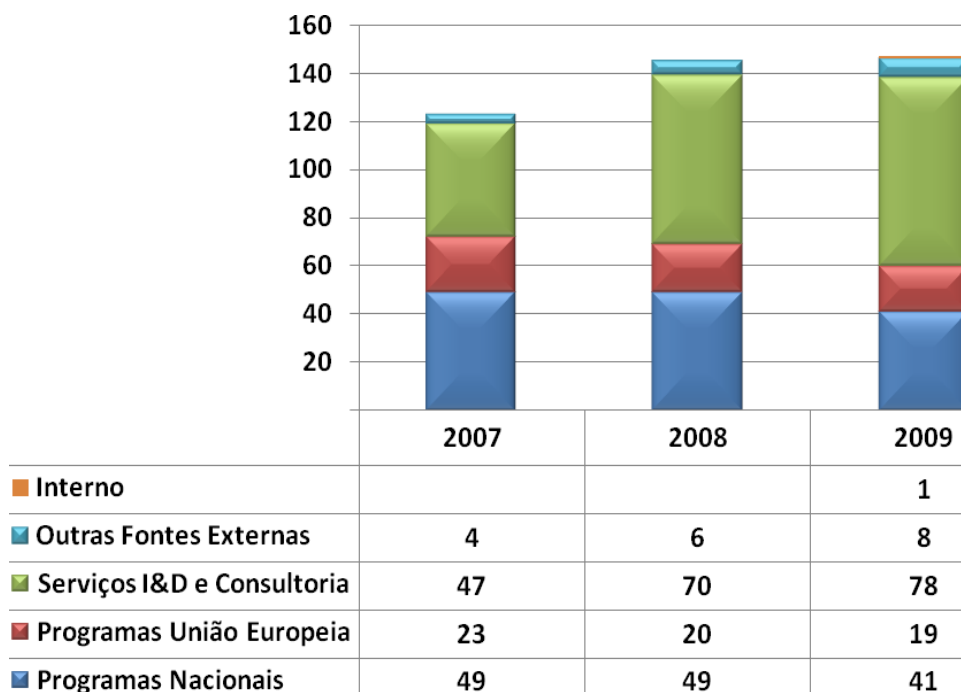
3.2 Actividade em projectos

Como foi anteriormente referido, os proveitos das actividade em projectos sofreram um crescimento assinalável no ano de 2009. Os gráficos seguintes evidenciam a evolução nos últimos três anos: apesar de o número de projectos não ter sofrido grandes alterações entre 2008 e 2009, já nos proveitos é evidente o crescimento em Programas Nacionais (essencialmente devido ao QREN), o decréscimo em Programas Europeus (devido à transição entre Programas-Quadro) e o aumento em Serviços de I&D e Consultoria.

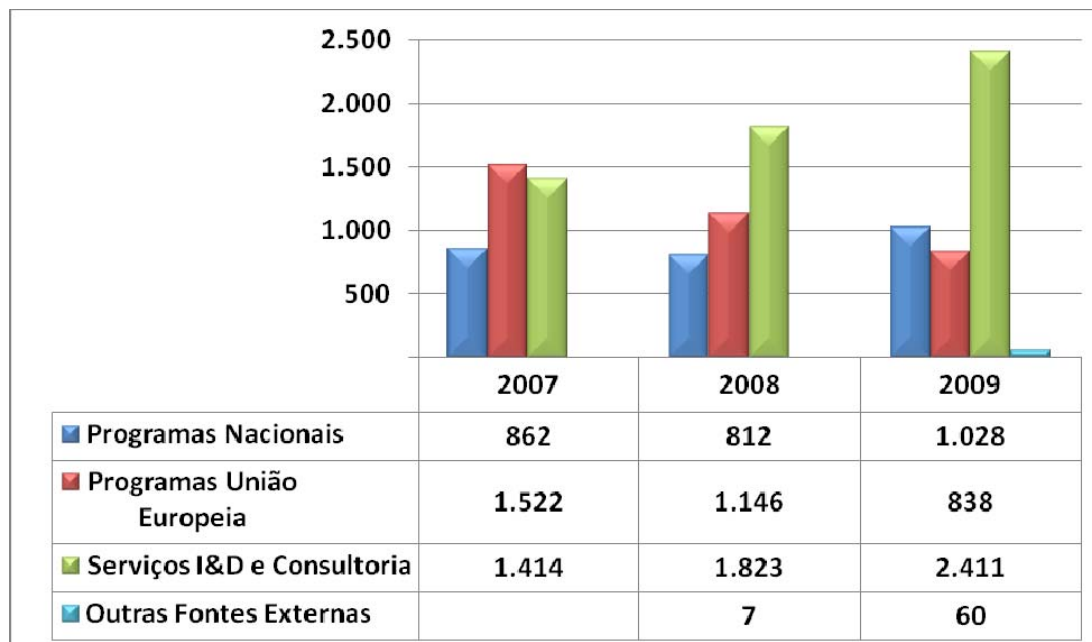
No total, os proveitos em 2009, em relação a 2008, aumentaram 15% nas unidades do INESC Porto, ou seja, sem considerar os projectos que decorrem nos Grupos Associados, e que, na fase de transição em que nos encontramos, já foram acolhidos no INESC Porto.

Refira-se, ainda, o facto de nos proveitos de actividade em 2009 estarem contabilizados os montantes que foram obtidos através da cedência de meios humanos dos Associados

Número de projectos com actividade em 2009



Proveitos de projectos em 2009 (em k€)



3.3 Associados e novas parcerias estratégicas

Em 2009, não se verificaram alterações na estrutura de associados da instituição.

No que se refere a parcerias, foram desenvolvidas diversas iniciativas no sentido de fortalecer a rede de contactos nacionais e internacionais do INESC Porto, entre as quais se destacam as seguintes:

- Protocolo de colaboração com a UPTEC com vista a regulamentar as relações de cooperação e intercâmbio. Entre as instituições signatárias, de modo a que ambas possam beneficiar de sinergias em acções de colaboração nos domínios da actividade a que se dedicam;
- Protocolo de Colaboração com vista a proporcionar a participação de docentes e investigadores do IPV, nas actividades de investigação e desenvolvimento levadas a cabo pelo INESC Porto;
- Protocolo de Cooperação no âmbito do projecto ReMobi "Rede de Excelência para Mobilidade";
- Acordo de Colaboração no âmbito do projecto IBM Center for Advanced Studies (CAS) em Portugal: EEM CAS - Enterprise Engineering and Management Center for Advanced Studies.

Foram ainda estabelecidos diversos protocolos com empresas no sentido de enquadrar colaborações em projectos em co-promoção.

Para além destes novos acordos, foi dada continuidade a relações já anteriormente estabelecidas na área do intercâmbio de estudantes de pós-graduação, com diversas instituições estrangeiras. O resultado deste trabalho é visível no número de estrangeiros que colaboravam na instituição no final de 2009: 37, dos quais 27 são bolseiros.

3.4 Acção da Comissão de Acompanhamento Científico

Em Junho de 2009 a FCT fez, finalmente avançar, um procedimento de avaliação do Laboratório Associado tendo começado por solicitar, à CAC - Comissão de Acompanhamento Científico internacional, presidida pelo Prof. José Carlos Príncipe, um relatório e parecer sobre o desempenho do INESC Porto LA.

Verificou-se que o procedimento previsto, ao contrário de experiências passadas, não incluiu nenhuma visita por júri de avaliação o que, no entender da Direcção, prejudica substancialmente a boa apreciação da actividade por fazer depender exclusivamente a avaliação em peças documentais que dificilmente podem traduzir de forma completa, abrangente ou fiel a realidade. Acresce que, sendo o INESC Porto uma instituição de interface de características especiais, com uma organização que não se plasma directamente no figurino clássico que a FCT pressupõe, fora efectivamente difícil verter em relatório a dimensão e importância da actividade desenvolvida e os aspectos de excelência da organização que, no passado, foram determinantes na avaliação de *excelente* que fora atribuída.

A Comissão de Acompanhamento Científico emitiu um parecer muito positivo em função da sua avaliação global da instituição, o que apraz registar. Este relatório encontra-se reproduzido em Anexo.

3.5 Laboratório Associado: dinamização científica interna

Dadas as incertezas quanto ao financiamento do Laboratório Associado (já referidas em Relatórios de anos anteriores e que se mantêm), apenas foi celebrado em 2009 um contrato de trabalho com um investigador doutorado, no âmbito desse financiamento, tendo a instituição apostado na contratação de doutorados no âmbito da Iniciativa Ciência 2008, com a celebração de 10 contratos de trabalho durante o ano de 2009, apesar das dificuldades em encontrar no mercado de trabalho recursos humanos com o perfil requerido.

Independentemente do reconhecimento formal pela FCT, procurou-se estabelecer laços de interactividade entre as Unidades e Grupos do INESC Porto nuclear e os Grupos Associados que futuramente integrarão o Laboratório Associado. Implementando uma recomendação do CAC, a Direcção lançou em 2009 um novo programa designado LAI – Linhas de Acção Inter-unidades.

Este programa, gerido pelo Conselho Científico, visa promover a cooperação entre investigadores do INESC Porto LA repartidos por várias unidades e grupos, estimulando a sua associação em torno de um tema científico ou tecnológico comum. Dada a dimensão actual do INESC Porto LA (mais de 400 colaboradores), a necessidade do estabelecimento de iniciativas facilitando uma fertilização cruzada de conhecimentos impunha-se.

O programa permite aos investigadores livremente associados numa LAI o acesso a verba disponibilizada pela Direcção para financiar actividades de interacção, como simpósios, workshops internos, etc., e ainda para promover actividades que promovam um reconhecimento externo da competência do INESC Porto na área respectiva.

3.6 Laboratório Associado: actividade geral

O INESC Porto participou ainda activamente nas reuniões do Conselho de Laboratórios Associados (CLA), por entender que esse organismo reforça o necessário diálogo entre instituições portuguesas e permite, pela primeira vez, a emergência de um quadro de acção comum que ultrapassa os interesses locais.

O INESC Porto continuou a receber, na sua qualidade de Laboratório Associado, solicitações para dar pareceres ou prestar aconselhamento a diversas entidades públicas, em áreas científico-tecnológicas e de organização e gestão, com especial destaque das energias renováveis e no sistema nacional de ciência, tecnologia e inovação.

3.7 Ampliação do Laboratório Associado e reestruturação do INESC Porto

Em 2009 assistiu-se a dois factos significativos, associados à adesão de dois grupos de ID& externos ao espírito e organização do INESC Porto LA.

O primeiro grupo constituía já uma Unidade de I&D do Sistema Científico e Tecnológico nacional, reconhecida pela FCT. Liderada pelo Prof. Sarsfield Cabral, solicitou a adesão ao INESC porto Laboratório Associado, tendo-se acordado numa integração sob o figurino de Grupo Associado autónomo, num paralelo com a situação do LIAAD e do CRACS. Este grupo tomou a designação de UGEI – Unidade de Gestão e Engenharia Industrial.

Trata-se de um grupo com avaliação de Muito Bom pela FCT e com um perfil científico complementar da UESP, com a qual se esperam grandes sinergias.

O segundo grupo veio do ISR Porto e é constituído por um conjunto de investigadores com sólidas provas dadas na área da robótica. Não se tratando de uma unidade reconhecida pela FCT, a solução foi a da assimilação directa pela estrutura do INESC Porto nuclear, tendo-se constituído com carácter transitório um Grupo que assumiu a designação de ROBIS – Grupo de Robótica e Sistemas Inteligentes.

Este grupo vem preencher uma evidente lacuna no tecido do INESC Porto e gerar a oportunidade de múltiplas sinergias com outras unidades, dado o carácter integrador de tecnologias que a robótica tem. O Grupo, organizacionalmente, constitui uma proto-unidade, com um coordenador designado, tendo a direcção do INESC Porto nomeado um co-coordenador oriundo da UESP para acompanhar a fase de adaptação e aculturação que um grupo externo necessariamente exige.

Para além do esforço de cooperação entre unidades e grupos associados, que as LAI potenciam, o núcleo de Desenvolvimento de Novos Negócios, criado informalmente em 2009, e instituído já em 2010, tem permitido dar um salto de qualidade na capacidade de oferta de cooperação e serviços a instituições públicas e empresas, bem patente pelo número de projectos recentemente angariados, que envolvem, não só as unidades anteriormente existentes, mas também os novos grupos recentemente aderentes.

Nos aspectos organizativos internos, esta ampliação de âmbito e dimensão da instituição, exigiu um esforço de revisão do relacionamento dos colaboradores com a instituição, resultando numa definição clara dos tipos de ligação e dos respectivos direitos e deveres. Toda a área de recursos humanos foi reorganizada em conformidade, destacando-se a reorganização de funções, o estabelecimento de políticas remunerativas diferenciadas para os diferentes tipos de ligação, o suporte electrónico de processos essenciais e criação de condições para a disponibilização de informação de gestão de recursos humanos, em tempo real.

Na área de controlo de gestão, consolidou-se uma metodologia unificada de orçamentação de projectos, capaz de apoiar a sua elaboração e fornecer indicadores de gestão relevantes para a proposta e para o acompanhamento da execução. O trabalho de organização da informação de projectos, apesar de já ter sido útil para a elaboração do presente relatório, será continuado em 2010, no sentido de se constituir uma base de informação capaz de fornecer informação em tempo real para o site na Internet, proporcionar dados curriculares actualizados das unidades, disponibilizar indicadores gerais de gestão, em formatos adequados, e permitir o suporte electrónico de diversos processos.

3.8 Programas de parceria internacional

O INESC Porto consolidou a sua presença nos programas de parceria internacional da FCT com o MIT, CMU e Universidade do Texas em Austin, ao nível da gestão operacional, da participação em orientações de doutoramento, em projectos de I&D e em outras iniciativas.

São os seguintes os programas em que os investigadores do INESC Porto têm envolvimento substancial, quer através da FEUP quer através da ligação directa do INESC Porto com as Universidades parceiras:

MIT

- Sustainable Energy Systems - PDSSE (PhD program)

- Leaders for Technological Industries (PhD program)
- Technology Management Enterprise (MSc program)
- Complex Transportation Infrastructure Systems (MSc program)

CMU

- MAP I (Joint PhD program on Informatics: Universidade do Minho, Aveiro e Porto)
- MAP Tele (Joint PhD program on Telecommunications: Universidade do Minho, Aveiro e Porto)
- PDEEC (Programa doutoral em Engenharia electrotécnica e de Computadores)

UT Austin

- Digital Media (PhD, MSc programs and Professional Master)
- University Enterprise Technology Network (Training Workshops, Internships in USA and Science & Technology Commercialization)

Investigadores senior do INESC Porto assumiram em 2009 nos programas de parceria internacional referidos:

- a Direcção dos Programas Doutorais em Sustainable Energy Systems (MIT Portugal), Digital Media (UT Austin Portugal), Map Tele (CMU Portugal) e Map I (CMU Portugal).
- participação no Management Board da área focal EDAM (MIT Portugal);
- Co-Direcção da área Digital Media (UT Austin Portugal);
- Direcção Científica do Programa UTEN (UT Austin Portugal).

A nível europeu, foi robustecida a posição na Plataforma Tecnológica Manufuture, tendo sido assumidos lugares:

- no Implementation Support Group e no High-Level Group da Plataforma Manufuture;
- na Coordenação a nível europeu das 26 Plataformas Nacionais e Regionais;
- no European Factories of the Future Research Association (EFFRA), entidade gestora da PPP Factories of the Future.

3.9 Comunicação e coesão interna

Com o objectivo de se reforçar a coesão interna, a instituição continuou a promover em 2009 a realização de actividades de grupo, tais como o concurso de fotografia, torneio de futebol, magusto e convívio de Natal.

Destaca-se igualmente a continuação da publicação regular do Boletim do INESC Porto - BIP, que em Novembro pode assinalar o 8º aniversário e a publicação do 100º número.

3.10 Comunicação e imagem externa

Durante 2009 o INESC Porto participou em eventos que promoveram a sua imagem no exterior, como foi o caso da Mostra da Ciência (promovida pela FCT em Lisboa), bem como da Mostra da Universidade do Porto. Os investigadores do INESC Porto participaram também, de uma forma intensa, no Encontro do Conselho de Laboratórios Associados (Lisboa, Gulbenkian, Julho 2009).

Manteve-se o esforço de organização e acompanhamento de visitas de empresas/instituições e de alunos ao INESC Porto.

O Boletim do INESC Porto - BIP, disponível em inglês no website do INESC Porto e divulgado em Faculdades e Universidades de muitos países, bem como o próprio website diariamente actualizado, afirmam-se como dos instrumentos mais válidos e eficazes de que a instituição dispõe actualmente para comunicar com o exterior, representando assim poderosos veículos de disseminação das actividades do INESC Porto.

Contagens de acessos ao BIP pelo Google Analytics permitem aferir o impacto real que este instrumento de comunicação tem. No período de 1 a 31 de Outubro de 2009, o Boletim recebeu 2303 visitas, com acesso de 1488 diferentes pessoas de 35 países: os mais frequentes foram de Portugal, Brasil, USA, Alemanha, Reino Unido, Espanha, França, Argentina, Itália e Bélgica. Em Fevereiro de 2010 este número foi de 1714 acessos (1283 visitantes de 45 países).

3.11 Internacionalização de serviços de I&D

A actividade de promoção de uma entidade sem fins lucrativos no Brasil, designada provisoriamente por INESC P&D Brasil, continuou em ritmo controlado, tendo-se privilegiado as negociações directas com os Reitores de um leque de instituições seleccionadas.

Em paralelo, incrementaram-se as acções de estabelecimento de parcerias com universidades brasileiras. Este esforço, com apoio de um investigador contratado no âmbito do Programa Ciência 2008, conduziu à submissão de várias propostas no âmbito do programa de P&D (Pesquisa e Desenvolvimento) sob os fundos sectoriais geridos pela ANEEL (regulador brasileiro do sector eléctrico) envolvendo várias Unidades (USE, UOSE, ROBIS).

É de destacar a acção da USE (Unidade de Sistemas de Energia), já com experiência e tradição neste tipo de actividade, onde esta vertente de serviços de I&D internacionais correspondeu a 28% do respectivo orçamento em 2009.

3.12 Actividades de valorização de resultados de I&D e de conhecimento e de transferência de tecnologia

A UITT continuou a registar uma interessante procura das suas competências e dos respectivos serviços pelo mercado, quer na vertente de consultoria especializada, quer no âmbito da pré-incubação de empresas.

A intervenção externa do INESC Porto na vertente de formação em transferência e comercialização de tecnologia, já iniciada, manteve-se face ao papel activo de investigadores e contratados seus no MIETE (Mestrado em Inovação e Empreendedorismo Tecnológico), no Cohitec (promovido pela COTEC) e nas acções de formação e treino de âmbito internacional levadas a cabo pela UTEN (University Technology Enterprise Network), programa incluído nas parcerias internacionais da FCT, inicialmente lançado com a Universidade do Texas em Austin e que, em 2008, foi estendido ao MIT, CMU, Instituto Fraunhofer, CERN e Universidade de Cambridge.

3.13 Pré-incubação de Empresas Spin-Off e Empresas Participadas

A actividade da UITT na área da pré-incubação de empresas/negócios de base tecnológica, na vertente do apoio ao empreendedorismo, continuou significativa, com base na estrutura designada LET-IN.

Em 2009 não foi constituída nenhuma nova empresa; porém, manteve-se o acompanhamento das já constituídas e, após avaliação de propostas de valorização, foram acompanhadas 9 propostas, em fase de pré-incubação, conforme descreve a tabela seguinte.

Proto-empresa	Actividade principal
Alter Ego	Decoração artística de espaços comerciais e particulares, publicidade e re-decoração de espaços municipais vandalizados com graffiti (INDÚSTRIAS CRIATIVAS)
Há Coisas de Cartão	Concepção e produção de mobiliário descartável a partir de cartão (INDÚSTRIAS CRIATIVAS)
Hesvi	Desenvolvimento e produção de um novo tipo de painéis solares fotovoltaicos de nanopartículas de 3.ª geração

Wallprinter	Decoração de espaços a partir de "técnicas de quase impressão" - INDÚSTRIAS CRIATIVAS)
Proto-empresa	Actividade principal
Água de Prata	Concepção e produção de artigos de design a partir da valorização do património artesanal (INDÚSTRIAS CRIATIVAS)
Vision Soccer Pro	Software para suporte de treino de jogos de equipa
By Gg	Produtos de eco-design através da reciclagem de desperdícios industriais (INDÚSTRIAS CRIATIVAS)
Deep Sea Portugal	Recifes artificiais e exploração de turismo subaquático
Quizionário	Plataforma móvel vocacionada para o ensino
PreWind	Previsão de produção de electricidade a partir de fontes de energia renovável.

De realçar ainda que as participadas Xarevision, Tomorrow Options e Smartwatt fizeram em 2009 as primeiras vendas de bens e serviços de alguma dimensão e que o conjunto das empresas spin-off do INESC Porto facturou em 2009 mais de três milhões de euros, sendo exportação 75% desse valor.

Não tendo sido incubada no INESC Porto, foi lançada uma nova empresa spin-off da FEUP e do INESC Porto na área das Plataformas Colaborativas baseadas em Web 2.0, a empresa e-Escolinhas.

4 Dados consolidados do INESC Porto e das suas actividades

Apresentam-se seguidamente os principais indicadores globais do INESC Porto, referentes a recursos humanos e às actividades desenvolvidas durante o ano de 2009, cuja discriminação detalhada por Unidade se faz na Parte B - Relatório de Actividade Científica (FCT) e na Parte C - Informação Complementar de Actividade das Unidades.

4.1 Recursos Humanos

4.1.1 Indicadores de Recursos Humanos em 31 Dezembro 2009

Estrutura Organizativa Interna			Tipo de Ligação										
			Recursos Humanos Integrados						Contratados Estrutura Central e Local	Total Integrados	Colaboradores e Convitados I&D	Estudantes Formação Inicial	Total Global
			I&D										
			Contratados	Docentes Ensino Superior	Bolseiros	Total I&D							
I&D	Unidades e Grupos INESCP Nuclear	UESP	13	14	11	38	3	41	6	2	49		
		UITT	1	1	1	3	1	4	4	0	8		
		UOSE	10	14	16	40	4	44	4	15	63		
		USE	4	12	24	40	2	42	4	6	52		
		USIC	10	11	10	31	1	32	6	9	47		
		UTM	5	25	47	77	1	78	14	13	105		
		ROBIS	0	9	2	11	0	11	0	1	12		
		Sub-Total	43	86	111	240	12	252	38	46	336		
	Grupos Associados INESCP LA	CRACS	1	10	1	12	1	13	0	2	15		
		LIAAD	0	6	2	8	0	8	0	0	8		
		UGEI	0	0	0	0	0	0	0	0	0		
		Sub-Total	1	16	3	20	1	21	0	2	23		
	Projectos Especiais	DNN	1	0	0	1	0	1	0	0	1		
		INESCBR	0	0	0	0	0	0	0	0	0		
		UTEN	0	0	0	0	1	1	0	0	1		
		Outros	0	0	0	0	0	0	0	0	0		
		Sub-Total	1	0	0	1	1	2	0	0	2		
	Total I&D		45	102	114	261	14	275	38	48	361		
Estrutura Central	Direcção Alargada		0	6	0	6	4	10	0	0	10		
	Serviços de Apoio	DIL	0	0	0	0	17	17	0	0	17		
		SCI	0	0	0	0	4	4	0	0	4		
		SCOM	0	0	0	0	4	4	0	0	4		
		SGI	0	0	0	0	4	4	0	0	4		
		SIG	0	0	1	1	2	3	0	0	3		
		Sub-Total	0	0	1	1	31	32	0	0	32		
	Total Estrutura Central		0	6	1	7	35	42	0	0	42		
TOTAL GLOBAL		45	108	115	268	49	317	38	48	403			

4.1.2 Evolução Anual de Indicadores de Recursos Humanos

Nota: para efeitos de comparação, a classificação do tipo de ligação em 2009 foi ajustada aos critérios usados nos anos anteriores.

Número de Pessoas no final do ano indicado

Tipo de ligação	2007	2008	2009	Variação 2008-2009
Docentes do Ensino Superior	92	99	108	9%
Contratados	74	73	90	23%
Bolseiros	78	104	115	11%
Outros	55	63	94	49%
TOTAL	299	339	407	20%

4.2 Actividade Contratual

4.2.1 Projectos com Actividade durante o ano de 2009

*Número de Projectos com Actividade em 2009
(Fonte de Financiamento vs. Tipo de Actividade Dominante)*

Fonte de Financiamento	Tipo de Actividade Dominante									Total
	Investigação	Desenvolvimento	Consultoria	Transferência Tecnologia	Rede Cooperação	Conferência	Formação Avançada	Incubação	Outro	
Programas Nacionais	30	12			2					44
Programas União Europeia	11	4	1			1	2			19
Serviços I&D e Consultoria Nacional		14	55	3			2			74
Serviços I&D e Consultoria União Europeia			2							2
Serviços I&D e Consultoria Internacional		2								2
Outras Fontes Financiamento I&D										
Outras Fontes Externas						4	1	4		9
Interno		1								1
TOTAL	41	33	58	3	2	5	5	4		151

*Número de Projectos com Actividade em 2009
(Fonte de Financiamento vs. Unidade)*

Fonte de Financiamento	Unidades e Grupos INESCP Nuclear								Grupos Associados INESCP LA				Projectos Especiais	Total Global
	UESP	UITT	UOSE	USE	USIC	UTM	ROBIS	Total INESCP Nuclear	CRACS	LIAAD	UGEI	Total Grupos Associados		
Programas Nacionais	3	2	14	2	6	13		40		3		3	1	44
Programas União Europeia	7		1	4	3	3		18					1	19
Serviços I&D e Consultoria Nacional	21	8	5	18	14	7		73					1	74
Serviços I&D e Consultoria União Europeia				2				2						2
Serviços I&D e Consultoria Internacional				2				2						2
Outras Fontes Financiamento I&D														
Outras Fontes Externas	1	4		1		2		8		1		1		9
Interno													1	1
TOTAL	32	14	20	29	23	25		143		4		4	4	151

*Número de Projectos com Actividade em 2009
(Tipo de Actividade Dominante vs. Unidade)*

Tipo de Actividade Dominante	Unidades e Grupos INESCP Nuclear								Grupos Associados INESCP LA				Projectos Especiais	Total Global
	UESP	UITT	UOSE	USE	USIC	UTM	ROBIS	Total INESCP Nuclear	CRACS	LIAAD	UGEI	Total Grupos Associados		
Investigação	6		14	3	5	11		39		2		2		41
Desenvolvimento	7	2	6	5	5	6		31		1		1	1	33
Consultoria	18	8		17	11	3		57					1	58
Transferência Tecnologia					2	1		3						3
Rede Cooperação						1		1					1	2
Conferência	1					2		3		1		1	1	5
Formação Avançada				4		1		5						5
Incubação		4						4						4
Outro														
TOTAL	32	14	20	29	23	25		143		4		4	4	151

4.2.2 Indicadores de proveitos Projectos com Actividade durante o ano de 2009

Proveitos de Projectos com Actividade em 2009
(Fonte de Financiamento vs. Tipo de Actividade Dominante)

Fonte de Financiamento	Tipo de Actividade Dominante									Distribuição (%)	Total (k€)
	Investigação	Desenvolvimento	Consultoria	Transferência Tecnologia	Rede Cooperação	Conferência	Formação Avançada	Incubação	Outro		
Programas Nacionais	14%	8%			3%					25%	1.095
Programas União Europeia	13%	4%	1%							19%	838
Serviços I&D e Consultoria Nacional		13%	32%	2%			1%			48%	2.101
Serviços I&D e Consultoria União Europeia			2%							2%	106
Serviços I&D e Consultoria Internacional		5%								5%	204
Outras Fontes Financiamento I&D											
Outras Fontes Externas						1%				1%	62
Distribuição (%)	27%	30%	35%	2%	3%	1%	1%			100%	
TOTAL GLOBAL (K€)	1.201	1.312	1.556	89	131	53	56	8			4.406

Proveitos de Projectos com Actividade em 2009
(Fonte de Financiamento vs. Unidade)

Fonte de Financiamento	Unidades e Grupos INESCP Nuclear									Grupos Associados INESCP LA					Projectos Especiais		Distribuição Global (%)	Total Global (k€)
	UESP	UITT	UOSE	USE	USIC	UTM	ROBIS	Distribuição (%)	Sub-Total (k€)	CRACS	LIAAD	UGEI	Distribuição (%)	Sub-Total (k€)	Distribuição (%)	Sub-Total (k€)		
Programas Nacionais	77	28	171	16	242	398		22%	932		67		98%	67	57%	96	25%	1.095
Programas U. Europeia	425		25	155	39	178		20%	822						9%	16	19%	838
Serviços I&D e Consultoria Nacional	472	70	194	614	590	105		49%	2.044						34%	57	48%	2.101
Serviços I&D e Consultoria U. Europeia				106				3%	106								2%	106
Serviços I&D e Consultoria Internacional				204				5%	204								5%	204
Outras Fontes Financiamento I&D																		
Outras Fontes Externas	2	8		17		33		1%	60		2		3%	2			1%	62
Distribuição (%)	23%	3%	9%	27%	21%	17%		100%			100%		100%		100%		100%	
TOTAL (K€)	976	106	391	1.112	871	713			4.169		68			68		169		4.406

*Proveitos de Projectos com Actividade em 2009
(Tipo de Actividade Dominante vs. Unidade)*

Tipo de Actividade Dominante / Estado de Execução		Unidades e Grupos INESCP Nuclear									Grupos Associados INESCP LA					Projectos Especiais		Distribuição Global (%)	Total Global (k€)
		UESP	UITT	UOSE	USE	USIC	UTM	ROBIS	Distribuição (%)	Sub-Total (k€)	CRACS	LIAAD	UGEI	Distribuição (%)	Sub-Total (k€)	Distribuição (%)	Sub-Total (k€)		
Tipo de Actividade Dominante	Investigação	282		168	112	111	502		28%	1.175		26		39%	26			27%	1.201
	Desenvolvimento	309	28	223	339	302	71		31%	1.272		40		59%	40			30%	1.312
	Consultoria	383	70		619	381	46		36%	1.499						34%	57	35%	1.556
	Transferência Tecnologia					77	12		2%	89								2%	89
	Rede Cooperação						35		1%	35						57%	96	3%	131
	Conferência	2					33		1%	35		2		3%	2	9%	16	1%	53
	Formação Avançada				42		14		1%	56								1%	56
	Incubação		8							8									8
	Outro																		
Estado de Execução	Iniciado	503	67	54	159	431	373		38%	1.587								36%	1.587
	Em curso	175	39	133	548	344	90		32%	1.329		67		98%	67	100%	169	35%	1.565
	Concluído	297		204	406	96	250		30%	1.253		2		3%	2			28%	1.255
	Distribuição (%)	23%	3%	9%	27%	21%	17%		100%			100%		100%		100%		100%	
TOTAL (k€)		976	106	106	391	1.112	871	713		4.169		68			68		169		4.406

4.2.3 Evolução anual de indicadores de actividade contratual

Nota: para efeitos de comparação, só foram incluídos os projectos desenvolvidos por Unidades (excluíram-se os Grupos Associados).

Número de Projectos com Actividade em cada Ano

Fonte de Financiamento	Ano		
	2007	2008	2009
Programas Nacionais	49	49	41
Programas União Europeia	23	20	19
Serviços I&D e Consultoria	47	70	78
Outras Fontes Financiamento I&D			
Outras Fontes Externas	4	6	8
TOTAL	123	145	147

Proveitos de Projectos por Ano (k€)

Fonte de Financiamento	Ano		
	2007	2008	2009
Programas Nacionais	862	812	1.028
Programas União Europeia	1.522	1.146	838
Serviços I&D e Consultoria	1.414	1.823	2.411
Outras Fontes Financiamento I&D			
Outras Fontes Externas		7	60
TOTAL	3.798	3.787	4.337

Proveitos de Projectos por Ano e Unidade (k€)

Ano	Fonte de Financiamento	Unidade						Projectos Especiais	Total (k€)
		UESP	UITT	UOSE	USE	USIC	UTM		
2007	Programas Nacionais	393	62	119	72	7	65	144	862
	Programas União Europeia	521	42	189	125	139	505		1.522
	Serviços I&D e Consultoria	270	6	93	562	393	90		1.414
	Outras Fontes Financiamento I&D								
	Outras Fontes Externas								
	Total (k€)	1.185	110	401	758	539	660	144	3.798
2008	Programas Nacionais	261	30	173	62	75	106	106	812
	Programas União Europeia	246		52	146	138	558	6	1.146
	Serviços I&D e Consultoria	286	169	238	596	490	43		1.823
	Outras Fontes Financiamento I&D								
	Outras Fontes Externas			5		2			7
	Total (k€)	793	199	468	804	705	707	113	3.787
2009	Programas Nacionais	77	28	171	16	242	398	96	1.028
	Programas União Europeia	425		25	155	39	178	16	838
	Serviços I&D e Consultoria	472	70	194	924	590	105	57	2.412
	Outras Fontes Financiamento I&D								
	Outras Fontes Externas	2	8		17		33		60
	Total (k€)	976	106	390	1.112	871	714	169	4.338
Variação 2008 - 2009	Programas Nacionais	-70%	-6%	-1%	-74%	224%	277%		27%
	Programas União Europeia	73%		-52%	7%	-72%	-68%		-27%
	Serviços I&D e Consultoria	65%	-59%	-19%	55%	20%	144%		32%
	Outras Fontes Financiamento I&D								
	Outras Fontes Externas			-100%		-100%			804%
	TOTAL (k€)	23%	-47%	-17%	38%	24%	1%	50%	15%

4.3 Publicações

Quadro resumo de publicações

Tipo de publicação	Número	Variação (*)
Artigos em revistas internacionais com revisores	85	9
Artigos em revistas nacionais com revisores	1	1
Comunicações em actas de conferências com revisores	241	82
Livros (Autor)	3	-1
Capítulos/Artigos em Livros	15	1
Publicações (editor)	10	3
Outras Publicações (Conf. Nacionais, Revistas Locais, etc.)	30	-46
Teses concluídas em 2009 por membros da unidade	25	0
TOTAL	410	49

(*) Relativamente ao ano anterior

4.4 Dissertações

Quadro resumo de pós-graduações

Tipo	Iniciadas	Em curso	Concluídas	Total	Variação (*)
Mestrados	37	7	220	253	-4
Doutoramentos	31	88	16	135	23
TOTAL	68	95	236	388	19

(*) Relativamente ao ano anterior

4.5 Cooperação e Disseminação

Quadro resumo de acções de cooperação e disseminação

Tipo de acção	Número	Variação (*)
Conferências com o INESC Porto na Organização (no comité de Organização ou Comité Científico)	28	-7
Número de co-autores externos em publicações do INESC Porto	355	138

(*) Relativamente ao ano anterior



INESCPORTO

INSTITUTO DE ENGENHARIA DE SISTEMAS
E COMPUTADORES DO PORTO
LABORATÓRIO ASSOCIADO

PARTE B

Relatório de Actividade Científica (FCT)

2009

INESCPORTO
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1. Main Page

Relatório Científico 2009 - Página de Rosto

Na lista de opções (menu) desta página poderá encontrar um conjunto de links para as diversas páginas do formulário que deve preencher, bem como a página "Lacrar" (Lock), a qual, uma vez cumpridos os requisitos mínimos, lhe permitirá dar por concluído esse preenchimento.

O prazo de submissão e lacragem do Relatório Científico tem início a 22 de Fevereiro e termina a 31 de Março de 2010.

2. Objectives and Achievements

This part of the report will allow you to describe the way in which the Unit or the LA is organized and managed, to give the general objectives of the research within the Unit or the LA and finally to give a brief description of the main achievements of the research carried out as a whole during the 2009 period. A maximum number of characters (without spaces) are allowed in each field. If the number of characters exceeds the maximum you will not be able to complete the form and an error message will appear when you try to save your work.

2.1 Unit Description (3000 ca.)

Here indicate form of organization and management

IMPORTANT FOREWORD

INESC Porto is organized in multi-disciplinary Units associated to science and technology application areas. Therefore, in a Unit one may find already a blend of several distinct skills or scientific knowledge in distinct areas, as required for technology transfer. The FCT report format assumes that the generic organization of a LA is based on scientific areas and “research groups” per area, with multi-disciplinarity at the research line level. This is not the case with INESC Porto, and a better view of the institution, suited to the organization of this LA, may be found at <http://profile.inescporto.pt/>

When examining this report, one must bear in mind that:

- a) a research Unit with a scientific multidisciplinary profile has been identified with “research group”
- b) under “collaborative work” in a “research line” one may find examples of joint efforts from distinct Units inside INESC Porto and multi-disciplinary work joining people from distinct scientific areas inside a Unit.

“Research lines” are a second tier of interdisciplinary activities. To gauge the full scope of interdisciplinary activity that characterize technology development and transfer, the “research groups” are perhaps even more fundamental and should be read in tandem.

The site <http://profile.inescporto.pt/> includes also charts, comparisons 2002-2007, data for 2008 and for 2009, some presentations in power point form and other material relevant to the understanding of all the dimensions of activity of the LA.

The official site is <http://www.inescporto.pt>. A monthly news bulletin is <http://bip.inescporto.pt>.

IMPORTANT REMARK

FCT opened a web form for 2009 that did not allow the change (since 2007) of the Principal Investigators of RG or RL - nor the identification of new Research Groups. The correct information has been, therefore, inserted wherever possible.

MANAGEMENT

INESC Porto depends on its GC - General Council, where its Associates take seat:

University of Porto (40%)

INESC (36%)

FEUP (18%)

FCUP (4%)

IPP (2%)

The GC appoints the BD - Board of Directors (5, one full time) for a 2-year mandate. In 2009, INESC Porto was organized in 6 research Units plus 1 Group (a proto-Unit), a Dpt. of Information and Logistics (DIL) and 5 Support Services (Communications and Informatics, Media, Informatics for Management, Building Manag., Lab and Workshop Service). Under DIL other services exist (juridical, human resources, accounting and treasury, project manag.). See <http://www2.inescporto.pt/ip-eBlankbout-us/organization>.

The BD meets every other week with the DIL Coordinator. In alternate weeks, the BD meets in the Units Council (UC) with Unit Coordinators, DIL and support services. Decisions are collectively discussed and policies deployed through the UC mechanism. Processes of delegation of responsibility are also in place.

The Units have independent executive management and complete scientific autonomy. The pool of resources is under common management and the solidarity among groups is a rule. The BD has put in place the necessary set of regulations applying to the different statutes of researchers, working conditions, careers and rewards, and performance evaluation.

The Scientific Council (SC) has representatives of the Units plus 3 members appointed by the BD. The Scientific Advisory Board (SAB) is composed of invited high-profile international scientists. The members of these councils are appointed by the GC. The enlargement of the LA to External Groups led to the extension of the UC to a LA Coordinating Council. Also the SAB and the SC have been extended. INESC Porto LA provides scientific and strategic consolidation but INESC Porto continues to exist as an independent private entity.

2.2 General Objectives (3000 ca.)

This refers to the current aims of the Unit or LA as a whole.

MISSION

The mission of INESC Porto is:

- To undertake R&D activities in specific areas generating internationally competitive science and technology
- To act as an effective interface between the university and companies, public institutions and services, through contract research, technology transfer, specialized consulting and advanced training
- To actively contribute for the development of the Portuguese science and higher education system and promote its continuous adaptation to societal needs.

DOUBLE ROLE

INESC Porto is recognized by the Ministry of Science as a Unit of the Science and Technology System of Portugal. At the same time, INESC Porto is also a Technological Infra-structure recognized by the Ministry of Economy and Innovation.

This double character means that its mission is not limited to scientific research but extends to the assistance of economic agents, public administration and institutions in general, through technology transfer and innovation as well as highly specialized consultancy.

INESC Porto also promotes spin-off and spin-out companies, hosting them during an early-stage pre-incubation phase and often participates in their capital with seed money.

EVOLVING FOOTPRINT

Since 2007, INESC Porto LA has been challenged to integrate research groups that were previously linked to other institutions. Three of these groups underwent an independent evaluation process by FCT and were classified as Very Good. Two of them (LIAAD and CRACS) are mentioned in this report because their integration process is on-going since 2007 (although their official recognition as part of INESC Porto LA by FCT was still pending in Dec 2009).

STRATEGIC CONCEPT

INESC Porto embodies the concept of knowledge production chain: FROM KNOWLEDGE PRODUCTION TO SCIENCE-BASED INNOVATION. The working organization obeys the concept of smooth integration of knowledge producers (creating science) with developers (producing applications) and of these with appliers (transferring to industry, generating spin-off companies, etc.). Therefore, the profile of a typical Unit in INESC Porto includes all these components and is a more effective integration than the one achieved with the research lines. Research projects generate new knowledge and excellence at the international level: post graduate theses and papers are published. Projects in tandem move knowledge along the chain: prototypes are developed and relationship with industry is strengthened. New projects are designed, materializing the value of innovation at the end of the chain: technology transfer, licensing. Eventually, new spin-off companies are incubated and launched. This is done with a careful blending of scientists from the University with full time contracted researchers and full time contracted professionals - engineers, mathematicians, economists, physicists. And this is supported by a highly qualified staff in project management, juridical, public relations, human resources.

2.3 Main Achievements during the year of 2009 (3000 ca.)

Highlights from past research over the reported period.

INTERNATIONALIZATION/WORLD RECOGNITION

- IEEE Fellows regularly spend sabbatical time at INESC Porto
- 2 IEEE Fellows now among permanent research staff
- The no. of papers co-authored with researchers from foreign institutions has increased consistently
- Contracts with ESA (EU), DoE/Argonne NL (USA) and others in Europe and Brazil
- 20 European projects run at simultaneously
- 40% of PhD students are foreigners
- Projects with top USA Universities: CMU, MIT and UT Austin - CMU sends PhD students to INESC Porto

SUSTAINED GROWTH

- A 10 million Euro plan for 2010 (after 8.5 million in 2009)
- Record number of 104 researchers holding PhD degree in 2009 (98 in 2008)
- Expectation of growth with the negotiated enlargement to 3 external Units CRACS, LIAAD and UGEI (still waiting for 2 years to be recognized by FCT).
- A new project to build a Knowledge Center for Sustainable Energy (including investment of about €3.5 M in 2010-2012)

THE SCIENTIFIC PRODUCTIVITY AND THE POLICIES TO STIMULATE IT

- New record number of 86 papers published in international journals (79 in 2008) and record total number of 321 publications in journals and international conferences
- The no. of international journal papers increased 6 times in 2002-2008 while the no. of researchers holding a PhD degree had only a 2-fold increase
- A rate of approval of FCT funded projects above average
- Creation of the concept of LAI (Inter-unit activity line) to promote cross-fertilization among Research Groups

THE TECHNOLOGY TRANSFER/KNOWLEDGE VALORIZATION

- In 2009, 29 projects were analyzed and 11 projects entered a pre-incubation process
- First companies launched (MOG and Fibersensing) reached €3 M sales in global markets (€2 M in 2008), with 80% exports.

IMPROVEMENT IN INSTITUTIONAL MANAGEMENT

- New concept in Unit leadership implemented
- External impact (national and international) of INESC Porto Bulletin BIP (read in 40 countries on average per month, thousands of hits).

SCIENTIFIC/TECHNICAL ACHIEVEMENT - ONE EXAMPLE PER RESEARCH GROUP

- New concepts integrating renewable generation, leading to the development of an advanced tool for operating reserve evaluation and resulting in a new research contract with the Portuguese and Spanish TSO to deliver such tool for practical application.
- Contributions for innovative concepts and solutions for planning and management of complex supply chains, applied in the automotive industry for the fast production of customized cars (under the ongoing AC/DC European project, for the “5 days cars”).
- Novel developments of nonlinear effects for optical sensing based on Raman/Rayleigh scattering
- A project on “A small autonomous vehicle”, a research contract with DELTAMATIC - Engenharia e Automação Industrial, S.A, resulted in a fully functional prototype.
- The successful completion of CAALYX Project in 2009, led to several European proposals in this area that were approved (eCAALYX, CAALYX-MV and ICT4DEPRESSION) and that will boost research activities in the Ambient Assisted Living area in the next years.
- Metadata and context-aware techniques applied to networked multimedia applications and content management

3. Activities

This part of the report will allow you to describe general activities of the Unit or the LA that are aimed at integrating the research of various groups of which multidisciplinary and/or trans-disciplinary activities are of particular relevance. The second part is aimed to describe work that the Unit or the LA does to extend beyond the scientific environment and to reach the general public, schools or other forms of engaging the public in the work of the Unit or the LA.

3.1 Integrative/multidisciplinary activities during the year of 2009 (3000 ca.)

Special activities that aim to carry out research across disciplines.

According to the reports of our Scientific Advisory Board, the successes of INESC Porto are centred at its ability to bring "on-demand", to the technology transfer activities, an effective blend of engineering disciplines. This is achieved because its Research Groups are formed and run under the concept of being multi-disciplinary. Therefore, for INESC Porto the need for a special reporting section to declare activities aiming to stimulate and carry out research across disciplines is somewhat redundant.

Furthermore, an important number of projects gather together and transiently resources form different groups, as it may be observed in the activity reports of each group.

To enhance cross-communication, several Groups organize a regular (weekly or bi-weekly) series of scientific discussion meetings, which receive the name of "Lab Meetings". The most active originate from the Telecommunications and Multimedia Unit, the Power Systems Unit and the Optoelectronics and Electronics Unit.

A scientific discipline may be spread among several Units, due to the organization of INESC Porto. In 2008, a new model started being studied to independently promote a sense of internal recognition and external visibility of this fact. In 2009, invited by the Board of Directors (BD), a member of the Scientific Advisory Board (Prof. Fortes, University of Florida, USA) helped in designing a new strain of activities which received the name of LAI (Inter-unit Action Lines).

A LAI is a coherent scientific or technological domain that cuts across INESC Porto organization and promotes scientific discussion, workshops, exchange of experience and ideas in an organized fashion. To support this activity, the BD defined a set of supporting measures including guaranteeing a base budget to each self-organized LAI. The Scientific Council manages the recognition of each LAI proposal and monitors its activity. There are scientific and activity targets that must be met in order to maintain the recognition of a LAI. LAIs in several domains have been proposed and the first launched was in Optimization and Operations Research.

This structuring of scientific coordination cross-groups is built over an increasing number of projects being tackled by 2 or more Groups in consortium. A considerable number of examples can be found in 2009, either in European projects or in direct research contracts with industry, e.g., joining power systems and telecommunications, manufacturing engineering systems with information systems, telecommunications with optoelectronics, power systems with artificial intelligence, manufacturing engineering systems with management and industrial engineering, telecommunications with robotics, etc.

The constitution of a new Knowledge Center for Sustainable Energy, joining external groups in Chemical Engineering (two rated as Excellent by FCT, including part of another LA) under the coordination of INESC Porto is a new organized effort to support research across disciplines. In 2009 the project has been put up and will come to light in 2010 with the erection of a new building next to INESC Porto headquarters.

3.2. Outreach activities during the year of 2009 (3000 ca.)

Science and Society/general public/schools, etc.

INESC Porto gives great importance to communication with citizens. In 2009 this activity followed the general trend of recent years and the condensed report that can be made is no different from past reports in its broad lines.

The Communication Service was organized and is headed by a specialist graduated in Media and Communication. An external service was contracted to watch the media and allow news

and press releases to flow to newspapers, radio and tv, in order to promote public awareness (and understanding) of science and make informal contributions to science education.

The Communication Service, among other duties, runs a digital monthly Bulletin (BIP, <http://bip.inescporto.pt/>) in Portuguese, with news on science and projects developed, that reaches a vast community of readers in Portugal and Brazil. In 2009 this BIP bulletin completed 10 years and 99 issues, which is remarkable together with the general acceptance it receives.

A version of BIP in English (<http://bip.inescporto.pt/index.php?lng=en>) is also published every 3 months.

Google Analytics provided a counting of accesses to BIP: in the period of October 1-31, 2009, the Bulletin had 2303 hits from 1488 different persons, from 35 countries, the top being Portugal, Brazil, USA, Germany, UK, Spain, France, Argentina, Italy and Belgium. In February 2010 this number amounted to 1714 hits from 1283 visitors in 43 countries.

INESC Porto developed a consistent action of presence in the civil society with participation in a diversity of events and initiatives. As a consequence, experts from INESC Porto are regularly interviewed by tv and radio stations (beside the press) on the hot topics that the society is debating.

INESC Porto is one of the partners of the Ciência Viva (CV) association whose aim is to promote science among youth. It has regularly cooperated with the CV initiatives, namely in the annual programs to receive students from secondary schools for short periods of time in its laboratories.

This cooperation with CV has been extended to the participation of experts from the LA in meetings in the Parliament with its Members to create awareness in the people's representatives of a number of problems linking science and society. Also, a member of the Board of Directors is a member of the Scientific Advisory Board of the Ciência Viva Center of Bragança.

Support to the University of Porto annual event, Mostra da Ciência (Science Exhibit), has also been given as well as support to Engineering and Sciences Faculties Open Days, highlighting the LA activities. INESC Porto also participated in national Exhibitions organized by the Innovation Agency and the Ministry of Science to disseminate science and technology accomplishments by Portuguese researchers.

Public talks and lectures were given by the senior members of the LA in various locations, in secondary schools and in Civic Associations, beside scientific and technical meetings.

4. Funding

In this section include funding details during the reporting period. In the item LA FCT include the total sum of the Base+Programmatic funding of the Associate Laboratory.

	2005	2006	2007	2008	2009	Total
LA FCT	652.720,00	894.690,00	1.250.000,00	1.447.500,00	1.971.592,05	6.216.502,05
Projects FCT	275.687,00	308.790,00	243.958,00	464.320,00	499.951,10	1.792.706,10
Other National	1.529.888,00	983.733,00	1.343.667,00	998.469,00	381.029,90	5.236.786,90
Other International	1.239.997,00	1.293.840,00	1.417.767,00	1.191.549,00	871.931,86	6.015.084,86
National Industry	1.216.326,00	1.351.126,00	1.409.480,00	1.636.454,00	2.228.402,57	7.841.788,57
International Industry	100.325,00	118.670,00	96.110,00	155.477,00	374.263,20	844.845,20
Total	5.014.943,00	4.950.849,00	5.760.982,00	5.893.769,00	6.327.170,68	27.947.713,68

5. General Indicators

This section is designed to provide information regarding the researchers and the technical personnel hired, and the total number of completed Masters and PhDs during the reported period.

5.1 Composition and Training

In this section indicate the number of researchers that the LA intended to hire during the reporting period based on the original contract with the FCT and those that were actually hired. In the Balance indicate the result per year as +1 (in the case that hired one more than expected) or -1 (in the case hired one less than expected) and so on. Include also the researchers hired through the Ciência Programme and the total number of integrated Researchers with PhD and the PhD or Master thesis completed in the period.

	2005	2006	2007	2008	2009	Total
Nº of Researchers Proposed	2	2	0	0	0	4
Nº Researchers Hired (LA)	1	4	4	0	1	10
Balance	-1	2	4	0	1	6
No. of Researchers Hired (Ciência Programme)	0	0	0	0	9	9
No. of Researchers (FTE)	308	2	692	0	104	-
Training Masters (Master thesis completed)	109	106	146	0	198	1.153
Training PhDs (PhD thesis completed)	79	81	93	0	15	268

(*) Number of eligible integrated researchers holding a doctoral degree.

5.2. Researchers hired

In this section indicate the individual researchers hired in the period by introducing the public key, their starting date and if applicable their finishing date. In case the researchers also hold a part-time position at another institution (teaching at University or Polytechnic) also indicate this in Other Institution.

Warning: Dates must be in the dd-mm-aaaa format.

Nome	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Other Institution
Gerald Bernard Sheble	15/04/2009	31/01/2010	
Agostinho Manuel Carvalho de Oliveira	02/02/2010	01/02/2011	
Fabien Gouyon	01/06/2009	14/01/2012	
Pedro Alberto da Silva Jorge	01/01/2009	31/12/2011	
Paulo Jorge Brandao Moreira	01/06/2009	31/05/2010	
Jorge Costa de Sousa e Castro	01/06/2009	31/05/2010	
Alexandre Rocco	01/06/2009	31/05/2010	
Iryna Yevseyeva	01/06/2009	31/05/2010	
Gali Hema Chandra	29/07/2009	28/07/2010	
Sumaili Akilimali Jean	17/07/2009	16/07/2010	

5.3. Technical Personnel Hired

In this section indicate individual technical personnel hired. To do so all personnel must be registered at the FCT and have a public key.

Warning: Dates must be in the dd-mm-aaaa format.

Nome	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Other Institution

5.2 Additional Comments

In this space you can provide any additional information regarding the section General Indicators

1. The columns in the first table (section 1. Composition and Training) referring to the years before 2009 are meaningless. The on-line form did not allow any correction to values that are obviously wrong - see, for instance, the no. researchers FTE, that oscillates between 2 and almost 700!... The dimension of the LA cannot be of 2 researchers for sure... The correct number for 2009 is of 104 and in previous years it was below this number although always in an increasing trend.
2. The lines referring to MSc and PhD thesis have had their meaning changed. In past reports, one would report the number of on-going thesis supervisions; this table now changes the meaning to "completed theses" so the numbers are not comparable among years although in the same line.
3. The column for 2008 is all in zeros which makes it evident that some kind of error happened when generating this table.
4. Along a number of years, INESC Porto has asked a number of times for some of these numbers to be corrected but until the present moment this has not been possible.

In the site <http://profile.inescporto.pt> other information is made available about the LA.

6. Research Groups

Research Group Title	RG-NORTE-50014-3346 MANUFACTURING SYSTEMS ENGINEERING
Principal Investigator	Jorge Manuel Pinho de Sousa
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

UESP

Entidade	Valor
Fundação para a Ciência e a Tecnologia	80.871,29 €
European Commission	423.290,79 €
QREN	19.667,25 €
TOTAL	523.829,33 €

ROBIS

No funding coming directly from state sources

6b. Research Groups - Objectives & Achievements

1. Objectives (6000 ca.)

FOREWORD

Because the FCT computer application did not allow the addition of a new Group, we report here that activities of the Manufacturing Systems Engineering (UESP) Research Group plus the activities of the newly formed (mid 2009) Robotics and Intelligent Systems (ROBIS) Group, which is being organized in connection with UESP since June 2009 by decision of the Board of Directors of INESC Porto.

UESP

The main goal of the group is to improve of performance of industrial enterprises through R&D projects, consulting, technology transfer and training services, with a high emphasis on a strong application focus. Its main competences are related to Operations Management and Enterprise Information Systems, applied to industrial companies and enterprise collaborative networks.

The main activity areas include: Enterprise Cooperation Networks, Decision Support Systems; Operations Management and Production Planning, Internal Logistics, Optimization of Cutting and Packing, Systems integration, and consulting, in the following domains:

- Cooperative Enterprise Networks Management: build-to-order strategies for complexity and variety, dynamic capacity management, early warning management, operations co-ordination in dynamic supply networks, semantic and technical Interoperability, collaborative performance management, life-cycle support of self-forming business networks.
- Information Management and Knowledge in Collaborative Networks: socio-technical analysis models in organizational networks, collaborative processes in organizational networks, information and knowledge management in organizational networks.
- Operations Management and Production Planning: structuring of decision processes; optimization methods; Combinatorial Optimization and meta-heuristics; optimization for planning and scheduling problems; Simulation; vehicle routing and transportation systems; Decision Support Systems.
- Optimization of Cutting and Packing: incorporation of real-world constraints and objectives in the pure/theoretical cutting and packing optimization models, integrated resolution of cutting and packing problems and related tactical and operational problems, use of meta-heuristic techniques, often in their multi-objective versions, hybridization of meta-heuristics and exact methods.

ROBIS

This Group was created in INESC Porto LA, linked to UESP, in June 2009, when a number of researchers joined the institution. Therefore this refers to 6 months of activity until December 31, 2009. Its Coordinator (equivalent to Principal Investigator) is Dr. Antonio Paulo Moreira.

The Group is engaged in discovering and developing fundamental scientific principles and practices, such as perception, control and planning, applicable to intelligent robot systems and other complex dynamic systems, in a wide range of application domains, namely robots that navigate through complex indoor and outdoor spaces and advanced flexible manufacturing support systems. Research activities address not only robotics but also application areas where technologies used in robotics play an important role, like control, automation, simulation, modeling, intelligent systems, etc.

The main competences are related to Robotics and Intelligent Systems applied to industrial companies and service companies, in the following scientific domains:

- Mobile Robotics: Robotic platform architectures; control of mobile platforms; smart and low-cost AGVs.
- Marine Robotics: Design of surface and underwater autonomous vehicles; underwater positioning and navigation, multiple platform systems, supervision of autonomous platforms, robotic based environment monitoring.
- Cooperative robotics: Warehouses and Logistics applications.
- Industrial Manipulators: Rapid teaching and programming interfaces; hyper-flexible cells.
- Intelligent sensors: Smart sensors and image processing; applications in robotics and automation.
- Intelligent control and simulation: simulation applications for complex dynamic electro/mechanical systems.

2. Main Achievements (2000 ca)

UESP

During 2009 a large number of projects have been launched, namely four new large European RTD projects, one led by INESC Porto, in the fields of Enterprise Collaboration Networks and

Operations Management. A very active participation in the Manufuture and Footwear European Technology Platforms played an important role in the preparation and set-up of these projects.

A large number of projects were started also at a national level, including research projects funded by FCT, RTD projects in partnership with companies and consultancy services.

During 2009 the following important achievements are highlighted:

- The e-biz-tcf project (Harmonising e-Business processes and data exchanges for SME's in the textile/clothing and footwear sectors in the Single Market) has implemented and validated innovative architectures for e-business integration in pilot projects at an European level. INESC Porto was responsible for the management of the implementation of the project results in nine Portuguese companies.
- New concepts and approaches for the management of complex supply networks were developed, leading to faster responses in the automotive industry (under the ongoing AC/DC European project).
- A framework for demand forecasting in the Retail Industry was developed. This framework includes methodological support to guide the resolution of problems and a simulation tool that can analyze sales historical data and several simulation scenarios.
- The “scheduler” developed by INESC Porto and integrated in the IZARO-GREY system has been marketed by SOFTI9 and I68 (Spain) with a considerable commercial success. The distribution network of this software application was extended to a large Portuguese ERP vendor and to one company operating in Germany and Austria. At the moment more than 20 licences have already been sold by I68.
- In the field of multi-criteria operations scheduling, several small research initiatives have been launched or continued, in order to consolidate the scientific leadership of INESC Porto in this field.
- A framework for demand forecasting in the Retail Industry was developed. This framework includes methodological support to guide the resolution of problems and a simulation tool that can analyze sales historical data and analyse several simulation scenarios.
- The “scheduler” developed by INESC Porto and integrated in the IZARO-GREY system has been marketed by SOFTI9 and I68 (Spain) with a considerable commercial success. The distribution network of this software application was extended to a large Portuguese ERP vendor and to one company operating in Germany and Austria. At the moment more than 20 licences have already been sold by I68.
- In the field of multi-criteria operations scheduling, several small research initiatives have been launched or continued, in order to consolidate the scientific leadership of INESC Porto in this field.

ROBIS

During 2009 the group took a strong effort in promoting new projects and was reinforced with 5 new PhD students. At the end of 2009, 2 new RTD and innovation projects were approved for funding. The following achievement must be noted:

- A project on “Robotized application of non-stick, anti-corrosion and self-lube coatings”, a industry contract with FLUPOL - Aplicações Técnicas de Polímeros Fluorados, Lda reached the end with successful results and will constitute a departing point to a new and larger project.

- A project on “A small autonomous vehicle”, an industry contract with DELTAMATIC - Engenharia e Automação Industrial, S.A, resulted in a fully functional prototype.
- New concepts for artificial vision applied to industrial manipulators and to mobile robots, were developed.
- Systems for global localization and control of mobile vehicles are in a mature stage of research in the group.
- Realistic simulators and virtual reality were developed and ready to use in robotic systems research.
- The study of coordination, cooperation and formation control of multiples robots is also in a high level of priority with already some results.

As a result of this research activity, during this period the members of the Group concluded 2 prototypes.

6c. Research Groups - Productivity

1. Publications in peer review Journals (3000 ca.)

Total number of publications: 6

List can be consulted in: <http://profile.inescporto.pt>

UESP

M Teresa Costa, A. Miguel Gomes, José F. Oliveira, “Heuristic approaches to large-scale periodic packing of irregular shapes on a rectangular sheet”, European Journal of Operational Research, vol. 192, January 2009, pp.29-40.

José António Crispim, Jorge Pinho de Sousa, “Partner selection in virtual enterprises: a multi-criteria decision support approach”, International Journal of Production Research, Volume 47, Issue 17, January 2009, Pages 4791 - 4812.

Julia A. Bennell, José F. Oliveira , “A tutorial in irregular shape packing problems”, Journal of the Operational Research Society, vol. 60, Supplement 1, May 2009, pp.S93-S105.

Claudia Chituc, Américo Azevedo, César Toscano, “A framework proposal for seamless interoperability in a collaborative networked environment”, Computers in Industry, vol.60, no.5, June 2009, pp.317-338.

Claudia-Melania Chituc, Américo Azevedo, César Toscano, “Collaborative business frameworks comparison, analysis and selection: an analytic perspective”, International Journal of Production Research, vol.47, no.17, January 2009, pp.4855-4883.

Ana Moura, José F. Oliveira , “An integrated approach to the Vehicle Routing and Container Loading Problem”, OR Spectrum, vol.31, no.4, October 2009, pp.775-800.

ROBIS

Patrícia Ramos, M. V. Neves, Monitorização de Descargas de Águas Residuais no Mar através de Veículos Submarinos Autónomos (VSAs), Ingenieria del Agua, vol.16, no.3, pp.201-216

André Conceição, António Paulo Moreira, Paulo José Costa, A Practical approach of Modeling and Parameters Estimation for OmniDirectional Mobile Robots, Proceedings of IEEE, IEEE/ASME Transactions on Mechatronics, vol.14, no.3, pp.377-381

2. Other publications National (3000 ca.)

UESP

No relevant national publications have been produced in 2009. However the participation of several members of the Unit in the conference of the Portuguese Operational Research Society (APDIO), held in Costa da Caparica, Almada, in September, was quite strong and led to several oral communications about the group's research activities.

ROBIS

Total number of publications: 12

List can be consulted in: <http://profile.inescporto.pt>

Bruno Miguel Ferreira, Miguel Migueis Pinto, Aníbal Matos, Nuno Cruz, Hydrodynamic Modeling and Motion Limits of AUV MARES, IECON09 - IECON2009, pp.2241-2246

André Carvalhosa, Pedro Machado, Armando Jorge Sousa, José Carlos Alves, Soft Core Robot with Joint Wheel Motion Controller, IECON09 - IECON2009

Armando Jorge Sousa, Catarina B. Santiago, Luis Paulo Reis, M. Luisa Estriga, Automatic Detection and Tracking of Handball Players, Proceedings of VipIMAGE 2009 - II ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, pp.213-219

Patrícia Ramos, Nuno Cruz, Aníbal Matos, Nuno Miguel Abreu, Avaliação de Impacte Ambiental e Modelização de Descargas de Águas Residuais usando Observações Bio-ópticas de Veículos Submarinos Autónomos, Actas das 4^{as} Jornadas de Hidráulica - 4^{as} Jornadas de Hidráulica, Recursos Hídricos e Ambiente da FEUP

Luis Paulo Reis, António J. R. Neves, Armando Jorge Sousa, Real-Time Vision in the RoboCup - Robotic Soccer International Competitions, Proceedings of VipIMAGE 2009 - II ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, pp.319-324

Manuel Gouveia, António Paulo Moreira, Paulo José Costa, Luís P. Reis, Marcos André Ferreira, Robustness and Precision Analysis in Map-Matching based Mobile Robot Self-Localization, EPIA 2009 - 14th Portuguese Conference on Artificial Intelligence, pp.243-253

Armando Jorge Sousa, Catarina Maria Santiago, Paulo Malheiros, Paulo José Costa, António Paulo Moreira, Using Barcodes for Robotic Landmarks, EPIA 2009 - 14th Portuguese Conference on Artificial Intelligence, pp.299-311

Erik Moreira Pegoraro, Armando Jorge Sousa, FEUP Fuzzy Tool - Renewed and Extended, for Intelligent Control and Education, CISTI 2009 - 4^a Conferência Ibérica de Sistemas e Tecnologias de Informação, pp.639-644,

Rui Filipe Guedes, Luís Paulo Reis, Armando Jorge Sousa, Surpassing the Limitations of the NXT Lego Robot with Distributed Computing, CISTI 2009 - 4^a Conferência Ibérica de Sistemas e Tecnologias de Informação, pp.633-638,

José Lima, José Alexandre Gonçalves, Paulo José Costa, António Paulo Moreira, PLC and Petri Net Training Based on a 3D Virtual Car Park Modelling and Control., Proceedings of PAEE'2009 - 1st Ibero-American Symposium on Project Approaches for Engineering Education

Paulo Malheiros, Paulo José Costa, António Paulo Moreira, Marcos André Ferreira, Robust and Real-time Teaching of Industrial Robots for Mass Customisation Manufacturing Using Stereoscopic Vision, IECON09 - IECON2009

Miguel Migueis Pinto, Bruno Miguel Ferreira, Anibal Matos, Nuno Cruz, Using Side Scan Sonar for Relative Navigation, IECON09 - IECON2009

3. Other publications International (3000 ca.)

Total number of publications: 13

List can be consulted in: <http://profile.inescporto.pt>

UESP

Mikio Kubo, J. P. Pedroso, "Metaheuristics: a Programming Guide" (inJapanese). Kyoritsu, Tokyo, 2009 [book].

Roberto Piedade, Américo Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, November, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "Short-term Semantic Consensus: Toward Agile Ontology Specification for Collaborative Networks", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, October, 2009.

Rui J. Rei, Peter Madera, João Pedro Pedroso, "Khronos - a High-level Framework for Discrete Event Simulation in Python", CIE39 - 39th International Conference on computers & Industrial Engineering, July, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A Socio-Semantic Approach to the Conceptualization of domains, Processes and Tasks in Large Projects", ICEIS 2009 - 11th International Conference on Enterprise Information Systems, in proceedings, 2009.

Ana Rodrigues, José Soeiro Ferreira, "Rural Postman Problem and Related Problems", VIII IWCPRT - VIII International Workshop on Cutting, Packing and Related Topics, 2009.

José Soeiro Ferreira, "Creativity, Soft Methods and Metaheuristics", pp 81-89, EU/Meeting 2009, 29-30 April 2009, Porto, Portugal

Jorge Pinho de Sousa, Luís Guardão, "A flexible multi-objective scheduling system based on configurable heuristics", EURO - 23rd European Conference on Operational Research, Bonn, July 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A socio-semantic approach to collaborative domain conceptualization", Proceedings of OnToContent 2009 - The 4th International Workshop on Ontology Content - OnToContent 2009, 2009.

Rui Gomes, Jorge Pinho de Sousa, "Dynamic Vehicle Routing for Demand Responsive Transportation", EWGT2009 - 13th Euro Working Group on Transportation Meeting, Padua (Italy), September 2009.

Nazaré Rego, Jorge Pinho de Sousa, "Supporting the definition of strategies for the configuration of health care supply chains", Conference on Logistics Management 2009, Hamburg, September 2009.

Nazaré Rego, Jorge Pinho de Sousa, “Virtually centralized Supply Chain coordination in Hospitals”, PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

José A Crispim, Jorge P Sousa, “Uncertainty in partner selection for virtual enterprises”, PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

ROBIS

Total number of publications: 9

List can be consulted in: <http://profile.inescporto.pt>

Pedro Neto, J. Norberto Pires, António Paulo Moreira, Accelerometer-Based Control of an Industrial Robotic Arm, IEEE RO-MAN 2009 - 18th IEEE International Symposium on Robot and Human Interactive Communication, pp.1191-1197

Bruno Miguel Ferreira, Miguel Migueis Pinto, Aníbal Matos, Control of the MARES Autonomous Underwater Vehicle, OCEANS'2009 MTS/IEEE - OCEANS'2009 MTS/IEEE BILOXI, OCEANS 2009, pp.1-10, Biloxi, EUA,

Bruno Miguel Ferreira, Miguel Migueis Pinto, Aníbal Matos, Nuno Cruz, Modeling and motion analysis of the MARES autonomous underwater vehicle, - ., pp.1-10

Nadja Bressan, António Paulo Moreira, Pedro Amorim, Catarina S. Nunes, Target Controlled Infusion Algorithms for Anesthesia: Theory vs Practical Implementation, Proceedings of IEEE - EMBC'09 - 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society , pp.6234-6237, Minnesota,

Miguel Migueis Pinto, Bruno Miguel Ferreira, Aníbal Matos, Nuno Cruz, Side Scan Sonar Image Segmentation and Feature Extraction, OCEANS'2009 MTS/IEEE - OCEANS'2009 MTS/IEEE BILOXI

Miguel Migueis Pinto, Bruno Miguel Ferreira, Aníbal Matos, Nuno Cruz, Using Side Scan Sonar to Relative Navigation, OCEANS'2009 MTS/IEEE - OCEANS'2009 MTS/IEEE BILOXI,

José Lima, José Alexandre Gonçalves, António Paulo Moreira, Paulo José Costa, Humanoid Realistic Simulator - The Servomotor Joint Modeling, ICINCO 2009, pp.396-400

Raquel Pinho, Armando Jorge Sousa, Andre Restivo, ILAB - Inventory Manager for Electronics Laboratory, CISTI 2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, pp.537-541

Paulo Malheiros, Paulo Santos, António Paulo Moreira, Fernando Veloso Gomes, Francisco Taveira Pinto, Paulo José Costa, Robust and Real-time Motion Capture of Rigid Bodies Based on Stereoscopic Vision, RF'2009 - 3rd International Conference on Integrity, Reliability and Failure, pp.1-1, Julho, 2009.

4. Master and Ph. D. thesis completed (3000 ca.)

Ph.D (UESP + ROBIS)

José António Crispim, Partner Selection in Virtual Enterprises (Orientador: Jorge P. Sousa), Doutoramento em Engenharia Electrotécnica e de Computadores da FEUP 2009

José Luis Sousa Magalhães Lima, Construção de um Modelo Realista e Controlo de um Robô Humanóide, Doutoramento em Engenharia Electrotécnica e de Computadores da FEUP (Orientador Paulo Gomes da Costa, Co-orientador António Paulo Moreira, DEEC-FEUP), Julho de 2009.

José Gonçalves, Modelação e simulação realista de sistemas no domínio da robótica móvel, Doutoramento em Engenharia Electrotécnica e de Computadores da FEUP (Orientador Paulo Gomes da Costa), 2009

M.Sc. (UESP + ROBIS)

A total of 50 M.Sc. theses were supervised and concluded in 2009, in the so-called Bologna format. There is no space to list all these theses.

5. Patents/prototypes (2000 ca.)

The following are some of the prototypes developed by the Unit during 2009:

UESP

Name: A multi-objective optimization system for production scheduling - a new version enhanced with new functionality

Developed under (Project Name): Izaro Grey

Demo Place: INESC Porto, Softi9

Development Period: 2007-2009

Name: A system for reliable exchange of business documents in the footwear industry

Developed under (Project Name): eBiz-tcf

Demo Place: Fivelarte, Cindicalfe, Centenário, Lusocal, Maximo Internacional, Trielle, Mystic Sea, Globo Vermelho, Santos e Júnior

Development Period: 2008-2009

Name: A framework for demand forecast in the retail industry

Developed under (Project Name): SPRY

Demo Place: Wipro Retail

Development Period: 2008-2009

Name: Methods and tools for benefit balancing in automotive supply chains

Developed under (Project Name): AC/DC

Demo Place: Continental AG

Development Period: 2008-2009

Name: An agile optimization planning system for footwear producing SMEs - first prototype

Developed under (Project Name): AGILPLAN

Demo Place: Oficina de Soluções

Development Period: 2009

Name: A system for the management of standard technical processes in the construction industry at national level (improved version)

Developed under (Project Name): Parque Escolar

Demo Place: INESC Porto

Development Period: 2009

ROBIS

Name: SmallAGV - a small autonomous vehicle

Developed under (Project Name): contract with DELTAMATIC - Engenharia e Automação Industrial, S.A

Demo Place: INESC Porto

Development Period: 2009

Development together with ISR Porto

Name: Robotic Painting

Developed under (Project Name): contract with FLUPOL, S.A

Demo Place: INESC Porto

Development Period: 2009

Development together with ISR Porto

Name: A system for the management of standard technical processes in the construction industry at national level (improved version)

Developed under (Project Name): Parque Escolar

Demo Place: INESC Porto

Development Period: 2009

6. Organization of Conferences (2000 ca.)

UESP

VIII International Workshop on Cutting, Packing and Related Topics , Vila Nova de Foz Côa, Portugal (2009 September 16/20) - Program and Organising Committee: Maria Antónia Carravilla, José Fernando Oliveira, António Miguel Gomes (<http://www.fe.up.pt/~esicup/extern/8IWCPR/>)

10th EU/MEeting workshop (the European metaheuristics community) - Debating the future: new areas of application and innovative approaches, Porto, Portugal (2009 April 29/30) - Chair: Ana Viana.

ROBIS

Organizing Committee Members of the IMS10 - 10th IFAC Workshop on Intelligent Manufacturing Systems, Lisboa 1,2 July 2010 (José Gonçalves and José Lima)

7. Industry contract research (2000 ca.)

The Unit (UESP + ROBIS) has a very strong link with industry, regularly collaborating with technology suppliers for industry, on the design and development of new products they put on the market. For industrial companies the group supplies consulting services on innovation and industrial management. For industrial companies, the group also offers RTD services to meet specific requirements that cannot be answered by available commercial solutions.

The main industry research, consulting and technology transfer projects during 2009 were:

UESP

- Wipro - Research project contracted by the consulting company Wipro, aiming at the design and development of a framework for demand forecasting in the Retail Industry. This framework includes methodological support to guide the resolution of these problems and a simulation tool that can analyze sales historical data and study several simulation scenarios.
- MIBEP - Manufacturing Industries Business Performance Toolkit, contracted by the Portuguese company Inovults. The objective is to design and develop a system to support performance management processes in industrial companies, the respective definition of KPIs and the automatic data collection to monitor those KPIs.
- Izaro Grey - design and implementation of several planned improvements in the scheduling optimization engine previously designed and developed.
- Consulting contracts to support several companies (Silampos, Digital Partners, 3M2P-Construção e Reabilitação de Edifícios, Lda., ANARIC, Confeitaria Mirene S.A., Metalfer, Oxisol, Padinho, Pedrosa&Rodrigues, PHC, SopSec and Waldemar Fernandes da Silva, S.A.) in analyzing their business processes, identifying their requirements in IT, supporting the selection and implementation of the selected solutions.
- Technical support to the implementation of internal logistic systems produced by the partner company Lirel.

ROBIS

- Aplicação Robotizada de Anti-aderentes (FEUP / FLUPOL - Aplicações Técnicas de Polímeros Fluorados, Lda), QREN - Sistema de Incentivos Vale I&DT, contrato nº 2009/3166, concurso nº 11/SI/2008, 2008 - 2009)
- Veículo Autónomo para Movimentação de Pequenas Cargas, (FEUP/ISR e DELTAMATIC - Engenharia e Automação Industrial, S.A.) QREN - Sistema de Incentivos Vale I&DT, contrato nº 2009/4637, concurso nº 11/SI/2008, 2008 - 2009

8. Government/Organization contract research (2000 ca.)

(Include here work carried out by the group that resulted in a publication or report. Of particular importance are those involved in public policy advice)

During 2009, the most relevant projects undertaken with the support of national RTD programmes were:

UESP

- Project PmColNet (a multi-paradigm approach to performance management in collaborative networks) and the project CROME (Creativity in optimisation with meta-heuristics) funded by FCT, are ongoing and will be finished during 2010.
- Project AGILPLAN (an agile planning system for footwear companies and networks) is supported by Agência de Inovação and aims at designing a methodology and support system for production planning optimization for SMEs, taking into account uncertainty and incompleteness of information. This project is led by Oficina de Soluções (a software house) and involves the Footwear Technological Centre and the user company AS.
- The RTD project MINERVA aims at designing and developing an innovative Maintenance Management solution for industrial companies. The project leader is Primavera Software and MIT (a consultancy company) is also a partner.
- The Unit also participates in the FADIS project in partnership with the UITT Unit of INESC Porto. The project goal is to design innovative decision support tools for the internationalization of technical services. The consortium includes Sistrade (a software house), CATIM (machine tool technological centre) and INESC Porto and collaboration with the “European Collaboration for Service Internationalisation” initiative.

ROBIS

- DOLPHIN - Análise do Comportamento Hidrodinâmico de Dispositivos de Acostagem e Amarração. O Caso Crítico do Terminal Petrolífero do Porto de Leixões. (FCT/PTDC/ECM/72835/2006, 2007-2009) , FEUP-Principal Investigator: António Paulo Moreira, Project Member: Paulo Gomes da Costa
- ACORD - Coordenação Adaptativa de Equipas de Robôs (FCT/PTDC/EIA/70695/2006, 2007-2009), Project Members: António Paulo Moreira, Paulo Gomes da Costa, Armando Sousa.
- WVECO - Mapeamento de Plumas de Emissários Submarinos Baseada em Sensores Ópticos, FCT / 2008-2011 / INESC Porto + Águas do Oeste.

9. Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the International level)

During 2009, UESP has participated in 7 European projects:

- AC/DC (Automotive Chassis Development for 5-Days Cars)
- The e-biz-tcf - Harmonizing eBusiness processes and data exchanges for SMEs in the textile/clothing and footwear sectors in the Single Market.
- Net-Challenge (Innovative networks of SMEs for complex products manufacturing) - this project in the field of Enterprise Collaboration Networks, was launched and is coordinated by INESC Porto.
- H-Know - Advanced Infrastructure for Knowledge Based Services for Buildings Restoring.
- VFF (Holistic, extensible, scalable and standard Virtual Factory Framework)

- FIT4U (Framework of Integrated Technologies for User Centred Products)
- DINAMIC - A new methodology for the promotion and dissemination of Innovation activities in European SMEs.

A strong activity in the MIT Portugal Program, in the areas of EDAM (Engineering Design and Advanced Manufacturing) and Transportation Systems has been pursued.

Contacts with researchers abroad have been strengthened to prepare new research activities (Professors Mikio Kubo, from the University of Tokyo, and Abílio Lucena from Universidade Federal do Rio de Janeiro).

Members of the Unit also have a regular participation in the activities of EURO, the Association of European Operational Research Societies - the same for ESICUP in the area of Cutting and Packing. ESICUP is since 2003 an EURO Working Group and since the year 2000 its coordinator is J F Oliveira from the Unit.

Regular collaboration is on-going with the University of Valencia, under the framework of a project funded by the Spanish Ministerio de Ciencia e Innovación.

Members of ROBIS also established links and cooperation with several Universities abroad: I3S, University of Nice, France, Carnegie Mellon University, U.S.A., University of Dundee - U.K., Georgia Institute of Technology - U.S.A., King's College London - U.K., Universidade da Bahia - Brasil.

6c. Research Groups - Future Research

1. Objectives (6000 ca.)

UESP

The research activity of the Unit has a strong interdisciplinary nature covering areas such as Decision Support Systems, Multi-objective Optimisation or Operations Management. Moreover, recently we had the possibility of developing work in topics related to supply-chain management, logistics, and transportation systems, and these opportunities are now leading us to structure our activities in order to handle a few challenging research questions arising in this area.

Under this light, the following themes:

a) Models and integration of cooperative networks

The ultimate goal is to develop: a) a global interdisciplinary theory for relationship management in organizational networks; b) business models and planning tools for creating, managing and dissolving collaborative networks.

Moreover research will be pursued in the domain of semantic integration of organizational structures formed by autonomous, independent and heterogeneous entities acting in a dynamic and competitive environment towards an environment of self-forming collaborative networked organizations. We will also go on contributing for the development of a conceptual framework allowing the integration of all actors involved in cooperative networks, and supported by interoperability protocols and domain semantic standards.

b) Information and knowledge management

The focus of this research line will be on the social process perspective of knowledge creation and use of collaboration as the fundamental instrument for that creation. This will involve working on: a) socially constructed socio-technical artifacts; b) collaborative workspaces for management; c) applications of networking theories.

In particular research will be pursued on "socio-semantics in collaborative networks", aiming at developing innovative concepts and applications for the management of information and knowledge in collaborative networks.

c) Decision Support Systems and Combinatorial Optimization

This research area has a long record in the Unit's activity, being quite relevant, both in scientific and economic terms, as it deals with raw material usage optimization. The research developed by the group has been applied in sectors such as textile, paper, wood, garment, ship construction, transportation. Moreover container and truck loading optimization is critical in many sectors.

Our future research involves issues such as the incorporation of real-world constraints and objectives in the pure/theoretical cutting and packing optimization models or the integrated resolution of cutting and packing problems and related tactical and operational problems.

Our research agenda will be centred in topics such as Multi-objective Metaheuristics, Soft Methods in Decision Making, or Creativity in Optimisation. Innovative concepts previously developed will be enhanced and extended. This is the case of Constraint Oriented Neighbourhoods.

A new research line is related to the design of new hybrid optimization techniques that merge optimization procedures with metaheuristics.

Advanced research on metaheuristics in scheduling will be pursued based on the large practical experience of the innovative "scheduler" developed by the Unit.

d) Logistics, Vehicle Routing and Transportation Systems

We are now defining some new research topics that will cover these problems in a hopefully integrated way. Successful applications and developments are expected in many areas, along with the production of relevant research results.

e) Cutting and Packing

This research area has a long record in the Unit's activity. The research developed by the group has been applied in sectors such as textile, paper, wood, garment, ship construction, transportation. Moreover container and truck loading optimization is critical in many sectors.

Our future research involves issues such as the incorporation of real-world constraints and objectives in the pure/theoretical cutting and packing optimization models or the integrated resolution of cutting and packing problems and related tactical and operational problems.

ROBIS

The general force lines for future research are:

- Autonomous marine vehicles: natural landmark navigation for AUVs; unconventional acoustic navigation networks; coordinated control of heterogeneous teams; vision based AUV guidance; modelling and control of autonomous sailboats; low bandwidth control of AUV teams.
- Control of mobile platforms: methodologies for automatic generation of mission plans; supervision of autonomous platform operations; cooperative operation of multiple platforms.
- Concerning vision based real time sensors: perception systems as a sensor for on board sensing; real time stereo sensing for mapping and self localization; low latency and robust feature extraction in semi controlled environments.

- In the land robotics field: modelling and control of mobile robots; fast team coordination and global path planning; navigation and localization in semi structured environments (using natural and artificial landmarks); Soccer robotics will continue to be a major test bed for the scientific results in this area.
- Industrial robotic manipulators: vision and manipulator coordination; advanced sensing: measurements and testing of features; rapid teaching and programming interfaces; hyper-flexible cells; development of a universal language with translators to different manipulators.
- Intelligent control and smart sensors: control algorithms for complex dynamic systems, adaptive sampling strategies for environment monitoring.
- To port the previously gathered knowledge in robotic systems and real time vision systems to civil society activities such as tracking of humans in indoor sports. An FCT project is planned to help achieve this goal. The scientific goal of the project will aim at sports teaching (advanced team play analysis) and referee education.

For the future a number of structural actions are planned, including:

- Developing a work of integration of the Group within the INESC Porto LA structure and organization and establish and increase partnerships with other groups of INESC Porto - beside UESP, one envisions UTM (Telecommunications and Multimedia) and UOSE (Optoelectronics and Electronic Systems).
- Continuing the consolidation of the scientific activity in the areas of mobile robotics and intelligent control systems, adopting the quality standards of the INESC Porto LA
- Increasing the GROUP participation and the visibility in European projects.
- Increasing technology transfer and consolidate partnerships with software houses and producers of equipments.

2. Funding, source, dates (1500 ca) (indicate in full including amount of current and pending funding)

UESP

Entidade	Valor
Fundação para a Ciência e a Tecnologia	41.248,00 €
European Commission	569.000,00 €
QREN	70.000,00 €
TOTAL	680.248,00 €

ROBIS

Entidade	Valor
Fundação para a Ciência e a Tecnologia	29.683,95 €
TOTAL	29.683,95 €

6. Research Groups

Research Group Title	RG-NORTE-50014-3347 TELECOMMUNICATIONS AND MULTIMEDIA
Principal Investigator	José António Ruela Simões Fernandes
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	132.332,39 €
European Commission	211.751,19 €
QREN	60.478,84 €
TOTAL	404.562,42 €

6b. Research Groups - Objectives & Achievements

1. Objectives (6000 ca.)

The Telecommunications and Multimedia Unit carries out research and development, consulting, technology transfer and advanced training in scientific and technological areas that fostered the convergence between the traditional telecom and broadcast worlds, the Internet and multimedia.

It has a multi and interdisciplinary nature and, for this reason, it is internally organized in four Areas, for management and scientific purposes. Each Area carries out basic and applied research in related topics, under a common strategy and goals determined by the market sector it covers:

- Multimedia Technologies and Systems has two main focus of research: Media Processing, which deals with audiovisual processing and analysis (music, audio, video and image), and Advanced Multimedia Services, which addresses creation and delivery of multimedia services (generation, description, search, adaptation, transmission and distribution of multimedia content over heterogeneous platforms), with applications in such areas as video surveillance, entertainment and culture.
- Wireless Networks addresses the research of innovative architectural solutions and new communications paradigms, covering the following main topics: mobility of networks and terminals in large and multi-technology mesh networks; usage of dynamic radio channel allocation, smart antennas, and cross layer techniques to implement adaptive radio-aware networks; auto-configuration and self-management of networks and terminal; efficient and

secure support of new types of traffic (IPTV, peer-to-peer applications, Web-based services) in such networks.

- Internet Architectures and Networking (IAN) is focused on the analysis and development of disruptive Internet paradigms, namely, novel Internet architectures and functionality where the user is an active player and a provider of services, assuming as starting point the current Internet architectures and user requirements. Hence, three main R&D tracks are considered in IAN, being the topics within such tracks addressed from an OSI Layer 2 and 3 perspectives: disruptive Internet architectures and services; cooperative networking; advanced forwarding and routing.
- Optical and Electronics Technologies has two main research lines: Optical Communications and Microwaves, whose main topics are the design of fibre supported microwave / radio systems, Electromagnetic Band-Gap (EBG) components and devices, signal processing techniques applied to optical communication systems, and passive optical access networks; and Microelectronics, which is focused on dynamic reconfigurable logic and custom computing hardware, analogue and RF circuits design, and test and design-for-testability of analogue, mixed-signal and RF circuits.

The Unit pursues a high-level of scientific excellence, with international recognition. Most of its activities, both at national and international level, are carried out under contract and in partnership with telecom and network operators, service providers, broadcasters, content producers and providers, equipment manufacturers, software houses, system integrators, universities and research institutions.

At national level, besides R&D contracts, the Unit is deeply involved in projects funded by R&D programmes (e.g, FCT and Agência de Inovação) and a number of on-going projects in the framework of QREN (Quadro de Referência Estratégico Nacional).

The exploitation of results is carried out by means of R&D contracts, technology transfer and consulting and is playing an important role in the incubation of start-up companies. In this context it is worth mentioning the current partnerships with companies created by former researchers of INESC Porto, such as MOG Solutions, Nonius Software, Xarevision and Next to You.

2. Main Achievements (6000 ca)

The main achievements are tightly connected with R&D activities in projects and contracts, as well as with MSc and PhD theses supervised by senior researchers of the Unit. They are described in scientific papers, project reports and theses and resulted in a large number of prototypes.

The scientific results, summarized below, are in the form of new algorithms, methods, tools and systems; in most cases, prototypes have been developed for a proof of concept and integrated in platforms or testbeds, to support internal research or as demonstrators.

1. Media analysis

Framework for automatic music generation using gestural controllers

Real-time human body skeletonization algorithm for Max/MSP/Jitter

Creation of an automatic rhythm generator

Music similarity software modules based on music audio content

Algorithm for staff line detection in Optical Music Recognition Systems

Algorithm for text line detection in Optical Character Recognition Systems

Algorithm for the assessment of spatial segmentations of images and video

Algorithm for content-aware image retargeting

Method for estimation of musical rhythm by the analysis of human movements captured in video

Hybrid approach for evaluating object tracking algorithms

2. Multimedia systems

Ontology based context-aware and DRM-enabled approach for content adaptation decision taking in networked multimedia applications

Software modules for the MPEG MXM standard specification framework

Machine learning techniques applied to context-aware content adaptation

Metadata models for the digital cinema content value chain

3. Wireless Networks

NS-3 simulation framework for scalable multi-technology mobile wireless mesh networks (WMN)

Radio resource management for interconnected multi-technology wireless networks

Auto-configuration framework for scale-free static WMN

Key Distribution Technique for IPTV Services with Support for Admission Control and User Defined Groups

Scalable Public Key Infrastructure for disruption-tolerant networks

Cross layer optimized peer-to-peer video streaming over WMN

Cognitive stub WMN

4. Internet Architectures and Networking

New International workshop series triggered, User-provided Networking (U-NET), first edition co-located with ACM CoNext conference, Rome, December 2009

EIFFEL Support Action participation and coordination of a new field (user-provided networking)

System specification surveying advances in Ethernet forwarding

System to analyze the performance of relaying in comparison to multihop routing, for few-hop networks

Reactive Management system for Quality of Service in Multimedia OBS Networks Based on GMPLS

Quality of Experience and Quality of Service system for user-centric mesh networks

Framework for the deployment of user-centric wireless networks

Development of a multiple-metric approach for multihop routing

Seamless mobility of senders transmitting multi-user sessions over heterogeneous networks

5. Optical Communications and Microwaves

Assessment of Parallel Equalizer/Phase Estimation Algorithms in Coherent Optical Systems

Performance assessment of simplified back propagation equalization in single/multiple channel transmission

Performance assessment of OFDM signals in frequency-interleaved WDM radio-over-fiber (RoF) links

Performance evaluation of the linear minimum mean-squared error wireless channel estimator for OFDM signals in RoF applications

Printed fractal monopole antenna for WLAN applications

Algorithms in FPGA for signal estimation in coherent optical systems

Printed C-Shaped Monopole Antenna Array with High Isolation for MIMO Applications

6. Microelectronics

In-circuit Test and Correction of Non-linearities of Adaptive RF Transmitters

On-chip Measurement of RF Power

Influence of Parasitic Capacitances in Modeling Advanced Floating Gate Memory Devices

Design of radiation hard analog and mixed-signal ICs

Design, simulation, and electrical characterization of MEMS

Tools for runtime generation of partial FPGA configurations for embedded systems

Architecture and design of e-FPGAs

6c. Research Groups - Productivity

1. Publications in peer review Journals (6000 ca.)

Total number of publications: 13

List can be consulted in: <http://profile.inescporto.pt>

ALMEIDA, F., OLIVEIRA, J.M., CRUZ, J.M., "Paths to Innovate Business Models in an Economic Downturn", International Journal of Business and Management, vol.4, no.11, November 2009, p.29-37.

VIANA, P., PIMENTA ALVES, A., “A Semantic Management Model to enable the integrated management of media and devices”, *Multimedia Tools and Applications*, Springer, October 2009, p.1-26.

PESSOA, L.M., SALGADO, H., DARWAZEH, I., “Performance Evaluation of Phase Estimation Algorithms in Equalized Coherent Optical Systems”, *Photonics Technology Letters*, vol.21, no.17, September 2009, p.1181-1183.

CARDOSO, J.S., CARVALHO, P.M., TEIXEIRA, L.F., CORTE-REAL, L., “Partition-distance methods for assessing spatial segmentations of images and videos”, *Computer Vision and Image Understanding*, vol.113, no.7, July 2009, p.811-823.

CIOBANU, L., CORTE-REAL, L., “Successive refinement of side information for multi-view distributed video coding”, *Multimedia Tools and Applications*, July 2009.

SANTOS, A.P., RICARDO, M., “Header Compressed VoIP in IEEE 802.11”, *IEEE Wireless Communications Magazine*, vol.16, no.3, June 2009, p.69-75.

TEIXEIRA, L.M., CORTE-REAL, L., “Statistical Multiplexing of H.264 Video Streams Using Structural Similarity”, *Journal of Information Science and Engineering*, vol.25, no.3, May 2009, p.703-715.

GONÇALVES, H., GONÇALVES, J.A., CORTE-REAL, L., “Measures for an Objective Evaluation of the Geometric Correction Process Quality”, *IEEE Geoscience and Remote Sensing Letters*, vol.6, no.2, April 2009, p.292-296.

SOFIA, R., “A Survey of Advanced Ethernet Forwarding Approaches”, *IEEE Communications Surveys & Tutorials*, vol.11, no.1, January 2009, p.92-115.

TEIXEIRA, L.F., CORTE-REAL, L., “Video object matching across multiple independent views using local descriptors and adaptive learning”, *Pattern Recognition Letters*, vol.30, no.2, January 2009, p.157-167.

CAMPOS, M.J., CARDOSO, J.S., WILD, T., KROIS, W., FITZAL, F., “Comparing Two Objective Methods for the Aesthetic Evaluation of Breast Cancer Conservative Treatment”, *Breast Cancer Research and Treatment*, vol.116, no.1, p.149-152, July 2009.

CARDOSO, J.S., REBELO, A.M., GUEDES, C.A., PINTO DA COSTA, J., “Staff Detection with Stable Paths”, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol.31, no.6, p.1134-1139, June 2009.

TEIXEIRA, L.M., CORTE-REAL, L., “H.264 Rate-Distortion Analysis Using Subjective Quality Metric”, *Lecture Notes in Computer Science*, vol. 5630, p.248-253, June 2009.

RAY, S., GUÉRIN, R., KWONG, K-W., SOFIA, R., “Always Acyclic Distributed Path Computation”, *IEEE/ACM Transactions on Networking*. (*)

CAMPOS, R.L., DUARTE, R., SOUSA, F., RICARDO, M., RUELA, J., “Network Infrastructure Extension Using 802.1D-based Wireless Mesh Networks”, *Wireless Communications and Mobile Computing Journal*. (*)

(*) Accepted for publication

2. Other publications National (6000 ca.)

Total number of publications: 11

List can be consulted in: <http://profile.inescporto.pt>

CARVALHO, L.M, SOFIA, R., “A Performance Evaluation of Multihop Relaying vs. Multihop Routing”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

DEL MONEGO, H., OLIVEIRA, J.M., RICARDO, M., “Analyzing the Impact of Real and Non-Real Time Traffic on Joint Radio Resource Management”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

FERREIRA, M.L., QUEIRÓS, J.I., MORLA, R., “Automatic Retrieval of Network Traffic Data for Analysis of Network-In-World Action Relations in MMOGs”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

CAMPOS, R.L., DUARTE, R., SOUSA, F., RICARDO, M., RUELA, J., “WiFIX: A New Solution for 802.11-based Wireless Mesh Networks”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

OLIVEIRA, J., RODRIGUES, M., SALGADO, H., “MMSE Receivers for Non-Linearly Distorted OFDM Signals”, Conftel 2009 - Conference on Telecommunications, Santa Maria da Feira, Portugal, May 2009.

ALMEIDA, F., OLIVEIRA, J.M., CRUZ, J.M., “Risks of Migration to IMS and a Way to their Mitigation”, Conftel 2009 - Conference on Telecommunications, Santa Maria da Feira, Portugal, May 2009.

ALVES, P., FERREIRA, J.C., “Generation of Non-Rectangular Reconfigurable Cores for System-on-Chip”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009.

KANDASAMY, S., MORLA, R., RICARDO, M., “Improving the Performance of IEEE802.11s Networks using Directional Antennas over Multi-Radio/Multi-Channel Implementation - The Research Challenges”, DSIE 2009 - 4th Doctoral Symposium on Informatics Engineering, Porto, Portugal, Feb. 2009.

SALTA, N., MORLA, R., RICARDO, M., “Optimizing Video P2P Streaming over Wireless Mesh Networks”, DSIE 2009 - 4th Doctoral Symposium on Informatics Engineering, Porto, Portugal, Feb. 2009.

SILVA, M.L., FERREIRA, J.C., “Run-Time Generation of Configurations for Dynamically Reconfigurable”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009.

DAMÁSIO, E., FERREIRA, J.C., “Suporte para Reconfiguração Dinâmica Parcial em Linux”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009

3. Other publications International (6000 ca.)

Total number of publications: 28

List can be consulted in: <http://profile.inescporto.pt>

Selected papers from a total of 46

SOUSA, R.J., BARBERO, B., CARDOSO, J.S., “An Ordinal Data Method for the Classification with Reject Option”, ICMLA2009 - Eighth Int. Conf. on Machine Learning and Applications, Miami Beach, USA, Dec. 2009.

CARDOSO, J.S., “Stable Text Line Detection”, WACV2009 - IEEE Workshop on Applications of Computer Vision, Snowbird, USA, Dec. 2009.

ANDRADE, M.T., COSTA, A., "Enabling Semantic search in structured P2P Networks via distributed Databases and Web Services", WWW/Internet 2009 - IADIS Int. Conf., Rome, Italy, Nov. 2009.

VEIGA, R., MOTA, P.M., MACHADO DA SILVA, J., "Estimation of RF PA Nonlinearities after Cross-Correlating Power Supply Current and Output Voltage", DCIS 2009 - XXIV Conf. on Design of Circuits and Integrated Systems, Zaragoza, Spain, Nov. 2009.

LUO, Q., PEREIRA, J.R., SALGADO, H., "Fractal Monopole Antenna for WLAN USB Dongle", LAPC 2009 - Loughborough Antennas & Propagation Conf., Loughborough, UK, Nov. 2009.

CASTRO, H., ALVES, A.P., "Cognitive Object Format", KEOD 2009 - Int. Conf. on Knowledge Engineering and Ontology Development, Funchal, Portugal, Oct. 2009.

CARNEIRO, G., SANTOS, A.P., RICARDO, M., "FlowMonitor - a network monitoring framework for the Network Simulator 3 (NS-3)", NSTOOLS 2009 - Int. Workshop on Network Simulation Tools, Pisa, Italy, Oct. 2009.

DEL MONEGO, H., OLIVEIRA, J.M., RICARDO, M., "A Resource Management Strategy for Interconnected WLAN and UMTS Networks based on User Mobility, Call Renegotiation, and Call Reallocation", ISWCS'09 - Sixth Int. Symp. on Wireless Communication Systems, Siena, Italy, Sept. 2009.

SILVA, S.R., AMARAL, L.S., SIGAUD, C., SALGADO, H. et al, "Characterization of Semiconductor Lasers for Radiation Hard High Speed Transceivers", TWEPP'09 - Topical Workshop on Electronics for Particle Physics, Paris, France, Sept. 2009.

PÁSSARO, N., PINTO, A.A., RICARDO, M., et al, "Management of User Generated Multicast Sessions in IMS-based Networks", NGMAST'09 - Int. Conf. and Exhibition on Next Generation Mobile Applications, Services, and Technologies, Cardiff, UK, Sept. 2009.

DEL MONEGO, H., OLIVEIRA, J.M., RICARDO, M., "Performance Analysis of Joint Radio Resource Management Strategies for Beyond 3G Networks", NGMAST'09 - Int. Conf. and Exhibition on Next Generation Mobile Applications, Services, and Technologies, Cardiff, UK, Sept. 2009.

MOREIRA, A., MACHADO DA SILVA, J., TAO, G., "Influence of Parasitic Capacitances in Modeling and Analysis of Advanced Floating Gate Memory Devices", IPFA 2009 - 16th IEEE Int. Symp. on Physical and Failure Analysis of Integrated Circuits, Suzhou, China, July 2009.

MADISON, G., GOUYON, F., ULLEN, F., "Musical Groove is Correlated With Properties of the Audio Signal as Revealed by Computational Modelling, Depending on Musical Style", SMC 2009 - 6th Sound and Music Computing Conf., Porto, Portugal, July 2009.

CAMPOS, R.L., RICARDO, M., "A New Efficient Mechanism for Establishing IP Connectivity between Ambient Networks", ICC 2009 - IEEE Int. Conf. on Communications, Dresden, Germany, June 2009.

VEIGA, R., MOTA, P.M., MACHADO DA SILVA, J., "Estimation of RF PA non-linearities after cross-correlating power supply current and output voltage", IMS3TW '09 - IEEE 15th Int. Mixed-Signals, Sensors, and Systems Test Workshop, Scottsdale, USA, June 2009.

COELHO, D., SALGADO, H., "OFDM Signals in WDM Radio-Over-Fiber Networks with Fiber Bragg Grating Selection", ICTON 2009 - 11th Int. Conf. on Transparent Optical Networks, Azores, Portugal, June 2009.

PESSOA, L.M., SALGADO, H., DARWAZEH, I., "Simplified Backpropagation Equalization in WDM Coherent Polarization Multiplexed Systems", ICTON 2009 - 11th Int. Conf. on Transparent Optical Networks, Azores, Portugal, June 2009.

CARRERAS, A., ANDRADE, M.T., BARBOSA, V.H., DOGAN, S., et al, "Contextual Information in Virtual Collaboration System beyond Current Standards", WIAMIS 2009 - 10th Int. Workshop on Image Analysis for Multimedia Interactive Services, London, UK, May 2009.

BARBOSA, V.H., ANDRADE, M.T., "MULTICAO: A Semantic Approach to Context-aware Adaptation Decision Taking", WIAMIS 2009 - 10th Int. Workshop on Image Analysis for Multimedia Interactive Services, London, UK, May 2009.

ALVES, P., FERREIRA, J.C., "Non-Rectangular Reconfigurable Cores for Systems-on-Chip", MNM 2009 - SPIE Europe: Conf. on Microtechnologies for the New Millenium, Dresden, Germany, May 2009.

VELOSO, L., CERQUEIRA, E., MENDES, P., MONTEIRO, E., "Seamless Mobility of Senders Transmitting Multi-user Sessions over Heterogeneous Networks", WWIC09 - Wired / Wireless Internet Communications, Twente, The Netherlands, May 2009.

SARMENTO, L., GOUYON, F., OLIVEIRA, E., "Music Artist Tag Propagation with Wikipedia abstracts", ECIR 2009 - European Conf. on Information Retrieval, Toulouse, France, April 2009.

KONDOZ, A., DOGAN, S., PEREIRA, F., ANDRADE, M.T., RUELA, J., et al, "Visual Media - Coding and Transmission", Wiley, May 2009.

SARMENTO, L., GOUYON, F., COSTA, B., OLIVEIRA, E., "Visualizing Networks of Music Artists with RAMA", WEBIST 2009 - 5th Int. Conf. on Web Information Systems and Technologies, Lisbon, Portugal, March 2009.

OLIVEIRA, H.F., CARDOSO, J.S., "Image Retargeting Using Stable Paths", VISAPP2009 - Int. Conf. on Computer Vision Theory and Applications, Lisbon, Portugal, Feb. 2009.

CARDOSO, J.S., SOUSA, R.J., TEIXEIRA, L.F., CAMPOS, M.J., "Breast Contour Detection with Stable Paths", BIOSTEC08 - Int. Joint Conf. on Biomedical Engineering Systems and Technologies, Funchal, Portugal, 2009.

NAVEDA, L., GOUYON, F., GUEDES, C.A., LEMAN, M., "Multidimensional microtiming in Samba music", SBCM 2009 - 12º Simpósio Brasileiro de Computação Musical, Recife, Brasil, Sept. 2009.

FARIAS, F., ESTEVES, R., MOREIRA, W., ABELÉM, A., STANTON, M., "Reactive Management of Quality of Service in Multimedia OBS Networks Based on GMPLS", EuropeComm 2009 - First Int. ICST Conf. on Communications Infrastructure, Systems and Applications in Europe, London, UK, Aug. 2009.

4. Master and PhD thesis completed (3000 ca.)

Authored by members of the Unit

PhD Theses

ABRANTES, F., Explicit Congestion Control Algorithms for Time-Varying Capacity Media (*)

MARTINS, L.G., A computational framework for sound segregation in music signals (*)

CALISTRU, C., Data organization and search in multimedia databases

TEIXEIRA, L.F., Contributions for the Automatic Description of Multimodal Scenes (*)

MSc Theses

BALTAZAR, A.M., Extraction of rhythmic information of dance movement by means of a video signal (P) (*)

ALMEIDA, J.F., Secure domestic networks (P) (*)

CARVALHO, L.M., User-provided Networks: Relaying vs. ad-hoc routing (*)

LOPES, M.A., Automatic classification of Latin music (*)

Supervised by members of the Unit (out of 47)

MSc Theses

FERNANDES, A.M., Mobile Environment Context Agent

MONTEIRO, B.M., Linux support for dynamic reconfiguration of hardware (P)

BARBOSA, F.A., Integration of Web services in Peer-to-Peer clients (P)

BASADRE, F.N., Integration of flash memory units in embedded systems over FPGA platforms (P)

REBOREDO, H.P., Processing of Turbo signal in optical communications systems (P)

RODRIGUES, N.J., Wireless Mesh Networks in Metropolitan Scenarios

ALVES, P.M., Flexible programmable cores for SOC applications

OLIVEIRA, P.M., Service integration in multi-use communications platforms (P)

MOREIRA, A.V., Comparative study of CMOS low-power multipliers (P)

CORTEZ, A.M., Design, simulation, and electrical characterization of mechanically moving components (MEMS) in SOI

MOREIRA, A.R., Reliability of Non-Volatile Devices during Process Development

FERNANDES, A.J., System for dissemination of energy consumption (P)

RESENDE, C.A., Real-time correspondence processor between stereo images (P)

CARRAPA, D.G., Mobile Router

OLIVEIRA, D.J., CMOS-RF Power Amplifier for Wireless Communications

SILVA, F.A., DIP based MPEG-21 Player

SOUSA, F.J., Radiation Tolerant Low power 12 bit ADC in 130 nm CMOS technology

LOPES, F.M., Fractal antenna for applications in wireless networks (P)

RODRIGUES, J.G., Rectification of stereo images in an FPGA-based embedded system (P)

SANTOS, J.P., Implementation of optical flow algorithms in FPGA platforms (P)

PINHEIRO, M.S., Web system for the recognition of music scores (P)

PINA, M.A., Adaptive filter of switched capacitors (P)

PINTO, N.J., FPGA-based implementation of signal estimation algorithms for optical coherent systems (P)

MAIA, P.M., Authentication of Wi-Fi networks based on DNSSEC (P)

SANTOS, P.M., FPGA-based system for detecting hand position using stereo images (P)

VEIGA, R.A., In-circuit observation of the distortion on an RF amplifier (P)

VIDAL, R.J., System for the calibration of temperature sensors based on fibre optic Bragg gratings (P)

FRAGA, S.D., Monitoring of multimedia processes (P)

SÁ, S.M., Predictive Multimedia Content Adaptation

ANTUNES, V.H., Web 2.0 frontend for RADIUS management (P)

RAMOS, D.F., Scheduling algorithm for QoS differentiation in MPLS / DiffServ networks (P)

(P) In Portuguese

(*) Also supervised by members of the Unit

5. Patents/prototypes (2000 ca.)

Prototypes

(demos at INESC Porto)

RAMA - Relational artist maps (web-based application for visualizing and interacting with networks of music artists) / on-line at <http://rama.inescporto.pt>

Automatic music generation using a Wii remote controller (with run-time control of tempo and density of events)

Prototype for adding groove to musical signals

Music recommender, integrated in the web portal of Palco Principal / on-line at <http://www.palcoprincipal.com>

Staff line detection and removal workstation for Optical Music Recognition Systems
Workstation for text line detection in Optical Character Recognition Systems

Platform for the assessment of spatial segmentations of images and video

Platform for image retargeting

Context-aware adaptation decision mechanism based on MPEG-7, MPEG-21 and ontologies

Simulation platform based on machine learning techniques to predict context changes and automatically adapt video content in multimedia networked applications

Configurable test platform to browse multimedia content represented as MPEG-21 Digital Items

Metadata management system to convert between metadata formats applied to digital cinema

Opportunistic routing protocol for vehicular networks

Peer-to-peer video streaming over WMN

Home gateway for secure, customer-defined, friend-to-friend overlay networks

Autoconfiguration and self-management solution for PANs

WiFix - WMN for extending infrastructure networks

Authentication of Wi-Fi networks based on DNSSEC
Simulator for routing in large scale networks

Printed fractal monopole multiband antenna for wireless LAN applications

Algorithms in FPGA for signal estimation in coherent optical systems

Printed C-Shaped Monopole Antenna Array with High Isolation for MIMO Applications

Orthomode transducer for Ku-band VSAT applications

Transmit-reject filter for Ku-band VSAT applications

Cylindrical horn for Ku-band VSAP applications

RAFTPA (Radio-Frequency Testable Power Amplifier) integrated circuit
Wireless readout of biomedical signals

6. Organization of Conferences (2000 ca.)

Organization of SMC 2009 - 6th Sound and Music Computing Conference and SMC Summer School, Porto, Portugal, July 2009

SMC 2009 - General Chair, Scientific Programme co-chair, Music Programme co-chair (F. Gouyon)

DCIS 2009 - XXIV Conference on Design of Circuits and Integrated Systems, Zaragoza, Spain, November 2009 (J.S. Matos - member of Steering Committee)

U-NET 2009 - Organization of the 1st edition of the international workshop "User-provided Networks, Challenges and Opportunities", in Rome, together with CoNext09 (R. Sofia, P. Mendes). The programme covered the presentation of 7 scientific publications and a discussion panel "UPNs: challenges and opportunities", <http://conferences.sigcomm.org/co-next/2009/workshops/unet/>

3rd EIFFEL Think-tank meeting, Athens, Greece, October 2009 - session "BYON: Build Your Own Network" (P. Mendes - session chair). EIFFEL is a Support Action dedicated to mobilizing researchers and experts in Europe and beyond in regards to the development of a Future Networked Society; discussions and debates are present and can be commented on Flpedia.

CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009, discussion panel on Future Internet (R. Sofia), <http://crc2009.inesc-id.pt/Painel+Discussao>

REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009 (J.C. Ferreira - member of Organizing Committee)

RTCM (National Thematic Network in Mobile Communications) - 9th and 10th Workshops, Covilhã, Februray 2009 and Porto, June 2009 (M. Ricardo - member of Organizing Committee)

Researchers of the Unit were members of Technical Program Committees of over 20 national and international conferences and reviewers of scientific papers in international journals and conferences. Networking 2008.

7. Industry contract research (2000 ca.)

1) Two research contracts with PT Inovação aimed at technology development and transfer and advanced training:

GrCLIFmcast - management of multicast sessions for IP based services created by users; ended in February 2009

ASP Domestic Networks - Authentication, Security and Privacy solutions for Domestic Network services; started in March 2009

2) Nine on-going projects with industrial partners in the framework of QREN (Quadro de Referência Estratégico Nacional), which started by the end of 2008 or during 2009

PALCO 3.0 - Intelligent Web system for supporting the management of music social networks, with Palco Principal (also involving other research groups of INESC Porto); started in December 2008

SEMANTIC PACS - Semantic Picture Archiving Communication System, with Emílio Azevedo Campos; started in January 2009

AHRS - Attitude-Heading Reference System based on MEMS technology, with Spin.Works; started in October 2008

RECOOP - Cooperative wireless networks, with NONIUS Software; started in January 2009

MOBILES -Sustainable electric mobility (with electric vehicles), with Ndrive, Inteli and CEIIA (also involving other research groups of INESC Porto); started in June 2009

Communications system with redundancy and soft degradation of QoS - advanced consulting to a start-up company (NextToYou); started in December 2009

SWIOP - Intelligent and secure webmail system, with Portugalmail; started in September 2009

SITME - Metropolitan multi-technology wireless network for public transportation systems, with Xarevision (INESC Porto spin-off) and STCP (public transportation company); started in September 2009

VSAT-1 - Development of devices for Ku-band Very Small Aperture (VSAT) applications, with SINUTA; started in April 2009

8. Government/Organization contract research (2000 ca.)

Projects funded by FCT (active in 2009):

BCTT - Advanced objective method for the evaluation of the aesthetical result of breast cancer conservative treatment

OMR - Optical Music Recognition of handwritten musical scores

ROFWDM - Design and Optimisation of WDM Millimeter-Wave Fibre-Radio Systems

DR-VidS - Dynamic management of reconfigurable logic resources for real-time foreground/background video segmentation

VECTOR - Software compilation and hardware synthesis tools for automatic translation of MATLAB applications into high-performance custom designed vector processors

MuMoMgt - Multicast and mobility management in heterogeneous access networks

KINETIC - Controller driven adaptive and dynamic music composition systems, in the framework of the programme with University of Texas at Austin

9. Internationalization (2000 ca.)

The participation in a number of projects funded by research programmes of the European Union (listed below) allowed consolidating the position of the Unit at international level and establishing strategic partnerships with leading R&D institutions in Europe.

In the framework of the research activities carried out on these projects, a large number of joint papers with researchers of other institutions were published.

1. European Projects (active in 2009):

VISNET II - Networked audiovisual media technologies (Network of Excellence) - FP6 IST programme, ended June 2009

EDCINE - Enhanced Digital Cinema - FP6 IST programme, ended June 2009

ACEOLE - Data Acquisition, Electronics, and Optoelectronics for LHC Experiments (with CERN) - Marie Curie Initial Training Network programme

DAPHNE - Developing Aircraft PHotonic Networks - FP7 ICT programme, started September 2009

TOETS - Towards One European Test Solution - CATRENE (Cluster for Application and Technology Research in Europe on NanoElectronics) / EUREKA programme

2. INESC Porto hosted short-term scientific missions via the SID (Sonic Interaction Design) COST Action and the FCT/CAPES convention (involving some Brazilian research institutions)

- Participation in the European EIFFEL Support Action (<http://www.fp7-eiffel.eu/home.html>); INESC Porto coordinates and contributes to the topic “user-provided networking”
- Participation in the eMobility platform (<http://www.emobility.eu.org/>); participation in the Post-IP group
- Organization of U-NET 2009 workshop, theme “user-provided networking”, co-located with ACM CoNext 2009.
- Disruptive Network Architectures - cooperation with University of Pennsylvania, USA (Prof. Roch Guerin); includes exchange of researchers and of know-how
- Routing in DTNs - cooperation with Columbia University, USA (Prof. Henning Schulzrinne); includes exchange of researchers and of know-how

6d. Research Groups - Future Research

1. Objectives (6000 ca.)

Some general and common goals will be pursued at Unit level:

- strengthening management and leadership skills and the links between the Areas;
- achieving a high-level of scientific excellence, measured by means of objective indicators;
- establishing strategic partnerships, based on existing scientific and technological know-how.

The Unit will continue to host MSc and PhD students and post-doc researchers, with active involvement in research projects.

Scientific and technical results will be exploited in research contracts with the industry, in particular in the framework of QREN (Quadro de Referência Estratégico Nacional).

The Unit will continue to encourage and help the incubation of new start-up companies and to reinforce the cooperation with former ones.

The specific objectives of each Area are detailed next.

Research in Multimedia Technologies and Systems will address knowledge-based multimedia systems, along two main lines - services in networked heterogeneous environments and media learning. The first includes research in content adaptation strategies based on ontologies, service presentation adaptation, QoS and context-aware service delivery, semantic content search in P2P networks, semantic Web Services, new business models with DRM. The second covers such topics as knowledge extraction from raw data, empirical learning, automatic semantic analysis and mining, community building tools.

Research in Wireless Networks will be focused on designing and evaluating new architectural solutions for well-identified problems in this field, with the purpose of extending-infrastructure networks and enabling the emergence of networks of “things”. The main problems being addressed include moving (sub)networks, multi-homing (including load sharing and flow distribution), cross layer mobility, cognitive (radio aware) networks, radio planning and network congestion avoidance, scalable routing techniques aware of network congestion, very large mesh networks, auto-configuration of networks and network elements, efficient and secure support of new types of traffic (IPTV, peer-to-peer applications, Web-based services).

IAN is focused on the analysis and development of disruptive Internet paradigms, namely, novel Internet architectures and functionality where the user is an active player and a provider of services, assuming as starting point the current Internet architectures and user requirements. Hence, three main R&D tracks are considered in IAN, being the topics within such tracks addressed from an OSI Layer 2 and 3 perspectives. The research to be developed in IAN follows a two-fold scientific-technologic methodology. Having a long-range (10 year) perspective, IAN explores new technologies and advanced architectures, as well as disruptive communication models. On a short-range perspective (1-3 years) IAN fosters synergies with industry and relevant international research entities. The balanced coordination of industry awareness and exploitation of new technologies with devising disruptive Internet architectures aims at opening new horizons in scientific and technological fields: disruptive technologies are normally left aside by industry due to the high risk they embody, but nonetheless are crucial in what concerns opening new market fronts and impacting the way technology is perceived (and applied) by society. Indicators of success include: patents, projects, journal and conference publications, MSc and PhD theses, event organization, degree of internationalization.

Research in Microwaves and Optical Communications will continue along the main topics already under study: design and optimization of fibre supported microwave and radio systems, investigation of fractal geometries combined with EBG (Electromagnetic Band-Gap) techniques for the development of small size microstrip antennas suitable for multiband operation in wireless applications, application of signal processing techniques for coherent optical communication systems. Two new related topics will be added: passive optical networks (PONs), to integrate fixed and wireless services in the access network using radio-over-fiber techniques, and modelling of surface plasmon resonance in optical fibers, for signal processing in optical communications.

Research in Microelectronics will continue along the three main lines outlined in the first section. Research on dynamic reconfigurable logic (DRL) will continue to address the area of application development support and current work on run-time assembly of reconfigurable modules (including on-line routing) will be expanded. 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. The activity on testing and design for testability of analog and mixed-signal circuits will progress with the design of microsystems for medical applications. The design and test of RF circuits is being extended to the design for testability of wireless sensor networks and NFC (near field communication) applications. The design and test of circuits for radiation environments is being conducted in order to include self-test and self-calibration in order to improve their reliability and durability.

1. Funding, source, dates (1500 ca)

(indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	256.543,32 €
European Commission	157.000,00 €
QREN	134.481,73 €
TOTAL	548.025,05 €

6. Research Groups

Research Group Title	RG-NORTE-50014-3348 OPTOELECTRONICS AND ELECTRONIC SYSTEMS
Principal Investigator	José Luís Campos de Oliveira Santos
Research Area	Physics
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	141.221,88 €
European Commission	25.457,74 €
QREN	29.187,66 €
TOTAL	195.867,28 €

6b. Research Groups - Objectives & Achievements

1. Objectives (4000 ca.)

In September 2009, a new Principal investigator has been appointed to this RG by the Board of Directors of INESC Porto: Prof. Paulo Vicente da Silva Marques. This information could not be inserted in the report in the proper place because the on-line form of FCT did not allow it.

The roots of this Unit (named UOSE) go back to 1985, when INESC Porto was funded in the context of the realization of a large project in optical communications. Along the years the activity was developed along several research areas following its established mission to perform internationally recognized research, development and training in Optoelectronics.

The research objectives embrace modelization, design, process development and Optoelectronics integration. The following areas were addressed in a chain that proceeded from technology to systems and applications:

- Fabrication of thin films, planar optical devices and fibre optics components;
- Interferometric based optical imaging;
- Optical sensing heads and some types of electrical sensing heads based on thin films;
- Fibre lasers for sensing;
- Optical fibre sensing systems; field tests and applications.

- Photovoltaics technologies: thin films for conventional and concentrated systems and organic dyes for BIPV (building integrated photovoltaics) applications
- Harvesting technologies and wireless power transfer for remote and unattended sensors

Specific objectives involved the acquisition of operational competences in those areas, the establishment of attractive post-graduated programmes, and the development of consultancy and technology transfer initiatives.

Broadly, the actual scientific objectives are pretty much the same as the ones defined for the last period but there are substantial changes and advances; for example in the field of optical sensing there has been a lot more research for new type of optical sensors that can detect other parameters than the more traditional strain, temperature, curvature, etc. The Group has been investing in the in-house development of novel competencies in multidisciplinary subjects that allow the development of these biosensors. These include, beyond the already established competencies (mainly in fiber optics & optoelectronics) new perspectives in materials science, chemistry and microfabrication.

In the last couple of years the Group was particularly active in pursuing another important objective which is related to the enhancement of relations with the local industry, following the nature of the institution centered in the interface between academia and industry. Several applications were submitted to the national initiative QREN. From this actions a total of two projects were approved: one in the area of electrodes for wearable textiles and the other in the full life-cycle monitoring of competition kayaks structural health.. These projects had their start during 2009 and are currently being executed. A positive evaluation of these actions has been taken. Another project in the area of photovoltaic cells was approved but it is due to start in early 2010.

Another important objective for 2009 and subsequent years was to strengthen the international relations, with special focus on European research groups/companies. The final aim is to promote a healthy scheme of student/researchers exchange schemes allied to a much higher level of participation in European projects.

Broadly, for the next three year period, the objectives is to continue to maintain a good balance between research and development; the success is achieved if the Group maintains a good level of participation in international conferences and a high standard of scientific publications allied to a good number of industrial contracts.

2. Main Achievements (4000 ca)

In this period the development of an interdisciplinary attitude within the Unit was always a strategic target in view of the objectives demanded. It built up properly, and constitutes nowadays a clear added-value for the Unit R&D enterprise. It is therefore stated as a strategic main achievement.

- Large scale test facility for long-term reliability evaluation of FBG strain sensors embedded in concrete
- Fibre Bragg Gratings as Interrogation Elements for Surface Plasmon Resonance Sensors
- Hybrid sol-gel planar optics and rapid prototyping of integrated optics beam combiners for astronomical interferometry
- Mechanical characterization of bone cement and crack zone identification in a cemented femoral implant using fiber Bragg grating sensors

- Novel developments of nonlinear effects for optical sensing based on Raman/Rayleigh scattering
- All-fiber hybrid interferometers
- Novel optical fiber geometry designs for sensing purposes (H-shaped, suspended twin core fiber, as examples)
- Wireless power transfer demonstration unit
- Fabrication of Carbon quantum dots by laser ablation
- Use of luminescent carbon dots in sensing applications
- Development of composite luminescent materials for detection of oxidative species
- Development of quantum dot based analytical imaging techniques
- Implementation of interferometric acetic acid sensor for biotechnology application
- Development of virtual instrumentation applications (for frequency domain spectroscopy and interferometry)
- Development of simple, high sensitivity, multiplexable, interrogation scheme for LPG based sensors
- Fabrication of Bragg gratings in pure silica suspended core fibers
- Fabrication of waveguides in pure silica through femtosecond laser writing
- Fabrication of integrated polarizers based on directional couplers fabricated in pure silica plates by direct writing
- Fabrication of refractive index sensors in slotted multimode integrated devices for chemical and biochemical sensing
- Fabrication of sub-micrometer gap coupler refractometric sensor
- Modelization and demonstration of effects of dispersion in coaxial mutlibeam combiners for astronomical interferometry.
- Extrinsic and intrinsic fiber optic interferometric sensors for acoustic detection in high-voltage environments
- Laser Direct Writing of integrated Arrayed Waveguide Gratings (AWG) for dense wavelength multiplexing
- Optical fiber sensor for hydrogen and metals
- CdS/CdTe thin film second generation solar cell prepared by RF magnetron sputtering
- Manganite multiferroics thin films prepared by chemical solution deposition
- Optimization process of sol-gel hybrid channel waveguide Bragg gratings patterned using a single photolithographic step.

- Field-Effect transistor based on hybrid sol-gel material interstate for optic and electronic integration
- Sol-gel channel Bragg gratings fabrication using a single photolithographic step
- Development of glasses doped with rare-earth ions
- Development of glasses for biomedical applications (prosthesis)

One outcome of this R&D activity and related achievements was the publication record of the Unit in this period, which stands to 31 works published in international journals and 57 presentations in international and national conferences.

6c. Research Groups - Productivity

1. Publications in peer review Journals (6000 ca.)

Total number of publications: 31

List can be consulted in: <http://profile.inescporto.pt>

Due to characters limitation only the most relevant papers are listed here.

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CALDAS, P., JORGE, P., ARAÚJO, F., FERREIRA, L.A., REGO, G., SANTOS, J.L., "Geometrical effects on the refractive index sensitivity of Mach-Zehnder fibre modal interferometers based on long-period gratings", Measurement Science & Technology, July 2009, vol.20, p.75201-75201.

TAFULO, P.A., QUEIRÓS, R., AGUILAR, G., "On the "concentration-driven" methylene-blue dimerization", Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, July 2009, vol.73, no.2, p.295-300.

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2. Other publications National (6000 ca.)

Total number of publications: 15

List can be consulted in: <http://profile.inescporto.pt>

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CARVALHO, J., MAGALHÃES, F., ARAÚJO, F., SANTOS, J.L., FERREIRA, L.A., "Optoelectronic sensing system based on wavelength modulation spectroscopy for methane detection", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

AREF, S.H., CARVALHO, J., AMEZCUA-CORREA, R., FRAZÃO, O., CALDAS, P., SANTOS, J.L., ARAÚJO, F., LATIFI, H., FARAHI, F., FERREIRA, L.A., KNIGHT, J.C., "Sensing Characteristics of Modal Interferometers based on HC-PCF", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

BAPTISTA, F.D., GUERREIRO, A., CALDAS, P., GOMES, L., "Simulation of Long Period Fibre Gratings", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

REGO, G., CALDAS, P., SANTOS, J.L., "Simulation of the transmission spectra of long-period gratings induced in pure-silica-core fibers by arc discharges", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

VELOSA, J.E., GOUVEIA, C.A., FRAZÃO, O., JORGE, P., BAPTISTA, J.M., SANTOS, J.L., "System for interrogation of interferometric optical fiber sensors with digital control", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

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3. Other publications International (6000 ca.)

Total number of publications: 12

List can be consulted in: <http://profile.inescporto.pt>

LEITÃO, P., MARQUES, M.J., "Reliability of a line-of-view sensor for recycling point waste containers", ISWA2009 - ISWA/APESB World Congress 2009, October 2009, Turning Waste into Ideas ISWA/APESB2009 World Congress. Book of Abstracts. José M. P. Vieira, Paulo, Lisboa, Portugal, p.119-120.

DIAZ-HERRERA, N., NAVARRETE, M.C., GONZALEZ-CANO, A., VIEGAS, D., ESTEBAN, Ó., "Nuevas Herramientas de Producción e Interrogación de Sensores de Fibra Óptica Basados en Resonancia de Plasmones Superficiales", RNO 9 - VI Reunión Nacional de Óptica, September 2009, Ourense, Espanha.

MAGALHÃES, F., CARVALHO, J., SANTOS, J.L., ARAÚJO, F., FERREIRA, L.A., "DEVELOPMENT OF AN OPTOELECTRONIC GAS MONITORING UNIT BASED IN WAVELENGTH MODULATION SPECTROSCOPY", IRF2009 - INTEGRITY - RELIABILITY - FAILURE CHALLENGES AND OPPORTUNITIES , July 2009, paper: S0213_A0381, Porto, Portugal.

FRAZÃO, O., FRIAS, C., NOVO, C., DIAS, I., BAPTISTA, J.M., T. MARQUES, A., "Novel sensing head geometry based on smart composite with embedded FBGs for strain and temperature discrimination", SMART09 - International Conference Smart Structures and Materials, July 2009, Porto, Portugal.

DIAZ-HERRERA, N., VIEGAS, D., NAVARRETE, M.C., JORGE, P., GONZALEZ-CANO, A., ARAÚJO, F., SANTOS, J.L., "Nuevo método de interrogación para sensores SPR basado en redes de Bragg", OPTOEL'09 - VI Reunión Española de Optoelectrónica, July 2009, Málaga, Espanha.

FRAZÃO, O., SILVA, S.O., FRIAS, C., BAPTISTA, J.M., T. MARQUES, A., "Curvature sensor based on a fibre Bragg grating embedded in a laminated composite", ICCS15 - 15th International Conference on Composite Structures, June 2009, Porto, Portugal.

QUEIRÓS, R., NORONHA, J., SALES, M.G., AGUILAR, G., "(Bio)Sensors for detection/quantification of aquatic bacterial contamination in waters for Human use ", NN09 - 6th International Conference on Nanoscience and Nanotechnology 2009, Thessaloniki, Greece.

MARQUES, P., KHORDONI, A., ALEXANDRE, D., REYNAUD, F., GARCIA, P., LEITE, A., "Integrated hybrid sol-gel devices for astronomical interferometry", ICTON 2009 - 11th International Conference on Transparent Optical Networks 2009, Island of S. Miguel, Azores, Portugal.

REGO, G., CALDAS, P., JORGE, P., IVANOV, O., SANTOS, J.L., "Investigation of Long Term Stability of Arc-Induced Gratings Annealed at High Temperatures", IRF2009 - INTEGRITY - RELIABILITY - FAILURE CHALLENGES AND OPPORTUNITIES 2009, Porto, Portugal.

QUEIRÓS, R., SALES, M.G., NORONHA, J.P., AGUILAR, G., "Modelos teóricos supramoleculares para el diseño de sensores de cianotoxinas " [Supramolecular theoretical models for designin cyanotoxins sensors], CIC 2009 - I Congresso Ibérico de Cianotoxinas 2009, Porto, Portugal.

QUEIRÓS, R., SALES, M.G., NORONHA, J.P., AGUILAR, G., "Sensores para detecção/quantificação de cianotoxinas em águas de uso e consumo Humano " [Sensors for detecting/quantifying cyanotoxins in water for human use], CIC 2009 - I Congresso Ibérico de Cianotoxinas 2009, Porto, Portugal.

CALDAS, P., JORGE, P., ARAÚJO, F., FERREIRA, L.A., REGO, G., SANTOS, J.L., "Whispering Gallery Modes: Device Fabrication and Sensing Applications.", IRF'2009 - INTEGRITY - RELIABILITY - FAILURE CHALLENGES AND OPPORTUNITIES 2009, Porto, Portugal.

4. Master and Ph. D. thesis completed (3000 ca.)

1) Thesis completed by members of the unit

Member of the Unit: Orlando José dos Reis Frazão

PhD thesis, Optical Fibre Sensors Based on Non-Linear Effects, FCUP

Member of the Unit: Carlos Avelino de Jesus Gouveia

MSc thesis, Title, Univ. da Madeira

2) Other thesis supervised by members of the group.

Member of the Group: José Luís Santos

PhD thesis, Orlando José dos Reis Frazão, Optical Fibre Sensors Based on Non-Linear Effects, FCUP

Member of the Group: José Manuel Baptista

MSc thesis, Carlos Avelino de Jesus Gouveia, Title, Univ. da Madeira

5. Patents/prototypes (2000 ca.)

National patent

- Interferómetro híbrido em fibra óptica, Orlando José dos Reis Frazão

Prototypes

- Interrogation unit for gas sensing
- Optical fiber torsion sensor
- Strain and temperature sensor based in a modal interferometer design
- Refractometers based on end of fiber polymer tips (Fabry-Perot cavities)
- Refractometer based on FBG in a H-shaped fiber
- Novel smart composite structures for sensing heads
- Laser direct writing unit

- Prototypes of methane gas detection based in photonic crystal fibers and wavelength modulation spectroscopy for application in the environmental area

6. Organization of Conferences (2000 ca.)

The Research Group was involved through several of its members in the Committees of SEON 2009 Symposium on enabling networks and sensors that took place at Lisbon. The workshop had the participation of 50 national and international researchers. The program included invited speakers and poster sessions

7. Industry contract research (2000 ca.)

The Unit continued the contract with Fibersensing in the framework of its first phase of development. Consultancy in monitoring systems for critical infrastructures and perimetric security and the development of an experimental monitoring system for land sliding to be used in transport infrastructure were the subjects considered.

In the framework of the European Space Agency, specifically Flight Hardware Activities and Long-Term Research and Development, the Unit managed to get a contract R&D project, on a competitive basis (ESA Announcement of Opportunity 1-4669/05/NL/HE). The ESA-ONE project is dedicated to technology development for integrated micro-optic filter to address optical signal detection in LIDAR applications. The research program will target future development of spaceborne LIDAR systems, thus providing a compact rugged integrated package with minimal size, weight, and power requirements but still fulfilling mechanical and thermal constraints for space applications.. The project objectives were completely fulfilled and presented in a formal session at ESA Headquarters.

Other projects are related to contracts within QREN. MEMIMETRIA is focused in the production of an industrial prototype for thin films characterization using interferometric imaging setups. The special requirements are related to the high speed for assembly line monitoring and the necessity to withstand the industrial environment. SENSKANOE aims at including optical fibers sensors in kayaks to determine the distribution of strain in the structure. The partner company supplies the finest products to more than 80% of the Olympic teams. The project E-TÊXTEL developed the production of polymeric fibres than can change their resistivity under deformation. These fibres have the correct mechanical characteristics to endure the process installation and operation within smart textiles (patient movement monitoring, for example).

8. Government/Organization contract research (2000 ca.)

In 2009 the RG was involved in 13 R&D national projects. Of these, 2 dealt with microfabrication, 8 with optical fibre sensors principles and applications, 2 with monitoring of biomedical signals and the other is an application in the optical fiber communications area. Microfabrication projects developed fundamental technology for sensors and communications devices in optical fiber and integrated optics that will enable further development. Developments included add-drop multiplexers for optical communications, and piezoelectric films in optical fibers for sensing and actuation. The sensor projects were dedicated to applications in acoustic emission detection by optical fibers, salinity and temperature monitoring in the geophysical domain, characterization of optical fiber sensing heads for civil engineering applications, measurement of carbon dioxide in algae cell culture, measurement of dissolved oxygen by fluorescence and biochemical sensors. The biomedical signals projects intend to acquire meaning from physiological signals obtained from image processing and embedded smart textiles sensors.

FCT projects (name and coordinator):

- AMDRAPHYD, Adv. Monitoring and Diagnostics of Ria de Aveiro Physical Dynamics, P. Jorge
- OPTIC-ALGAE, Hybrid photobioreactors, containing microstructured OPTICal fibres Aimed at operating with microalgae, J. M. Baptista

- WELDING, Fiber Bragg grating sensors for modeling of friction stir welding and Laser beam welding, O. Frazão
- BIOPELVIC, Study of Female Pelvic Floor Disorders, L. A. Ferreira
- ENDURANCE, Long-Term Reliability of Fiber Bragg Grating Sensors for Structural Health Monitoring in Civil Eng., F. Araújo
- AMBISENSE, Monit. remota de parâmetros ambientais através de sens. fibra óptica, J. L. Santos
- MOTION, Monitoring and compensaTion of Impairments in Opt. Networks, O. Frazão
- NANOCRYSTALLINE, New nanocrystalline glass ceramics with non linear optical properties, M. J. Marques
- OREO2, Self-patternable organic/inorganic hybrids for low cost integrated optics devices, P. V. Marques
- SenRONS, Dev. of optical fiber sensors for the determination of reactive oxygen and nitrogen species in boil. systems, P. Jorge
- SMARTBIO, Hip femoral prosthesis for in vivo loosening data acquisition, O. Frazão
- BIOMOTION, Perception of biological motion - integrating psychophysics, neurophysiology and computational modeling, M. Correia
- BIOSWIM, Body Interface System based on Wearable Integrated Monitorization, M. Correia

9. Internationalization (2000 ca.)

In international terms, the main contribution of the Group was the participation on the large European consortium NextGenPCF. This project was concluded in the fall of 2009 with all the objectives stipulated for the research unit achieved, and as such it was a success.

However, Internationalization is a point where the Unit has been trying to enhance its performance with the ultimate goal of being involved in more international projects. In this context two main actions were strategically adopted during 2009: active participation in COST actions and in bi-lateral cooperation schemes involving the group and other international research groups, with special focus on European groups (an example is the recent cooperation with Chalmers University of Technology, Sweden). However, it should also be mentioned the strong collaboration with Brazilian groups, which is part of a more general internationalization action of INESC Porto. As a result several proposals are under evaluation/study and bilateral researchers exchange is common.

LIST OF COST ACTIONS

- MP604, Optical Micro-Manipulation by Nonlinear Nanophotonics
- ICT 299, Optical Fibres for New Challenges Facing the Information Society P18, The Physics of Lightning Flash and Its Effects
- MPNS 539, Electroceramics from Nanopowders Produced by Innovative Methods
- D 41, Inorganic oxides: surfaces and interfaces
- ICT 0806, Intelligent Monitoring, Control and Security of Critical Infrastructure Systems
- MP0803, Plasmonic Components and Devices
- MP 0702, Action : Towards Functional Sub-Wavelength Photonic Structures

- MP0804, Highly Ionised Pulse Plasma Processes

BI-LATERAL ACTIONS

During 2009 there were seven active integrated actions with other countries (2 with Brazil, 1 with Spain, 2 with France, 1 with Italy and 1 with Hungary)

Under all the schemes above the Group received 11 researchers. Also, 6 researchers of our group spent some periods abroad.

6c. Research Groups - Future Research

1. Objectives (6000 ca.)

The mainstream R&D activity of the Unit develops along the broad branches of: Microfabrication, Integrated Optics, Optical Systems and Optoelectronic Integration. In particular, in the future a core activity for the next five years will be on Optical Biochemical Sensing and Interferometric Based Imaging.

The LA Research Line will not drain the entire R&D planned for the Unit, as other subjects will also be addressed along consistent and ambitious research and development programs.

One subject is the development of efficient photovoltaic cells based on thin-film technology. The development of the so called “Green Solar Cells” has nowadays a clear opportunity in face of the worldwide energy constraints and environmental concerns. This opportunity started to be explored by the Unit in the last two years and a plan was established aiming the improvement of the efficiency of solar cells fabricated according to a novel proprietary process. A submission to a National financing program (QREN) was submitted together with an Industrial partner MagPower and the project is scheduled to begin in early 2010. With this project the thin film fabrication facility will experience a significant boost.

Another subject is related with the study, design, modelling, fabrication and test of optical recombiners for sky imaging based on astronomical interferometry. Planar optical devices are particularly well suited for this purpose and some encouraging results were already obtained in the Unit. This activity is to be enhanced further and strategic collaborations with prestigious international Groups working in this field have already been established. The group has experience in the design, fabrication and testing of multiaxial and co-axial beam combiners. The future is focused in the development of dichroic functions within the beam combining chip also with possibility for phase tuning. In the particular case of the dichroic function there are no available devices that can perform this function, due to the very large broadband nature of these signals (200nm wide bands). Ultimately, the development will pass through the fabrication of devices in materials with high transparency in the range between 1.8-8.0µm through process of laser direct writing in chalcogenide glasses.

To progress further in the field of optical sensing we are exploring more fundamental concepts, namely non linear effect for distributed sensing, modal interferometers based on new fiber designs, surface Plasmon resonance interactions and applications based on metamaterials. Added with remote electrical powering of sensors, novel applications will emerge (like in the context of real time monitoring of prostheses installed in the human body).

The Research Group Scientific Council has identified that the cooperation with other Research Groups of INESC Porto has to be strengthened through the development of cross-fertilized projects. Identified examples are the specific cases of USE (Power Systems Unit), in the area of development of smart sensing systems and UTM (Telecommunications and Multimedia Unit) in the area of optical communications.

Since 1993, the Unit constructed a small cleanroom and since then has maintained it in a operational condition. In addition to the initial investment, the regular projects and the re-equipment initiative launched by FCT in 2002(?) allowed the Group to take the facility a step further ahead. Recently, the research Unit was involved in a consortium to enhance the microfabrication infrastructure within University of Porto, in close cooperation with other research groups. This initiative was triggered inside the group and is thought to be the way forward because of two factors: the cost is diluted and more importantly, the different varieties of knowledge of the users in a large facility are essential in terms of cross-fertilization; this is especially important for the development of multidisciplinary projects.

The fabrication of nano structures in a top-down and bottom-up approaches are planned for the near future.

The top-down approach will be achieved using femtosecond laser writing. Until now, good results have been obtained through cooperation with our international partners (IPHT, Jena, Germany and University of Toronto, Canada) but a local infrastructure still not fully operational. A laser direct writing unit was developed in house in the recent years and is ready for a simple upgrade to be working with a femtosecond laser source. The laser writing process will allow the fabrication of micro/nanostructures in polymers and silica amongst others. In addition by exploring the selective wet etching induced by laser exposure, microfluidic structures will be developed, aiming at full integration between the optical and the liquids manipulation structures in a monolithic approach.

In a bottom-up approach the group was recently involved in experiments in thin film growing using layer-by-layer self assembly with cooperation with the chemistry group at FCUP. These initial experiments are focused on fabrication of fast optical modulators using polar molecules but the idea is to extend the capabilities of the self assembled films into the sensing areas.

2. Funding, source, dates (1500 ca)

(Indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	159.705,37 €
QREN	23.409,74 €
TOTAL	183.115,11 €

6. Research Groups - Group Description

Research Group Title	RG-NORTE-50014-3349 POWER SYSTEMS
Principal Investigator	Manuel António Cerqueira Costa Matos
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	33.147,01 €
European Commission	143.086,94 €
TOTAL	176.233,95 €

6b. Research Groups - Objectives & Achievements

1. Objectives (4000 ca.)

The mission of the Power Systems Unit is centered on the development of advanced research in emergent modeling, optimization and control techniques applied to Power Systems characterized by large scale integration of renewable power sources and distributed generation, with technology and know-how transfer to utilities and industrial companies and support to the public sector and energy agencies.

In scientific terms, this corresponds to combining the traditional analytical models and tools of power systems with the emergent techniques of operational research and computational intelligence the Unit has been applying and with economic models of the new organization of the power sector, in order to develop multidisciplinary integrated models and tools useful for the relevant agents (system operators, producers, regulators, government) and for global understanding of the complex phenomena under research.

A need also exists of organizing the Unit's know-how in a way that high level consultancy can be provided through specific studies and strategic thinking, supported by the new tools to be developed.

The developments should mainly be driven by the application area, but general-purpose models and tools for optimization, decision and negotiation may also be an objective where the Units' experience suggests further developments of the fundamental tools.

The main application areas are related to the ones defined for the thematic line:

- Intermittent power integration: analysis, control, forecasting, operation optimization;

- Electricity markets: load profiling, regulated remuneration schemes, uncertainty management, optimization and decision-aid, adequacy evaluation;
- Microgeneration and microgrids: conceptualization, components' models, control, stability analysis, operation procedures, islanding, remuneration;
- Electric vehicles integration: business and technical models, consumption patterns, communications, network impact, ancillary services provision.

2. Main Achievements (4000 ca)

Main scientific results:

- Control solutions for fault ride through of wind generators for asymmetrical faults in weak meshed systems
- Integrated multi-level smart control solutions for charging batteries of plugged-in electric vehicles
- Control solutions for Vehicle to Grid (V2G) implementation in isolated systems with a large penetration of wind power
- Decision-aid tool for operating reserve definition based on probabilistic modeling of failures, load and wind power forecasts
- Multicriteria methodology for the technical and economic evaluation of multi-microgrid deployment alternatives
- Voltage control approach to manage the integration of micro-generation of multi-microgrids
- New models for short term wind power forecasting using entropy related concepts
- New model for power system reliability evaluation with evolutionary computing as an alternative to Monte-Carlo simulation
- Negotiation-aid platform for maintenance scheduling using autonomous agent technology
- Platform for simulation of grid integration and dynamic behavior analysis of wave energy systems

Projects

- Successful conclusion of the European project "More Microgrids"
- Successful proposals of the two new European projects MERGE and TWENTIES, to begin in 2010
- Extension of the contract with REN and REE (Portuguese and Spanish TSO) to deliver an advanced tool for operating reserve evaluation, in the sequence of the studies performed in project RESERVAS

Publications

- 17 papers in international journals

- 48 papers in international conferences with peer review

Spin-off

- Provisions to create a company able to deliver wind park forecasts, starting from the results of the project PrevEol

6c. Research Groups - Productivity

1. Publications in peer review Journals (6000 ca.)

Total number of publications: 17

List can be consulted in: <http://profile.inescporto.pt>

Bessa, R. J., Miranda, V., Gama, J., "Entropy and Correntropy against Minimum Square Error in Off-Line and On-Line 3-day ahead Wind Power Forecasting", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1657-1666.

Costa, P. M., Matos, M., "Avoided losses on LV networks as a result of microgeneration", Electric Power Systems Research, vol.79, no.4, April, 2009, pp.629-634.

Costa, P. M., Matos, M., "Assessing the contribution of microgrids to the reliability of distribution networks", Electric Power Systems Research, vol.79, no.2, February, 2009, pp.382-389.

Gomes, M. H., Saraiva, J. T., "A market based active/reactive dispatch including transformer taps and reactor and capacitor banks using Simulated Annealing", Electric Power Systems Research, vol.79, no.6, June, 2009, pp.959-972.

Gomes, B. A., Saraiva, J. T., "Demand and generation cost uncertainty modelling in power system optimization studies", Electric Power Systems Research, vol.79, no.6, June, 2009, pp.1000-1009.

Gouveia, E., Matos, M., "Evaluating operational risk in a power system with a large amount of wind power", Electric Power Systems Research, vol.79, no.5, May, 2009, pp.734-739.

Gouveia, E., Matos, M., "Symmetric AC fuzzy power flow model", European Journal of Operational Research, vol.197, no.3, September, 2009, pp.1012-1018.

Khodr, H., Martinez-Crespo, J., Matos, M., Pereira, J. C., "Distribution Systems Reconfiguration Based on OPF Using Benders Decomposition", IEEE Transactions on Power Delivery, vol.24, no.4, October, 2009, pp.2166-2176.

Khodr, H., Salloum, G. A., Saraiva, J. T., Matos, M., "Design of grounding systems in substations using a mixed-integer linear programming formulation", Electric Power Systems Research, vol.79, no.1, January, 2009, pp.126-133.

Matos, M., Peças Lopes, J. A., da Rosa, M. A., Ferreira, R., Leite da Silva, A., Salles, W., Resende, L., Manso, L., Cabral, P., Ferreira, M., Martins, N., Artaiz, C., Soto, F., López, R., "Probabilistic evaluation of reserve requirements of generating systems with renewable power sources: The Portuguese and Spanish cases", Electrical Power and Energy Systems, 2009, pp.562-569.

Madureira, A., Peças Lopes, J. A., "Coordinated Voltage Support in Distribution Networks with Distributed Generation and Microgrids", IET Renewable Power Generation, vol.3, no.4, December, 2009, pp.439-454.

Mendonça, Â., Peças Lopes, J. A., "Robust tuning of power system stabilisers to install in wind energy conversion systems", IET Renewable Power Generation, vol.3, no.4, December, 2009, pp.465-475.

Miranda, V., Carvalho, L., da Rosa, M. A., Leite da Silva, A., Singh, C., "Improving Power System Reliability Calculation Efficiency With EPSO Variants", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1772-1779.

Miranda, V., Santos, A., Pereira, J., "State Estimation Based on Correntropy: A Proof of Concept", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1888-1889.

Moyano, C. F., Peças Lopes, J. A., "An optimization approach for wind turbine commitment and dispatch in a wind park", Electric Power Systems Research, vol.1, no.79, January, 2009, pp.71-79.

Ramirez-Rosado, I. J., Fernandez-Jimenez, L. A., Monteiro, C., Sousa, J.N., Bessa, R. J., "Comparison of two new short-term wind-power forecasting systems", Renewable Energy, vol.34, no.7, July, 2009, pp.1848-1854.

Schweickardt, G., Miranda, V., "A two-stage planning and control model toward Economically Adapted Power Distribution Systems using analytical hierarchy processes and fuzzy optimization", International Journal of Electrical Power & Energy Systems, vol.31, no.6, July, 2009, pp.277-284.

2. Other publications National (6000 ca.)

Fonseca, I., Farinha, J. M. T., Simões, A., Maciel Barbosa, F., "Manutenção Preditiva de Geradores Eólicos", APMI- Associação Portuguesa de Manutenção Industrial, 10.º Congresso Nacional de Manutenção, Figueira da Foz, Portugal, 19 - 20 November, 2009.

Peças Lopes, J. A., Messias, A. A., Gonçalves, R. M. P., "Redes de energia inteligentes como contributo da engenharia portuguesa para o desenvolvimento sustentável", InGenium, no.112, July, 2009, pp.44-47.

3. Other publications International (6000 ca.)

Total number of publications: 24

Number publications of this kind: 48

List can be consulted in: <http://profile.inescporto.pt>

Artaiz, C. J., Docavo, M. I., Cabral, P., Martins, N., Tavares, M. N., Matos, M., da Rosa, M. A., Ferreira, R., Leite da Silva, A., "Evaluacion de Los Niveles Adecuados de Reserva de Operacion en los Sistemas Eléctricos Ibéricos a Médio y Largo Plazo", XIII ERIAC - Décimo Tercero Encontro Regional Iberoamericano do CIGRÉ, Puerto Iguazú, Argentina, 24 - 28 May, 2009.

Blanquet, A., Santos, J., Carrapatoso, A., Teixeira, C., Madureira, A., Alves, F., "From DA to SmartGrids - Evolution or Revolution? A Path to Improve the Utility Efficiency", CIRED2009 - 20th International Conference on Electricity Distribution, Prague, Czech Republic, 8 - 11 June, 2009.

Botterud, A., Wang, J., Monteiro, C., Miranda, V., "Wind Power Forecasting and Electricity Market Operations", IAEE32 - 32nd International Association for Energy Economics (IAEE) International Conference, San Francisco, CA USA, 21 - 24 June, 2009.

da Rosa, M. A., Miranda, V., Matos, M., Sheblé, G., Leite da Silva, A., " Intelligent Agent-based Environment to Coordinate", ISAP 2009 - The 15th International Conference on Intelligent System Applications to Power Systems, Curitiba, Brazil, 8 - 12 November, 2009.

de Almeida, S. A. B., Pestana, R., Maciel Barbosa, F., "Principais Causas dos Incidentes na Rede Nacional de Transporte - Caracterização e forma de utilização numa metodologia de análise de risco", XII ERIAC A Energia a Serviço da Integração, Foz do Iguaçu, 20 - 24 May 2009.

Duarte, A. F., Fidalgo, N., Saraiva, J.T., "Forecasting Electricity Prices in Spot Markets - One Week Horizon Approach", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Fernandes, R.V., de Almeida, S.A.B., Pestana, R., Maciel Barbosa, F., "Load Shedding - Coordination between the Portuguese Transmission Grid and the Distribution Grid with Minimization of Loss of Distributed Generation", 2009 IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Fonseca, I., Farinha J. M. T., Maciel Barbosa, F., "On-Condition Maintenance for Wind Turbines", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Gomes, B. A., Saraiva, J. T., Neves, L., "Impact of Load and Generation Proce Uncertainties in Spot Prices", in Proceedings of IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Hatziargyriou, H. D., Anastasiadis, A. G., Vasiljevskaja, J., Tsikalakis, A. G., "Quantification of Economic, Environmental and Operational Benefits of Microgrids", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Leite, H., Barros, J., Miranda, V., "Evolutionary Algorithm EPSO Helping Doubly-Fed Induction Generators in Ride-Through-Fault", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Madureira, A., Peças Lopes, J. A., Carrapatoso, A., Silva, N., "The New Role of Substations in Distribution Network Management", CIRED2009 - 20th International Conference on Electricity Distribution, Prague, Czech Republic, 8 - 11 June, 2009.

Matos, M., Bessa, R.J., "Operating Reserve Adequacy Evaluation using Uncertainties of Wind Power Forecast", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Peças Lopes, J. A., Almeida, P. M. R., Soares, F. J., "Using Vehicle-to-Grid to Maximize the Integration of Intermittent Renewable Energy Resources in Islanded Electric Grids", ICCEP 2009 - International Conference On Clean Electrical Power Renewable Energy Resources Impact, Capri, Italy, 9 - 11June, 2009.

Peças Lopes, J. A., Almeida, P. M. R., Soares, F. J., Hatziargyriou, N., "Electric Vehicles Grid Integration Under the MicroGrid Concept", Smart Grids and Mobility, Würzburg, Germany, 16 - 17 June, 2009.

Peças Lopes, J. A., Soares, F. J., Almeida, P. M. R., Silva, A. M., "Smart Charging Strategies for Electric Vehicles: Enhancing Grid Performance and Maximizing the Use of Variable Renewable Energy Resources", EVS24 - The 24th International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition, Stavanger, Norway, 13 - 16 May, 2009.

Pereira, A. J. C., Saraiva, J. T., "A Decision Support Tool for Generation Expansion Planning in Competitive Markets Using System Dynamics Models", in Proceedings of IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Reis, C., Maciel Barbosa, F., "Line Indices for Voltage Stability Assessment", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Resende, F., Peças Lopes, J. A., "Evaluating the Performance of External Fault Ride-Through Solutions used in Wind Farms with Fixed Speed Induction Generators when Facing Unbalanced Faults", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Saraiva, J. T., Dantas, H. F., "Evolution of the Marginal Based Remuneration of the Portuguese Transmission Company From 1998 to 2004", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Silva, N., Marsh, D., Rodrigues, A., Peças Lopes, J. A., Madureira, A., "New Control and Management Architectures for Active Distribution Networks", PowerGrid2009, KoelnMesse, Cologne, Germany, 26 - 28 May, 2009.

Tennakoon, A. P., Arulampalam, A., Leite, H., Ekanayake, J. B., "Operations of DFIG with simplified rotor current reference model and solution to the recent grid code requirements", IECON09 - 35th Annual Conference of the IEEE Industrial Electronics Society (IECON 2009), Porto, Portugal, 3 - 5 November, 2009.

Vasiljevska, J., Peças Lopes, J. A., Matos, M., "Multi-Microgrid Impact Assessment Using Multi Criteria Decision Aid Methods", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Wang, J., Botterud, A., Miranda, V., Monteiro, C., Sheblé, G. "Impact of Wind Power Forecasting on Unit Commitment and Dispatch", 8th Int. Workshop on Large-Scale Integration of Wind Power into Power Systems, Bremen, Germany, 14 - 15 October, 2009.

4. Master and Ph. D. thesis completed (3000 ca.)

PhD:

Eduardo Gouveia, Avaliação da Adequação da Rede de Transporte de Energia Eléctrica em Ambiente Liberalizado [Adequacy Evaluation of the Electrical Transmission Network in a Liberalized Environment], PhD Thesis, 2009 (Manuel Matos)

Pedro Marques, Solutions to Improve the Dynamic Security of Interconnected Systems with Large-Scale Integration of Wind Power Soluções para Melhoria da Segurança Dinâmica de Sistemas Interligados com Grande Integração de Produção Eólica, PhD Thesis, 2009 (João Peças Lopes)

Nuno Gil, Identification of operating conditions and procedures for emergency islanding mode of multi-microgrids [Identificação de Condições de Operação em Modo Isolado e Procedimentos de Controlo de Emergência para Multi-Micro-Redes], PhD Thesis, 2009 (João Peças Lopes)

Master:

António Santos, Estudo do Comportamento Dinâmico de Redes Eléctricas Industriais - Caso da Refinaria de Matosinhos - Leça [Study of the Dynamic Behaviour of Industrial Electrical Grids - The Case of Matosinhos-Leça Refinery], MSc Thesis, 2009 (João Peças Lopes)

Daniel Burnier de Castro, Simulation of Intelligent Active Distributed Networks - Implementation of Storage Voltage Control, MSc Thesis, 2009 (João Peças Lopes)

Mário Neto, Valorização Tarifária de Tecnologias Energéticas Renováveis [Valorization of Tariffs for Renewable Energy Technologies], MSc Thesis, 2009 (Cláudio Monteiro)

Pedro Correia, Conceção de um Módulo de Gestão para Sistemas Energéticos Híbridos em Redes com Funcionamento Isolado [Development of a Management Module for Hybrid Systems in Networks Operating in Isolated Mode], MSc Thesis, 2009 (José Rui Ferreira)

Ricardo Ferreira, Adequação da Reserva em Sistemas com Elevada Integração de Produção Eólica [Reserve Adequacy in Systems with Large-Scale Integration of Wind Power], MSc Thesis, 2009 (Manuel Matos)

Tiago Moraes, Estudo da Operação de Parques de Sistemas de Conversão de Energia das Ondas em Energia Eléctrica [Study of the Operation of Conversion Systems for Wave Energy to Electrical Energy Parks], MSc Thesis, (João Peças Lopes)

New MSc Thesis (total: 45)

Alexandre dos Santos Dias, Gestão Sustentável da Procura, MSc Thesis, 2009 (Maria Teresa Ponce de Leão)

Bernardo Silva, Parques Eólicos com “Ride-through Fault”: Validação de um Novo Sistema de Protecção em Tempo Real com Ajuda do RTDS, (Hélder Leite)

Filipe Gil, Detecção de defeitos em Redes de Distribuição Secundária, MSc Thesis, 2009 (Fernando Maciel Barbosa)

Guilherme Fonseca, Simulação de Sistemas Híbridos Insulares com Elevada Penetração de Energias Renováveis, MSc Thesis, 2009 (Cláudio Monteiro)

Tiago Pires, Desenvolvimento de um Plano de Eficiência Energética para Transporte Vertical, MSc Thesis, 2009 (José Rui Ferreira)

5. Patents/prototypes (2000 ca.)

DMS/EMS new modules

Developed under EFACEC-DMS

Demo Place: EFACEC

Development Period: 2008-2009

Reserve evaluation tool

Developed under TSO-Reservas

Demo Place: REN, REE

Development Period: 2009-2010

Operating reserve advice tool

Developed under Anemos.Plus

Demo Place: REN

Development Period: 2008-2009No patents.

6. Organization of Conferences (2000 ca.)

BLANK

7. Industry contract research (2000 ca.)

Abridged list of the main contracts with industry:

DMS - Development of new modules for the DMS/EMS system of EFACEC, in the framework of a sustained partnership of more than ten years.

RESERVAS - Medium and long-term evaluation of operational reserve in the Iberian power systems in the presence of a high penetration of renewable sources. Extension to include new features and deliver a prototype of the simulation tool. REN and REE (the TSO of Portugal and Spain). 2009-2010.

ENERCON - Studies for the definition of control parameters of wind generators for new wind parks. ENERCON. Extension 2009-2010.

INOVGRIID - Development of advanced telemetering systems able to support the technical and commercial management of distribution networks including micro-generation. EDP, 2007-2009.

REN-Recep, contracted with REN (Portuguese TSO) to estimate limits for the acceptance of new generation in the system nodes, 2007-2010.

ENEOP2, with the objective of developing of a methodology for loss allocation in a common grid connection infrastructure of multiple wind farms, 2008-2009.

ASIRP - Analysis and selection of investments to reduce losses in the distribution system, EDP, 2009-2010

CCR - Characterization of Consumers and Networks. Extension to incorporate new data and update consumer models, EDP Distribution, 2008-09.

8. Government/Organization contract research (2000 ca.)

Include here work carried out by the group that resulted in a publication or report. Of particular importance are those involved in public policy advice)

Research projects funded by FCT:

PLASM -Platforms for the Simulation of Markets (coord. Gerald Sheble), on-going.

GREEN ISLAND - (coord. J. Peças Lopes), 2009 - 2011.

9. Internationalization (2000 ca.)

Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the international level)

European Projects:

MORE MICROGRIDS - Advanced Architectures and Control Concepts for More Microgrids, ended 2009.

ANEMOS-PLUS - Advanced Tools for the Management of Electricity Grids with Large-Scale Wind Generation, 2007-2010. On- going.

International contracts:

JRC - Study on the Impact of Large Renewable Deployment on European Electricity Higher Voltage Systems, EU (JRC-Institute for Energy), 2009

ARGOS - Development of a platform of tools for wind power forecasting tools. Contract with the Argonne National Laboratory, USA, 2008- 2010. On-going.

PARAFUZZY - Development of fuzzy state estimation functions for online network analysis using paraconsistent logic. UNISANTA, Brazil,.2009-2011.

RESERVAS - Medium and long-term evaluation of operational reserve in the Iberian power systems in the presence of a high penetration of renewable sources. Extension to include new features and deliver a prototype of the simulation tool. REN and REE (the TSO of Portugal and Spain). 2009-2010.

International training:

EES-UETP - The unit keeps the coordination of the training activities of the European training consortium EES-UETP, and a member of the unit chair the course programme committee.

JADES - (TEMPUS programme) aims at enhancing the research capabilities in the area of sustainable energy systems, on-going.

SECEEN - (TEMPUS programme) helped the development of joint continuing education curricula and coordinated continuing education organizational structure, ended 2009.

MIT-Portugal programme (MPP):

Participation in the Scientific Committee and Direction of the PhD program on Sustainable Energy Systems (SES) at FEUP. Co-direction of the MPP SES PhD educational program.

Hosting of several PhD students of the PhD Programme on Sustainable Energy Systems

6d. Research Groups - Future Research

1. Objectives (6000 ca.)

Future research will continue to follow the long-term objectives defined for the Unit and the Research Line, but new general objectives are identified:

- Support to the development of active distribution networks
- Conceptualization of new emergency functionalities, like the participation of wind generation and plugged-in electric vehicles in black start and islanding
- Definition of smart metering architectures to extend the capability of monitoring and controlling the LV distribution grid with active loads and microgeneration.
- Monitoring and control schemes and software tools for smart charging of electric vehicle's batteries and exploitation of the presence of this distributed storage for ancillary services provision to the power system
- Scientific support to the design of regulatory schemes
- Development of strategies and technical solutions for the integration of large amounts of off-shore wind power

As more specific scientific objectives, the Unit will address:

- More effective forecasting tools with uncertainty characterization, exploiting new paradigms like entropy minimization and aimed at decision support in specific situations

- Risk evaluation, decision support and negotiation tools for specific agents and circumstances
- Models for Coordinated and Optimized Management of Distribution Networks with Multi-Microgrids
- Advanced control procedures and simulation tools for assessing the steady state and dynamic impact of large scale integration of EV in electricity grids together with large deployment of renewable energy sources
- Multi-agent system approach to the management and control of distribution grids with large scale distributed storage from EV in emergency conditions
- Ancillary services provision from HVDC off-shore wind farms
- Development of prototypes of battery charging systems of EV for flexible smart charging

As instrumental objectives, the Power Systems Group will aim to increase the number of PhD holders, both young and of high level. Another key policy component will be to strengthen present partnerships with international research centers, namely in Brazil and USA (in the framework of the MIT-Portugal and CMU-Portugal programmes and with the ANL - Argonne National Laboratory, USA).

2. Funding, source, dates (1500 ca)

(indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	147.871,00 €
European Commission	427.000 €
TOTAL	574.871,00 €

6. Research Groups - Group Description

Research Group Title	RG-NORTE-50014-3351 INNOVATION AND TECHNOLOGY TRANSFER
Principal Investigator	João José Pinto Ferreira
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
QREN	28.304,96 €
TOTAL	28.304,96 €

6a. Research Groups - Objectives & Achievements

1. Objectives (4000 ca.)

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. Regarding this theme UITT supports the incubation process of ideas and projects emergent within the several research groups of INESC Porto.

The Unit also plays a role 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.

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

- Entrepreneurship:

Promote an entrepreneurship culture behind academic researchers

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

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

2. Main Achievements (4000 ca)

Innovation Management Systems

Under this research team UITT development:

Two tools concerning

- The diagnosis tool for innovation management audit process
- A tool to evaluate ideas portfolio throughout the different s phases of idea development

During 2009 UITT integrated the group of national experts represented Portugal in CEN/TC389 European Technical Commit ion CT319 -Innovation Management. UITT participate in two meetings.

INESC Port's units offer firms, especially, SMEs, consultancy services which include contents, methodologies, procedures and tools to knowledge and innovation management. Two contracts where established with SME's.

Open Innovation:

During 2009 UITT initialize contacts with Portuguese companies in other to development specific projects. UITT was invited (Feb2010) to become a member of Galp Innovation Network, a web 2.0 platform whose prime objective is promote knowledge exchange about technology between Galp Energia's group and the Science and Technology Community. The main aim is to create an innovation market that generates benefits for all Galp Innovation Network members.

Galp Innovation Network portal is available in beta version, being the Innobrokers Community one of the pioneers in this new way of cooperation of Galp Energia with the Science and Technology Community.

Follow-up: active participation on development, proposal for a case study, then bigger research project together with INESC Porto

Launching and support to Spin-off companies

During 2009 29 projects were studied and 11 projects entered a pre-incubation process

6b. Research Groups - Productivity

1. Publications in peer review Journals (6000 ca.)

Total number of publications: 12

List can be consulted in: <http://profile.inescporto.pt>

Steffen Conn, Marko Torkkeli, Iain Bitran, Assessing the management of innovation with software tools: An application of innovation Enterprizer, International Journal of Technology Management, vol.45, no.3, pp.323-336,

Olli-Pekka Hilmola, Sandor Ujvari, Marko Torkkeli, Harri Lorentz, Thomas Andersson, From Northern Europe to Russia and Asia, and Vice Versa: Traffic Flow Analysis - Current Situation and Development Trends, International Journal of Logistics Systems and Management

Eelko Huizingh, Marko Torkkeli, Steffen Conn, Innovation for Growth, International Journal of Entrepreneurship and Innovation Management, vol.10, no.2, pp.111-226,

Daria Podmetina, Maria Smirnova, Juha Väättänen, Marko Torkkeli, Innovativeness and Internationalisation - Empirical Study of Russian R&D Oriented Companies, International Journal of Innovation Management, vol.13, no.2, pp.1-23, 2009.

Olli-Pekka Hilmola, Marko Torkkeli, Ville-Veikko Savolainen, Intangibles and business performance - a technical efficiency approach, International Journal of Entrepreneurship and Innovation, vol.9, no.4, 2009.

Pekka Salmi, Marko Torkkeli, Inventions utilizing satellite navigation systems in the railway industry - An analysis of patenting activity, Journal of Technology Management & Innovation, vol.4, no.3, pp.46-58

Marko Torkkeli, Daria Podmetina, Anna-Mari Ylä-Kojola, Juha Väättänen, Knowledge Absorption in Emerging Economy - Role of Foreign Investments and Trade Flows in Russia, International Journal of Business Excellence, vol.2, no.3

Pekka Salmi, Marko Torkkeli, Knowledge Transfer in Collaborative Public-Private R&D Project, International Journal of Business Innovation and Research, vol.3, no.3

Marko Torkkeli, Ferdinando Chiaromonte, Steffen Conn, Networks Innovation, International Journal of Entrepreneurship and Innovation Management, vol.10, no.3, pp.227-393

Anna Kyrki, Marko Torkkeli, Subcontracting product development - creating competitiveness through networking, International Journal of Technology Intelligence and Planning, vol.5, no.3, pp.241-257

Carl Kock, Pekka Salmi, Marko Torkkeli, The 'Open Innovation' Paradigm: A Contingency Perspective", Journal of Industrial Engineering and Management, vol.2, no.1, pp.176-207

Ferdinando Chiaromonte, Marko Torkkeli, Ravinder Zutshi, The role of Knowledge in Innovation Management, International Journal of Technology Management, vol.45, no.3, pp.323-336

2. Other publications National (6000 ca.)

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3. Other publications International (6000 ca.)

Total number of publications: 19

List can be consulted in: <http://profile.inescporto.pt>

Ricardo Madureira, Critical realism and case studies in international business research., In Piekari, Rebecca & Welch, Catherine (eds.) "Rethinking the Case Study Approach in International

Marko Torkkeli, Olli-Pekka Hilmola, Exploring new research avenues of industrial management, Research report 217, 978-952-214-893-3, Lappeenranta 2009, pp.15

Ricardo Madureira, Scientific method and case study research., Mills, A., Durepos, G. and Wiebe, E. (eds.) Encyclopedia of Case Study Research, Sage Publications.

Marko Torkkeli, The future of innovation in emerging markets, in Future of Innovation, edited by Bettina von Stamm & Anna Trifilova

Antti Lääperi, Marko Torkkeli, Disruptive Elements in the OLED Business Ecosystem, in Proceedings of ISPIIM 2009 Symposium - 2nd ISPIIM Innovation Symposium - Stimulating Recovery - The Role of Innovation Management , New York, USA

Daria Podmetina, Juha Väättänen, Marko Torkkeli, Maria Smirnova, Open innovation Business Models in Russia: Role of clusters, stakeholders and networks, in Proceedings of ISPIIM 2009 Symposium - 2nd ISPIIM Innovation Symposium - Stimulating Recovery - The Role of Innovation Management , New York, USA

Irina Savitskaya, Marko Torkkeli, Outbound open innovation: a model for external technology commercialization, in Proceedings of ISPIIM 2009 Symposium - 2nd ISPIIM Innovation Symposium - Stimulating Recovery - The Role of Innovation Management , New York, USA, Dezembro

Eelko Huizingh, Steffen Conn, Marko Torkkeli, Iain Bitran, Stimulating recovery - The role of Innovation Management, in Proceedings of ISPIIM 2009 Symposium - 2nd ISPIIM Innovation Symposium - Stimulating Recovery - The Role of Innovation Management , ISBN 978-952-214-864-3; II ISPIIM Annual Symposium book of Abstracts ISBN 978-952-214-863-6, New York, USA,

Irina Savitskaya, Marko Torkkeli, Markets for Technology in an Emerging Economy: Case of St. Petersburg Russia, in Proceedings of ISMOT'09 - THE SIXTH INTERNATIONAL SYMPOSIUM ON MANAGEMENT OF INNOVATION AND TECHNOLOGY - Open Network and Total Innovation Toward Innovative country, Hangzhou, P.R. China

Irina Savitskaya, Marko Torkkeli, Governmental Reforms for Innovation Systems in Emerging Economies: Case Russia, in Proceedings of ECEI 2009 - 4th European Conference on Entrepreneurship and Innovation , Antwerp, Belgium,

Antero Kutvonen, Marko Torkkeli, Opening the Fuzzy Front End: A Synthesis of Two Theories, in proceedings of PICMET'09 - Portland International Center for Management of Engineering and Technology, Portland, USA,

Antti Lääperi, Marko Torkkeli, Disruptive Innovation and Innovation Ecosystem in the Display Industry, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, Viena, Austria,

Antero Kutvonen, Marko Torkkeli, Enabling innovativeness: Parallel development of business plan and technology, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, Viena, Austria,

Irina Savitskaya, Marko Torkkeli, Implementation of Open Innovation Paradigm in Russia. Case studies, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, Viena

Daria Podmetina, Juha Väättänen, Marko Torkkeli, Maria Smirnova, Marina Aleksandrova, Open Innovation vs. Technology Commercialization in Russia. Conceptualization and New challenges, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, Viena

Eelko Huizingh, Steffen Conn, Marko Torkkeli, Iain Bitran, The Future of Innovation, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, ISBN 978-952-214-767-7; Annual Conference Book of Abstracts , Viena

Maria Smirnova, Daria Podmetina, Juha Väättänen, Marko Torkkeli, Sergey Kouchtch, The Role of Cooperation with Internal and External Stakeholders in NPD processes: the Case of Russia, in Proceedings of ISPIIM 2009 - The XX ISPIIM Conference - The Future of Innovation, Viena

Marko Torkkeli, Daria Podmetina, Juha Väättänen, Marina Aleksandrova, The study of innovations in Russia: Possibilities for Open innovations, in proceedings of 11th SGBED Conference - 11th International Conference of the Society for Global Business & Economic Development - Striving for Competitive Advantage & Sustainability: New Challenges of Globalization, Bratislava, Slovak Republic

Daria Podmetina, Marko Torkkeli, Juha Väättänen, Towards Open Innovations: Technology Acquisition and Technology Commercialization. Case of Russia, in Proceedings of IAMOT'2009 - The 18th International Conference on Management of Technology - Management of Green Technology, EUA

4. Master and Ph. D. thesis completed (3000 ca.)

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5. Patents/prototypes (2000 ca.)

BLANK.

6. Organization of Conferences (2000 ca.)

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7. Industry contract research (2000 ca.)

The relationship of this Unit with the industry has been focused on the support to technology transfer and to spin-off company incubation.

Incubation of spin-off companies:

- Process -net - development of a new service in the ICT area
- Next To You

Pre- incubation services - Feasibility Studies (Technology and Market) for the projects:

- Alter Ego
- Há coisas de cartão
- Hesvi
- Wallprinter
- Água de Prata
- Vision Soccer pro
- By GG
- Deep Sea Portugal
- Quizionário

Projects with industry:

Shortcut -Implementation of Innovation Management Systems

M.A.R. Kayakes - Implementation of Innovation Management Systems

Training

Executive Training on “Innovation Management Systems” organized by Cotec

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

General activity

- 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 idea evaluation and Innovation process diagnosisCIFIAL - R&D diagnosis and evaluation

8. Government/Organization contract research (2000 ca.)

BLANK

9. Internationalization (2000 ca.)

During 2009 UITT integrated the group of national experts represented Portugal in CEN/TC389 European Technical Committee CT319 -Innovation Management.

6d. Research Groups - Future Research

1. Objectives (6000 ca.)

As main future research goals, UITT will address the main areas:

Open innovation in innovative firms - Gathering of best practices and models of innovation management in companies of several countries (China, Finland, Portugal, Russia, and Spain). Through an overall quantitative survey and an in-depth study of a selective sample of highly dynamic firms in terms of innovation, this research endeavors to illuminate and add empirical evidence to a scarcely analyzed phenomenon. The Open Innovation study is likely to contribute to a broader understanding of the linkages and cooperation between firms, R&D institutes, Universities and Government facilities and policies, and the critical issue of knowledge transference and property rights management among the different players. This issue directly links with the entrepreneurial process and R&D valorization target, often representing a nebulous and almost unreachable subject for both firms and R&D agents.

“Enabling the Fuzzy Front End of Innovation (EFFE)”: The innovation process may be divided into three areas: the fuzzy front end (FFE), the new product development (NPD) process, and commercialization. In this research area we will put our effort and focus in the Fuzzy Front End of Innovation, namely in the multidisciplinary methods and tools, that enable the unfolding of the so-called New Concept Development phase that is illustrated in this picture. (PDMA1)

Examples of research topics include & combine (but are not restricted to) issues such:

Network Enabled Organizations

Collaborative Innovation Networks

The role of IT, Supporting Technologies and Interoperability

Roadmapping and Foresight

Negotiation

Cultural Issues

Qualitative Research Methods applied to the FEE (e.g.: ethnographic research)

The wide scope of this topic as a research topic, lead to focusing the research effort of this new UITT Area in particular topics that reflect the interests and motivations of the starting team.

Idea Projects (at kick-off)

PhD Research Projects:

- (PDEIG): Enterprise interoperability in collaborative networks: The strategic role of ICT in the promotion of collaborative innovation
- (PRODEI): Enabling Product Co-Creation at the FFE
- MSc Projects
- Modelling the Value Creation Process Contracts (foreseen)

- Roadmapping project for the Sea Life Sciences and Industry

Measuring R&D+I - One of the dilemmas which challenge scholars, policymakers, and business managers is how to conveniently assess whether R&D investments are coming to fruition or not. Since R&D activities still have a central place in the innovation process for many, measuring the impact of R&D spending, tracking its effectiveness, checking whether the costs justify the expenses, are not clichés, but real concerns that are not to be overlooked in both public and private sectors, since R&D activities compete with other activities in the run for (scarce) resources allocation.

Development entrepreneurship tools

The main objective for to 2010 is the development of three manuals in the areas of Digital Media, Valorization Open Source Software and Services.

CEN/TC389 European Technical Committee CT319 -Innovation Management

UITT represent Portugal in two working :

Working Group 1: Collaboration and creativity management,

Working Group 6: Intelligence Strategic Management

2. Funding, source, dates (1500 ca)

(Indicate in full including amount of current and pending funding)

Entidade	Valor
QREN	57.772,45 €
TOTAL	57.772,45 €

6. Research Groups

Research Group Title	RG-NORTE-50014-3406 LIAAD
Principal Investigator	Vladimiro Henrique de Barrosa Pinto de Miranda
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	26.450,64 €
QREN	2.623,79 €
TOTAL	29.074,43 €

6b. Research Groups - Objectives & Achievements

1. Objectives (6000 ca.)

The reference to this Group is included in this report only to indicate that the evolution of INESC Porto LA includes associating LIAAD to the LA.

LIAAD - Laboratory of Artificial Intelligence and decision Support, is a Group with some 17 PhDs, coordinated by Prof. Pavel Brazdil. Most of the researchers have a link with the School of Economics in the University of Porto. Its main areas of activity are linked with Machine Intelligence and Data Mining and this generates an extremely interesting synergy with the historical INESC Porto Groups, especially with USIG, and also with CRACS.

LIAAD received an evaluation from FCT of VERY GOOD in 2008, for the previous 3 year period.

Informally, LIAAD and INESC Porto Groups have already started, during 2008, and continued in 2009, cooperation in joint projects - with Power Systems (USE), Information Systems (USIG), Telecommunications and Multimedia (UTM). Joint papers have already been written and submitted to journals.

FCT has delayed the recognition of the enlargement of the LA since 2008, until the end of the institution evaluation process (which is not completed yet by March 2010!) and did not recognize the integration until the end of 2009.

This 3-year delay is objectively harmful for the organization of the LA and research activities and does not allow the factual reporting of the global activities carried out, also because of the format imposed for the reports.

The activity of LIAAD is reported independently in a different report.

In this report one has indicated Prof. Vladimiro Miranda as the PI for lack of a better way to indicate that the relations between the group and INESC Porto, to enlarge the LA, are held under Prof. Miranda's responsibility.

2. Main Achievements (6000 ca)

BLANK.

6c. Research Groups - Productivity

1. Publications in peer review Journals (4000 ca.)

BLANK

2. Other publications National (4000 ca.)

BLANK

3. Other publications International (3000 ca.)

BLANK

4. Master and Ph. D. thesis completed (3000 ca.)

BLANK.

5. Patents/prototypes (2000 ca.)

BLANK.

6. Organization of Conferences (2000 ca.)

BLANK.

7. Industry contract research (2000 ca.)

BLANK.

8. Government/Organization contract research (2000 ca.)

BLANK

9. Internationalization (2000 ca.)

BLANK.

6d. Research Groups - Future Research

1. Objectives (3000 ca.)

BLANK.

2. Funding, source, dates (1500 ca)

(indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	59.331,02 €
QREN	12.717,90 €
TOTAL	72.048,92 €

6. Research Groups

Research Group Title	RG-Norte-50014-3435 SOFTWARE ENGINEERING AND INFORMATION SYSTEMS
Principal Investigator	Mário Jorge Moreira Leitão
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	28.741,65 €
QREN	113.512,86 €
European Commission	52.617,93 €
TOTAL	194.872,44 €

6b. Research Groups - Objectives & Achievements

1. Objectives (4000 ca.)

Historically, the group's activity has been mostly in the area of Advanced Information Systems Engineering with a large emphasis on technology transfer and high level consultancy, and less on fundamental research. The group has contributed significantly in application areas with high social impact, namely in e-Government and e-Health, and has been engaged in many national and European competitive projects.

Following the recommendations of the INESC-Porto's SAB, the group was re-structured in 2009 to integrate INESC Porto internal competences in Computer Graphics, Information Management and Systems, and Software Engineering. The group was renamed as the "Information and Computer Graphics Systems (USIG)" group. It includes researchers from the former group, from other groups inside INESC Porto, but also new researchers that joined INESC Porto during 2009.

The group objectives encompass several types of activities, namely: research, development, technology transfer, consulting, auditing and advanced training. These activities are anchored on three main research areas: Information Management and Systems, Software Engineering and Computer Graphics and Virtual Environments. The research goals include work geared to:

- Improve and innovate on current software development methodologies with particular emphasis on model-driven development with formal methods, agile and collaborative development methodologies, and software quality assurance based on software testing, verification and certification.
- Investigate frameworks for information management, retrieval and processing in contexts such as web mining, recommender systems, social web, semantic web, information

retrieval, and text mining. This is leading us into the development of innovative systems such as federated libraries of semantically socially-assisted annotated documents, digital cultural heritage portfolios, and e-learning environments and tools.

- Devise models, methods and tools for digital preservation, namely in the area of database preservation and scientific data repository management. There is preliminary work on the transformation of databases into preservation-friendly representations along under the framework established by the OAIS, and on the development of descriptions for scientific datasets.
- to develop innovative models, methodologies and architectures for large scale information systems. We focus on systems integration and interoperability, authentication, access authorization, security and auditability mechanisms.
- Investigate innovative methods in computer graphics and virtual environments, especially in application to serious games, immersive and interactive urban planning based on virtual environments, modeling and visualization of large scenes for immersive environments and mobile devices, and image synthesis.

Research will be closely matched with application areas in which the group has large experience and established successful partnerships. The main applications areas are: public administration (local, regional and central government), healthcare, telecommunications, transport and industry, commerce and services sectors. It is expected that e-Government and e-Health will be major application areas in the near future.

The group is composed by a heterogeneous team, composed by 49 collaborators, a combination of researchers, professionals and post-graduate students with skills and competences in diversified areas: information systems, information management, computer graphics, simulation, telecommunications, computing sciences, software engineering and geographic engineering.

Management will be performed by two coordinators. Both have previous experience, one in operational management of INESC Porto groups and another one in research management. The latter is also coordinator of CRACS, an INESC Porto Associated Laboratory Autonomous Group. This will ensure also a transversal coordination in Computer Science areas inside the Associated Laboratory.

2. Main Achievements (2000 ca)

One main achievement was the restructuring of INESC Porto R&D internal competences in Computer Graphics, Information Systems and Software Engineering into a new group. This, together with the groups of CRACS and LIAAD, will enforce a new strategic research line, named “Digital Society - Large Scale Platforms, Advanced Services, Citizen Participation and Policies”, proposed to be developed in the future at INESC Porto Associated Laboratory.

The group was very successful in obtaining competitive funding, over 1 M€ from diversified sources, roughly one third from each source (national programs, European programs and consulting and services). Some new projects are eCAALYX - Enhanced Complete Ambient Assisted Living Experiment, under (AAL Joint Programme), CAALYX-MV - CAALYX Market Validation (CIP PSP), ICT4DEPRESSION - User-friendly ICT Tools to Enhance Self-Management and Effective Treatment of Depression in the EU (7FP), ADDME - Activating Drivers for Digital eMpowerment in Europe (ICT PSP), DB Preserve - Data Warehouses for the Long-term Preservation of Institutional Electronic Records and Databases (FCT), URBIS - Efficient management and visualization of spatiotemporal urban data (FCT), and 3DWikiU - 3D Wiki for Urban Environments (FCT).

There has been also a reinforcement of the activity around collaborative platforms and social software. Examples are the work performed for CCDD LVT (PROT OVT, PROT AML, Lisboa 2020), CCDD-Norte (PROT-N, Atlantic Region, Norte em Rede), ANAFRE, Wiki Wipro and Palco 3.0. Prototypes were obtained in CAALYX, El-Nautilus - Escola Interactiva NAUTILUS and Wiki Wipro.

New collaborations were created with AMAVE (regional association of local municipalities), ANAFRE (national association of small local authorities), WIPRO Retail (software services for retail multinational) and GENERG (renewable energies producer) and reinforced with CCDR-N and IVDP.

Two members were involved in two spin-offs, one is Tecla Colorida focused on Colaborative and Social Software for Primary Schools and the other is Strongstep specialized in Software Engineering, particularly Software Development Processes.

3 PhD and 42 MSc thesis were completed under the supervision of members of the group, thus showing the strong group's commitment in advanced training of young researchers.

The group maintained its participation in several industrial fora, like DANOTEC (association in the area of defense, security, naval and aerospace industries) and CEDT (association for the promotion of IT for dematerialization of traditional processes). Additionally, in 2009 it started to participate in several new industrial clusters (ICT, forests and ocean).

6c. Research Groups - Productivity

1. Publications in peer review Journals (6000 ca.)

Total number of publications: 4

List can be consulted in: <http://profile.inescporto.pt>

CALISTRU, C.M., RIBEIRO, C., DAVID, G., "Multimedia in cultural heritage manuscripts: Integrating description, transcription, and image content", EURASIP Journal on Image and Video Processing 2009.

FONSECA, T., RIBEIRO, C., GRANJA, C., "Vital Signals in Intensive Care: Automatic Acquisition and Consolidation into Electronic Patient Records", Journal of Medical Systems 2009, vol.33, no.1, p.47-57.

GONÇALVES, A., MAGALHÃES, L.G., CHALMERS, A., "High Dynamic range - A gateway for predictive ancient lighting", ACM Journal on Computing and Cultural Heritage, July 2009, Article 3, vol.2, no.1.

PEREIRA, J.E., COSTA, L.M., CABRITA, A.M., COUTO, P.A., FILIPE, V.M., MAGALHÃES, L.G., FORNARO, M., DI SCIPIO, F., GEUNA, S., MAURICIO, A.C., VAREJÃO, A.S., "Methylprednisolone fails to improve functional and histological outcome following spinal cord injury in rats", Experimental Neurology, a Journal of Neuroscience Research, November 2009, vol.220, no.1, p.71-81.

2. Other publications National (6000 ca.)

Total number of publications: 17

List can be consulted in: <http://profile.inescporto.pt>

AGUIAR, A., MERSON, P., DEKEL, U., "Proceedings of the Wikis for Software Engineering Workshop" 2009.

BESSA, M., BULAS-CRUZ, J.A., CHAMBERS, A., "Selective Rendering for 3D Maps: High-Fidelity Graphics on Mobile Devices" 2009.

CUNHA, N., MOREIRA, M., VAREJÃO, A., COSTA, L., PEREIRA, J., COUTO, P., MELO-PINTO, P., BULAS-CRUZ, J., MAGALHÃES, L.G., FILIPE, V., "Colour Marker Segmentation in Biomechanics Applications", RECPAD 2009, Aveiro, Portugal.

CUNHA, V., LEITÃO, M., "Exploração da Remoção Hierárquica por Oclusão em Simulações em Tempo Real", 17º EPCG 2009, Covilhã, Portugal.

FERREIRA, H.J., AGUIAR, A., PASCOAL FARIA, J., "Adaptive Object-Modelling: Patterns, Tools and Applications", SEDES- Software in ICSEA 2009, Porto, Portugal, p.530-535.

FLORES, N., AGUIAR, A., "Patterns and Tools for improving Framework Understanding: a Collaborative Approach", SEDES 2009, Porto, Portugal.

FRANCHIN, W., CARVALHO, A., MOREIRA, J., DE SOUSA, A.A., RIBEIRO, C., "An importer of virtual 3D City Models datasets into a spatiotemporal database" [Um importador de modelos de cidades virtuais 3D para base de dados espaço-temporal], September 2009, INFORUM (Xata) 2009.

GRILLO, A., PAIVA, A.C., PASCOAL FARIA, J., "Reverse Engineering of GUI Models", INFORUM/XATA 2009 - Lisboa, Portugal, p.527-538.

MARTINS, J., SILVA, J., DE SOUSA, A.A., "Reconhecimento de Fachadas de Edifícios em Imagens de Ambientes Urbanos", 17º EPCG 2009, Covilhã, Portugal.

ORTEGA, M.D.R., COELHO, A., DE SOUSA, A.A., ALVARADO, L.O., "Modelling a virtual urban environment with realistic terrain features", 17º EPCG 2009, Covilhã, Portugal, p.313-314.

PEREIRA, F., MOURA, J.P., BULAS-CRUZ, J.A., MAGALHÃES, L.G., CHALMERS, A., "Efficient use of Multiple Hardware Components for Image Synthesis", 17º EPCG 2009, Covilhã, Portugal.

RESTIVO, A., AGUIAR, A., "Testing for Unexpected Interactions in AOP", SEDES 2009, Porto, Portugal.

RODRIGUES, R., COELHO, A., REIS, L.P., "Modelação Expedita de Edifícios Monumentais a partir de Descrições Textuais" [Expedition Modelling of Monumental Buildings from Textual Descriptions], 17º EPCG 2009, Covilhã, Portugal, p.35-43.

SILVA, J., RIBEIRO, C., CORREIA LOPES, J., "Sharing botanical information using geospatial databases", INFORUM/XATA 2009, Lisboa, Portugal.

SILVA, M.J., GOMES, C.A., PESTANA, B., CORREIA LOPES, J., MARCELINO, M.J., GOUVEIA, C., FONSECA, A., "Adding Space and Senses to Mobile World Exploration" 2009, Cap.8, Mobile Technology for Children: Designing for Interaction and Learning, p.147-169.

URBANO, C., MAGALHÃES, L.G., MOURA, J.P., BESSA, M., MARCOS, A.F., "Desenvolvimento de um operador de tone mapping para dispositivos com ecrã pequeno", 17º EPCG 2009, Covilhã, Portugal.

VAREJÃO, A.S., COSTA, L.M., PEREIRA, J.E., COUTO, P.A., FILIPE, V.M., MAGALHÃES, L.G., MELO-PINTO, P., BULAS-CRUZ, J., MAURÍCIO, A.C., GEUNA, S., "The effect of gait speed on three-dimensional analysis of hindlimb kinematics during treadmill locomotion in rats", 11º Meeting SPN 2009, Braga, Portugal.

3. Other publications International (6000 ca.)

Total number of publications: 34

List can be consulted in: <http://profile.inescporto.pt>

AGUIAR, A., MERSON, P., DEKEL, U., "Wikis for Software Engineering Workshop", ICSE 2009, Vancouver, Canada.

AMARO OLIVEIRA, M., "Interoperable Geographic Information Services from crisis Management perspective", DSIE 2009, Porto, Portugal.

BARROSO, I., AZEVEDO, M., RIBEIRO, C., "Thematic digital libraries at the University of Porto: metadata integration over a repository infrastructure", ECDL 2009, LNCS, vol.5714, Corfu, Grécia, p.392-395.

CARVALHO, A., DE SOUSA, A.A., RIBEIRO, C., COSTA, E., FRANCHIN, W., "Interactive focus + context visualization of spatio-temporal urban data models", GeoViz 2009, Hamburg, Germany.

CARVALHO, R., PORTELA, L., VARAJÃO, J., MAGALHÃES, L.G., "Actividades do gestor de sistemas de informação", ADM 2009, Ponta Grossa, Brasil.

CORDEIRO, M., RIBEIRO, C., "Reuse of Video Annotations Based on Low-Level Descriptor Similarity Techniques", WIAMIS 2009, London, UK, p.193-196.

CORREIA, F.F., FERREIRA, H.J., AGUIAR, A., "Design for an Adaptive Object-Model Framework; An Overview", PLOP'2009 - Workshop MODELS@runtime2009, Chicago-Illinois, USA.

CORREIA, F.F., FERREIRA, H.J., FLORES, N., AGUIAR, A., "Incremental Knowledge Acquisition in Software Development using a weakly-Typed Wiki", WikiSym 2009, Orlando, USA.

CORREIA, F.F., FERREIRA, H.J., FLORES, N., AGUIAR, A., "Patterns for Consistent Software Documentation", PLOP'2009, Chicago-Illinois, USA.

COUTO, T., RIBEIRO, C., NUNES, S., "Characterizing the Portuguese blogosphere", ICWSM 2009, San José, USA.

CRUZ, A.M.R., PASCOAL FARIA, J., "Automatic Generation of User Interface Models and Prototypes from Domain and Use Case Models ", ICISOFT 2009, vol.1, Sofia, Bulgaria.

DORES, A.R., CARVALHO, I., ABREU, C., GUERREIRO, S., ALMEIDA, I., ROMERO, L., NUNES, J., LEITÃO, M., BARBOSA, J., CALDAS, A.C., "New Answers for Old Questions in the Domain of the Cognitive Rehabilitation", IADIS 2009, Roma, Itália.

DORES, A.R., CARVALHO, I., ABREU, C., NUNES, J., LEITÃO, M., CALDAS, A.C., "Virtual Reality: Application to Cognitive Rehabilitation after Acquired Brain Injury", DSAI 2009, Lisboa, Portugal.

FREITAS, M., DE SOUSA, A.A., COELHO, A., "Evaluation of Visualization Features in Three-Dimensional Location-Based Mobile Devices", GRAPP 2009, Lisboa, Portugal, p.328-336.

FREITAS, T., COELHO, A., ROSSETTI, R., "Improving Digital Maps Through GPS Data Processing", IEEE ITSC09, St. Louis, Missouri, USA, p.480-485.

KAJKO-MATTSSON, M., AGUIAR, A., BONESS, K., KAINDL, H., POOLEY, R., TAEI, A., "Long-Term Perspective of Agile Methods", ICSEA 2009, Porto, Portugal.

LIBERATO, N., PERES, E., VARAJÃO, J., BESSA, M., "LBES:Location-Based E-Commerce System", Centeris' 2009, Ofir, Portugal, p.145-151.

MORAIS, R., CUNHA, C.R., PERES, E., BESSA, M., REIS, M.C., "Contextualized Ubiquity: A New Opportunity for Rendering Business Information and Services", CENTERIS'2009, Ofir, Portugal, p.573-581.

MOREIRA DA SILVA, P., CORREIA LOPES, J., SILVA, M.J., "Ubiquitous Computing in Children Education: Framework for Georeferenced Multisensory Information", SIIE'09, Coimbra, Portugal.

MOREIRA, P.M., REIS, L.P., DE SOUSA, A.A., "Jumping Jack: A Parallel Algorithm for Non-Monotonic Stream Compaction", GRAPP 2009, Lisboa, Portugal, p.137-146.

MOREIRA, P.M., REIS, L.P., DE SOUSA, A.A., "New Algorithms for GPU Stream Compaction: A Comparative Study", GRAPP 2009, Lisboa, Portugal, p.119-128.

NUNES, S., RIBEIRO, C., DAVID, G., "Improving web user experience with document activity sparklines", EPIA 2009, Aveiro, Portugal, p.601-604.

NUNES, S., RIBEIRO, C., DAVID, G., "Using Temporal Evidence in Blog Search", ECIR 2009, Toulouse, France, p.22-26.

OANCEA, D., SILVA MOREIRA, R., CORREIA LOPES, J., "Controlling Complex Multimedia Systems via Reflection and Ontologies", ICC-WCSS 2009, Lisboa, Portugal.

PERES, E., LIBERATO, N., BESSA, M., "Events Promotion: An E-Business Solution", 13th IBIMA conference 2009, vol.11, no.11, Marraquexe, Marrocos, p.255-265.

RAHMAN, A., DAVID, G., RIBEIRO, C., "Model Migration Approach for Database Preservation", IDCC 2009, London, United Kingdom.

RESTIVO, A., AGUIAR, A., "drUID - Unexpected Interactions Detection", AOSD.09 - Charlottesville, Virginia, USA.

ROCHA, T., GONÇALVES, M., MAGALHÃES, L.G., GODINHO, F., BESSA, M., "Accessibility and Usability on the Internet for people with intellectual disabilities", DSAI 2009, Lisboa, Portugal.

RODRIGUES, N., LINO OLIVEIRA, J., COELHO, A., "Adapting traditional web applications to new user interfaces provided by rich internet applications", IADIS 2009, vol.2, Roma, Itália, p.395-398.

SILVA, A.R., MARTINHO, D., AGUIAR, A., FLORES, N., CORREIA, F.F., FERREIRA, H.J., "An Implementation Model for Agile Business Process Tools", IWODE09, Lisboa, Portugal.

SILVA, A.R., MEZIANI, R., MAGALHÃES, R., MARTINHO, D., AGUIAR, A., FLORES, N., "AGILIPO: Embedding Social Software Features into Business process Tools", BPMS2'09, Ulm, Alemanha.

SOARES, G., ROSETI, R., FLORES, N., AGUIAR, A., FERREIRA, H.J., "Towards a Cooperative Personal Agenda in a Collaborative Team Environment", CDVE 2009, Luxembourg.

SOUSA RODRIGUES, N.C., MAGALHÃES, L.G., MOURA, J., SANTOS, F., MORGADO, L., CHALMERS, A., "ArchHouseGenerator - A Framework for House Generation", Slactions 2009, Braga, Portugal.

VAN DE VEN, P., BOURKE, A., TAVARES, C.E., FELD, R., ROCHA, A., NELSON, J., "Integration of a suite of sensors in a wireless health sensor platform", IEEE Sensors Conference 2009, Christchurch, New Zealand.

4. Master and Ph. D. thesis completed (3000 ca.)

Thesis completed by members of the unit.

PhD Thesis:

CARVALHO, A., "Spatio-Temporal Information Management Visualization"

MSc Thesis:

GASPAR, A., "Definição Arquitectura Empresarial: Caso Observatório Mobilidade Região Metropolitana de Lisboa".

BARROS, R., "Definição de uma Framework para Municípios de Pequena Dimensão".

Thesis supervised by members of the group:

PhD Thesis:

MOREIRA, P., "Intelligent Optimization Methodologies Applied to the Visualization of Virtual Environments"

CALISTRU, C., "Data Organization and Search in Multimedia Databases".

Selected MSc Thesis from a total of 42:

ALMEIDA, J. "Visualização de Documentos Partilhados em Coleções Dinâmicas".

AMARAL, L., "A gap analysis methodology for the Team Software Process".

AZEVEDO, M., "Biblioteca Digital de Alimentação e Nutrição Humana".

BARROSO, I., "BDart - Biblioteca Digital de Arte Arquivo e Biblioteca: A Integração de Fundos de Diferentes Proveniências numa Infra-Estrutura de Repositório".

COSTA, G., "Implementação de uma ferramenta para auditoria de software clínico"

COSTA, T., "Avaliação da Medida "h-index" na Ordenação de Resultados na Blogosfera".

COUTO, O., "Characterizing the Portuguese Blogosphere".

CUNHA, V., "Detecção de oclusão em ambientes 3D".

DINIS, A., "Reengenharia de Software - Contributos para a melhoria no desenvolvimento de sistemas de informação nas organizações".

ESPINHEIRA, E., "A Requirements Development Methodology Compatible with CMMI".

FERNANDES, C., "Novos Serviços de Rede Inteligentes Redes Móveis de Dados".

FERREIRA, R., "Development of GUI Test Coverage Analysis and Enforcement Tools".

FRANCISCO, V., "Business Intelligence - Um Caso Prático".

FREITAS, T., "Geospatial Data Processing for GPS Navigation Systems".

GOMES, P., "Integração de modelos de desenvolvimento de software mais e menos ágeis".

GONÇALVES, M., "Mapas de Importância para a Web"

GONÇALVES, R., "Projecção de Vídeo em Ambientes Virtuais; Enriquecimento de cenários tridimensionais com base em imagens recolhidas por veículos robóticos".

GUEDES, J., "Gestão de Informação na Documentação de Software".

HENRIQUES, P., "Information System Strategic Planning - A Case Study in the Public Sector".

MANO, L., "Novos Padrões de Interacção com o Utilizador em Aplicações Web usando Ajax".

MOREIRA, J., "Sistemas de Informação para avaliação de desempenho na administração local"

MOURA, S., "Modelo conceptual de base de dados para Web sobre Espaços Verdes Urbanos com a utilização dos Sistemas de Informação Geográfica (SIG)".

NUNES, T., "Towards a Pedestrian Navigation System".

QUEIROZ, N., "CrystalBox - Uma Ferramenta para Documentação Ágil de Software"

RESENDE, H., "Web Social em Serviços Móveis baseados na localização".

RODRIGUES, N., "Aplicação Web para Classificação de Parcelas Agrícolas".

SILVA, J., "Sharing botanical information using geospatial databases".

VILAS BOAS, M., "Avaliação da Maturidade Organizacional em Gestão de Projectos de SI/TI - Administração Pública Portuguesa".

5. Patents/prototypes (2000 ca.)

Three prototypes were developed in 2009:

CAALYX, - The final prototype of this ambient assisted living FP6 project. The group developed a mobile telephone based system that interacts with several sensors, evaluates the data gathered and, based on context and medical patterns, alerts a care centre.

El-Nautilus - Escola Interactiva NAUTILUS - First version of NET_SCHOOL, a classroom control software, compatible with several OS (Windows, MAC OS and Linux), for the integrated control of student PCs and interactive boards in the classroom. This project was developed for NAUTILUS, a producer of classroom material (with integrated PCs) and retailer of interactive classroom boards.

Wiki Wipro - A JAVA based collaborative platform for the creation and re-use of commercial presentations, developed for WIPRO Retail, a software services multinational in the retail area, specialized in the implementation of ORACLE Retail solutions

6. Organization of Conferences (2000 ca.)

IWODE'09 - International Workshop on Organizational Design and Engineering

11 - 12 December 2009, Lisboa, Portugal

Ademar Aguiar - Program Committee

PLOP'2009- Pattern Languages of Programs Conference

28 - 30 August 2009, Chicago, USA

Ademar Aguiar - Program Committee

SEDES 2009 - Simpósio para Estudantes de Doutoramento em Engenharia de Software

20-25 September 2009, Porto, Portugal

Ademar Aguiar - Technical Program Committee

WikiSym 2009 - The 5th International Symposium on Wikis and Open Collaboration

25-27 October, Orlando, USA

Ademar Aguiar - Symposium Committee: Sponsorships Chair; and Program Committee

ADM 2009 - Congresso Internacional de Administração, Ponta Grossa, Brasil, 21-25 Setembro 2009.

Luís Magalhães - PC member

17º Encontro Português de Computação Gráfica, Covilhã, Portugal, 29-30 Outubro 2009.

Luís Magalhães - PC member]

17º Encontro Português de Computação Gráfica, Covilhã, Portugal 29 - 30 de Outubro de 2009

António Coelho - co-Chair

CLOUDVIEWS.ORG - Cloud Computing Conference 2009, Porto, Portugal, 28-29 May 2009

Miguel Leitão - Organization

17º Encontro Português de Computação Gráfica; Covilhã, 29 e 30 de Outubro de 2009.

Augusto Sousa - Member of Scientific Committee

SIACG 2009 - SIACG 2009 IV Iberoamerican Symposium in Computer Graphics; Margarita island, Venezuela, 15 a 17 de Junho.

Augusto Sousa - Member of International Organization Committee

CEIG'09 - CONGRESO ESPAÑOL DE INFORMÁTICA GRÁFICA; 9-11 de Septiembre 2009 - San Sebastian, Spain.

Augusto Sousa - Member of Scientific Committee

XATA2009, "XML: Aplicações e Tecnologias Associadas", INFORUM, Simpósio de Informática, Universidade de Lisboa, Portugal, 10 e 11 de Setembro de 2009

Correia Lopes - Membro do Comité de Programa

Membro do Comité de Organização e do Comité de Programa da CISTI2009, "4ª Conferência Ibérica de Sistemas e Tecnologias de Informação", Póvoa de Varzim, Portugal, 17-20 de Junho de 2009

Membro do Comité de Programa da ICEIS2009, "11th International Conference on Enterprise Information Systems", Milan, Italy, 6-10 de Maio de 2009

7. Industry contract research (2000 ca.)

EI-NAUTILUS - The EI-NAUTILUS is a QREN funded project, developed in co-promotion with NAUTILUS, which aims to create a set of applications, NET_SCHOOL, which will allow integrated management of electronic equipment in classrooms.

Escolinhas - Consulting and development services for an educational collaborative and social platform for Tecla Colorida, an INESC Porto/FEUP spin-off involved in educational software for the K12 market.

GENERG - Consulting services for GENERG, a renewable energy power producer, addressing their telecommunications network, mainly their wireless part.

Mobiles - The development of electric mobility creates new logistic needs. This is particularly true if electric batteries are changed instead of charged. This QREN funded project addresses the IT needs of this business model and will prototype several solutions.

NIDT FORUM - Consulting services for Forum Sistemas de Informação, a small software house, in the area of healthcare information systems.

NIDT PROCESSNET - Consulting services for Process.Net, a small software house, in the area of location based dispatch systems.

Palco Principal - This QREN project aims to develop the base platform of an already existing music content portal (<http://palcoprincipal.com/>), by innovating in several processes, such as content identification, automatic classification, selective research, organization, sharing, recommendation and intelligent treatment of all types of data involved (music, preferences, texts, photographs, posts, among others).

WIKI WIPRO - Development of a collaborative platform, wiki-based, for WIPRO Retail, an Indian multinational specialized in retail, addressing the collaborative elaboration of business proposals.

8. Government/Organization contract research (2000 ca.)

ANAFRE - Development of a collaborative platform and Internet portals for small local authorities.

CCDR-LVT - Collaborative platforms for the elaboration and public discussion of two regional master plans (Oeste e Vale do Tejo and Lisbon) and participation in the thematic working group ICT. Collaborative platform for the Lisboa 2020 Regional Strategic Plan

CCDRN-RJUE - Specification and implementation support of a regional interoperability platform between municipalities and central administration, in the area of urbanization and building construction licensing.

CCDRN-TIC - Implementation of collaborative platforms for PROT N, Norte em Rede and Atlantic Area INTERREG Programme.

DB Preserve -Data Warehouses for the Long-term Preservation of Institutional Electronic Records and Databases, a FCT project.

IVDP - Consulting in Geographic Information Systems for the Porto and Douro wine industry regulator.

Portal Douro -Consulting and development of a regional Portal for the Douro region.

SAMA2007 - Consulting for CCDR-N in the evaluation of SAMA Call proposals.

SIGAVE - Development of a regional solution for the integration of georeferenced content in AMAVE portal, using geographic web services.

SIVIDA - Specification of an Information System for AIDS data collection and processing, for the Healthcare High Commissioner.

URBIS - Efficient management and visualization of spatiotemporal urban data, a FCT project.

9. Internationalization (2000 ca.)

(Collaborative publication, Research, Graduate Training Networks or other forms of participation of the Research Group at the International level)

The internationalization of the group has been accomplished mainly through European projects and collaborative initiatives.

ADDME - Activating Drivers for Digital eMpowerment in Europe, an Thematic ICT PSP project, aiming to fight the digital divide.

CAALYX - Complete Ambient Assisted Living Experiment - 6FP-IST - CAALYX's main objective is to develop a wearable light device able to measure specific vital signs of the older person, to detect falls and to communicate automatically in real time with his/her caregiver in case of an emergency, wherever the older person happens to be, at home or outside. The project was finished in the beginning of 2009.

eCAALYX - Enhanced Complete Ambient Assisting Living Experiment - An AAL Initiative project that builds on the strengths of the infrastructure and functionality already developed in the original CAALYX project, development new features.

ELANET - European Local Authorities Telematic Network, an association promoted by CEMR, with the goal to develop the Information Society at local and regional level. One collaborator is member of the Steering Committee.

HILLSIDE Group - Is a private non-profit devoted to the advance of software patterns. It organizes several PLoP conferences and the WikiSym. One collaborator is member

Initiatives with US Universities - Partnerships are being initiated with US Universities which could generate joint R&D projects. Examples are the UT Austin Portugal (in the area of e-Gov) and CMU Portugal (with the Software Engineering Institute, in the area of Software Quality).

RAIA - Oceanic Observatory of the Iberian Coast - This project aims to improve the real time knowledge of ocean conditions, thanks to data services using an extensive maritime sensor network.

6d. Research Groups - Future Research

1. Objectives (6000 ca.)

USIG research objectives are in line with those of INESC Porto, focusing in the development of fundamental and applied research strongly anchored in industrial partnerships and technology transfer in the application areas of e-Government and e-Health. A major goal of the group is also to contribute the advanced training of young researchers and professionals. The future research goals of the group are highlighted through the specific research goals of each area:

Information Management and Systems

The work in this area encompasses information systems, information retrieval and digital repositories and preservation. Future work plans are:

- Development of new models of integration of the authentication and digital signature facilities provided by the Portuguese Citizen Card in organizational information systems.
- Research on models of leveraging the intra-organizational communication by the adequate use of social software tools.

- Development of tools for enhanced web retrieval, based on temporal analysis, citation patterns and user context modelling.
- Continuing the development of image retrieval methods and tools, using state-of-the-art feature extraction techniques and exploring user feedback on specialized collections.
- Exploring a set of case studies in database transformation, using the results of the DBPreserve project. Test the resulting data warehouse representation and generate XML preservation version. Define the submission, archive and dissemination packages of the OAIS framework, applied to the case of DB preservation.
- Design preservation procedures and description models for a set of scientific datasets. Experiment with the deposit of the datasets into a data repository

Computer Graphics and Virtual Environments

The work in this area encompasses virtual environments, geo-spatial systems, and image synthesis and visual perception. Future work plans are:

- Research on modelling and visualization of large and/or complex 3D Virtual Environments. We will focus on using and extending the Geo-Spatial L-Systems developed within the group to develop new and efficient methods to introduce information rules to model historical buildings, specially monuments. This opens new research lines combining Procedural Modelling, Machine Learning, Natural Language Understanding and Information Extraction. One PhD student is working in this area.
- Continue research work on methodologies for Spatio-Temporal Information Representation and Visualization. These areas require 3D modelling of similar objects, but a major challenge is introduced when integrating temporal information as buildings and other objects need to be recovered only by means of old texts and other expertise information. Information Visualization is very important in this context and the methodologies used to make a simultaneous representation in space and in time have to be further developed. This work will benefit from the existing experience within the group on Geographical Information Systems that lead to the development of the Geo-Spatial L-Systems.
- Develop new metaphors in interactive and immersive environments for collaborative task performance, namely in 3D virtual environments. We will combine with the work on serious games frameworks within a FCT funded project starting in 2010.
- Work on new mobile solutions, namely on defining new methodologies for augmented/virtual reality applications on urban environments and new interaction techniques based on augmented and mixed reality for open spaces.
- Continue research on the visualization of 3D, namely deriving new visualization and image synthesis techniques based on human image perception. We aim to achieve different and better levels of realism, new usability and accessibility tests based to improve and bring efficiency to web pages and the development of ontology for transcoding web pages based on Visual Perceptual Information.

Software Engineering

The work in this area encompasses software development processes, software architecture and design, collaborative environments, software testing and software quality. Future work plans are:

- Mining, capturing and description of patterns to enhance software documentation, understanding, and visualization, especially for reusable complex software systems, such as object-oriented application frameworks.

- Development of innovative collaboration features and tools to support knowledge management in software projects, taking advantage of social software and collaboration tools.
- Development of tools to support a disciplined reuse of aspect-oriented software, based on testing tools and techniques.
- Definition of custom software processes for software projects combining best practices of both agile processes and quantitative methods.
- Definition of advanced design techniques for software systems with high-demand on variability based on meta-modelling techniques and run-time adaptation, such as adaptive object modelling, virtual machines, and meta-programming.

2. Funding, source, dates (1500 ca)

(Indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	60.280,03 €
QREN	161.288,35 €
European Commission	81.187,43 €
TOTAL	302.755,81 €

6. Research Groups

Research Group Title	RG-Norte-50014-3507 CRACS-CENTER FOR RESEARCH IN ADVANCED COMP.
Principal Investigator	Vladimiro Henrique de Barrosa Pinto de Miranda
Research Area	Electrical and Computer Engineering
Home Institution	INESC Porto

6a. Group Description

1. Funding, source, dates (1000 ca.)

No funding coming directly from state sources.

6b. Research Groups - Objectives & Achievements

1. Objectives (2000 ca.)

The reference to this Group is included in this report only to indicate that the evolution of INESC Porto LA includes associating CRACS to the LA.

CRACS - Center for Research in Advanced Computing Systems, is a Group with some 9 PhDs, coordinated by Prof. Fernando Silva. Most of the researchers have a link with the Faculty of Sciences in the University of Porto. Its main areas of activity are linked with Computer Science and this generates an extremely interesting synergy with the historical INESC Porto Groups, especially with USIG, and also with LIAAD.

CRACS received an evaluation from FCT of VERY GOOD in 2008, for the previous 3 year period.

Informally, CRACS and INESC Porto Groups have already started, during 2008, and continued in 2009, cooperation in joint projects - namely with the Information Systems Group (USIG).

FCT has delayed the recognition of the enlargement of the LA since 2008, until the end of the institution evaluation process (which is not completed yet by March 2010!) and did not recognize the integration until the end of 2009.

This 3-year delay is objectively harmful for the organization of the LA and research activities and does not allow the factual reporting of the global activities carried out, also because of the format imposed for the reports.

The activity of CRACS is reported independently in a different report.

In this report one has indicated Prof. Vladimiro Miranda as the PI for lack of a better way to indicate that the relations between the group and INESC Porto, to enlarge the LA, are held under Prof. Miranda's responsibility.

2. Main Achievements (2000 ca)

BLANK

6c. Research Groups - Productivity

1. Publications in peer review Journals (3000 ca.)

BLANK.

2. Other publications National (3000 ca.)

BLANK.

3. Other publications International (3000 ca.)

BLANK.

4. Master and Ph. D. thesis completed (3000 ca.)

BLANK.

5. Patents/prototypes (2000 ca.)

BLANK.

6. Organization of Conferences (2000 ca.)

BLANK.

7. Industry contract research (2000 ca.)

BLANK.

8. Government/Organization contract research (2000 ca.)

BLANK.

9. Internationalization (2000 ca.)

BLANK.

6d. Research Groups - Future Research

1. Objectives (3000 ca.)

BLANK.

2. Funding, source, dates (1500 ca)

(indicate in full including amount of current and pending funding)

Entidade	Valor
Fundação para a Ciência e a Tecnologia	37.214,48 €
QREN	3.820,00 €
TOTAL	41.034,48 €

7. Research Lines - General Description

Research Line Title	FIBER OPTIC DEVICES AND NETWORKS FOR MULTI-PARAMETER
Principal Investigator	José Luís Campos de Oliveira Santos
Research Area	Physics

7a. Objectives and Achievements

1. Objectives (1000 ca.)

Increasing social awareness of safety issues and more demanding regulatory framework ask for continuous, remote, real time and distributed multiparameters measurement. Present systems have limitations concerning these requirements specially if connected with the need of a new proactive paradigm of environmental and structural health integrity monitoring.

Within this overall context, the Research Line deals with the acquisition of know-how and competences for implementation of sensing devices and networks based in optical fiber technologies.

Novel sensing heads, robust and reliable interrogation techniques, multiplexing issues and optoelectronic system integration are the operational objectives.

An integrated approach to the creation of a sustainable framework in terms of human and financial resources, addressing R&D progress, partnership and networking consolidation, post-graduation training, and know-how economic valorization, is the underlying objective of the Research Line.

2. Main Achievements (2000 ca.)

In the framework of this Research Line several achievements were attained:

- Large scale test facility for long-term reliability evaluation of FBG strain sensors embedded in concrete
- Fibre Bragg Gratings as Interrogation Elements for Surface Plasmon Resonance Sensors
- Mechanical characterization of bone cement and crack zone identification in a cemented femoral implant using fiber Bragg grating sensors
- Novel developments of nonlinear effects for optical sensing based on Raman/Rayleigh scattering
- All-fiber hybrid interferometers
- Novel optical fiber geometry designs for sensing purposes (H-shaped, suspended twin core fiber, as examples)
- Use of luminescent carbon dots in sensing applications
- Development of composite luminescent materials for detection of oxidative species
- Development of quantum dot based analytical imaging techniques
- Implementation of interferometric acetic acid sensor for biotechnology application
- Development of virtual instrumentation applications (for frequency domain spectroscopy and interferometry)
- Development of simple, high sensitivity, multiplexable, interrogation scheme for LPG based sensors
- Fabrication of Bragg gratings in pure silica suspended core fibers

- Fabrication of refractive index sensors in slotted multimode integrated devices for chemical and biochemical sensing
- Fabrication of sub-micrometer gap coupler refractometric sensor
- Extrinsic and intrinsic fiber optic interferometric sensors for acoustic detection in high-voltage environments
- Optical fiber sensor for hydrogen and metals
- Optimization process of sol-gel hybrid channel waveguide Bragg gratings patterned using a single photolithographic step.
- Sol-gel channel Bragg gratings fabrication using a single photolithographic step

One outcome of this R&D activity and related achievements was the publication record of the Unit in this period, which stands to 31 works published in international journals and 57 presentations in international and national conferences.

7b. Research Line Output

This section allows you to provide the productivity of the Research Line during the reporting period.

1. Collaborative Publications in peer review Journals (2000 ca.)

Include only if more than one Research Groups of the LA is involved. Give title and full citation in original language

Total number of publications: 8

List can be consulted in: <http://profile.inescporto.pt>

LIMA, S.E., FRAZÃO, O., ARAÚJO, F., FERREIRA, L.A., MIRANDA, V., SANTOS, J.L., "Extrinsic and intrinsic fiber optic interferometric sensors for acoustic detection in high-voltage environments", Optical Engineering, February 2009, vol.48, no.3.

FRAZÃO, O., CORREIA, C., ROCCO GIRALDI, M., MARQUES, M.J., SALGADO, H., MARTINEZ, M., COSTA, J., BARBERO, A., "Stimulated Raman Scattering and its Applications in Optical Communications and Optical Sensors", The Open Optics Journal, February 2009, vol.3, no.2, p.1-11.

FRAZÃO, O., MARTYNKIEN, T., BAPTISTA, J.M., SANTOS, J.L., URBANCZYK, W., WOJCIK, J., "Optical refractometer based on a birefringent Bragg grating written in an H-shape fiber", OPTICS LETTERS, January 2009, vol.34, no.1, p.76-78.

VIEGAS, D., GOICOECHEA, J., CORRES, J.M., SANTOS, J.L., FERREIRA, L.A., ARAÚJO, F., MATIAS, I.R., "A fibre optic humidity sensor based on a long-period fibre grating coated with a thin film of SiO₂ nanospheres", Measurement Science & Technology 2009.

MAYEH, M., VIEGAS, J., SRINIVASAN, P., MARQUES, P., SANTOS, J.L., JOHNSON, E.J., FARAH, F., "Design and fabrication of slotted multimode interference devices for chemical and biological sensing", MDPI Sensors Journal 2009.

SIMEÃO CARVALHO, P., FIGUEIRAS, F., MENDONÇA, S.L., M. FERREIRA, C., RODRIGUES, M., "Dielectric Relaxation and Optical Transmittance of PVC Membranes Modified by Nematic Liquid Crystal", International Journal of Polymeric Materials 2009, vol.58, no.11, p.588-603.

FRIAS, C., FRAZÃO, O., TAVARES, S., VIEIRA, A., TORRES MARQUES, A., SIMÕES, J., "Mechanical characterization of bone cement using fiber Bragg grating sensors", *Materials & Design* 2009, vol.30, no.5, p.1841-1844.

FRAZÃO, O., BAPTISTA, J.M., SANTOS, J.L., KOBELKE, J., SCHUSTER, K., "Refractive index tip sensor based on Fabry-Perot cavities formed by a suspended core fibre", *JOURNAL OF THE EUROPEAN OPTICAL SOCIETY-RAPID PUBLICATIONS* 2009, vol.4, no.1990.

2. Collaborative Other Publications (2000 ca.)

Include only if more than one group is involved and only include here Books, chapters or full papers published in conference proceedings. Give title and full citation in original language

Total number of publications: 9

List can be consulted in: <http://profile.inescporto.pt>

GOUVEIA, C.A., et al "LPG-based interferometric sensor for measurement of dissolved CO₂", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

AREF, S.H., et al "Sensing Characteristics of Modal Interferometers based on HC-PCF", SEON 2009 - VII Symposium on Enabling Optical Networks 2009, Lisboa, Portugal.

DIAZ-HERRERA, N., NAVARRETE, et al, "Nuevas Herramientas de Producción e Interrogación de Sensores de Fibra Óptica Basados en Resonancia de Plasmones Superficiales", RNO 9 - VI Reunión Nacional de Óptica, September 2009, Ourense, Espanha.

MAGALHÃES, F., et al "DEVELOPMENT OF AN OPTOELECTRONIC GAS MONITORING UNIT BASED IN WAVELENGTH MODULATION SPECTROSCOPY", IRF'2009 - INTEGRITY - RELIABILITY - FAILURE CHALLENGES AND OPPORTUNITIES , July 2009, paper: S0213_A0381, Porto, Portugal.

FRAZÃO, O., et al., "Novel sensing head geometry based on smart composite with embedded FBGs for strain and temperature discrimination", SMART09 - International Conference Smart Structures and Materials, July 2009, Porto, Portugal.

DIAZ-HERRERA, N., et al., "Nuevo método de interrogación para sensores SPR basado en redes de Bragg", OPTOEL'09 - VI Reunión Española de Optoelectrónica, July 2009, Málaga, Espanha.

FRAZÃO, O., et al "Curvature sensor based on a fibre Bragg grating embedded in a laminated composite", ICCS15 - 15th International Conference on Composite Structures, June 2009, Porto, Portugal.

QUEIRÓS, R., et al "(Bio)Sensors for detection/quantification of aquatic bacterial contamination in waters for Human use ", NN09 - 6th International Conference on Nanoscience and Nanotechnology 2009, Thessaloniki, Greece.

MARQUES, P., et al "Integrated hybrid sol-gel devices for astronomical interferometry", ICTON 2009 - 11th International Conference on Transparent Optical Networks 2009, Island of S. Miguel, Azores, Portugal.

3. Master and PhD thesis completed (2000 ca.)

Co-supervision or clearly multidisciplinary projects are allowed here

MSc Theses

BLANK

PhD Theses

Orlando José dos Reis Frazão, Optical Fibre Sensors Based on Non-Linear Effects, FCUP, (sup. J.L. Santos)

7c. Future Research

1. Other Information (4000 ca.)

Include only if more than one group is involved. Patents/prototypes, organization of conferences, industry contract research

Photonics for Life Sciences: Optical Biochemical Sensing and Imaging

General Objectives

It is proposed an advanced follow-up of the previous Research Line framed now by the central objective of to develop know-how and technological competences oriented to optical biochemical sensing and imaging. In sensing, the R&D of fibre optic/integrated optics platforms and functionalization techniques for highly sensitive and selective sensing of chemical and biochemical parameters, compatible with multi-point measurement using optical multiplexing approaches will be privileged. In imaging, focus will be on the R&D of solutions based in optical interferometry (white light) and signal processing that, to some extent, has been explored in the context of fibre optic sensing. This central objective addresses also system development for application of these technologies in the chemical, biological and medical domains.

It is also an objective of this new Research Line to research further new optical fibre based sensing solutions for measurement of physical parameters exploring the large opportunities provided by novel developments in fibre optic technology, such as those associated with the outcome of photonic crystal fibres (which show also large potential for biochemical sensing).

The planned local development of an infra-structure for femtosecond laser writing will allow extra flexibility in the design and fabrication of optical microstructures (in fibre optics and in planar optical waveguides) optimized to address specific sensing targets, particularly in the context of utilization of microfluidics concepts and techniques.

Multiplexing of biochemical parameters is a crucial issue when looking for the application of optical technologies in the monitoring of natural environments, water quality, chemical plants, and others. Depending on the measurement concept, to handle in a proper way the multiplexing related topics of sensor networking and sensor addressing/interrogation can be an highly complex task, that involves the mastering of different optoelectronic technologies and of sophisticated signal processing techniques. In view of this, sensor multiplexing will be for the next period an important subject of study and development.

Therefore, one key characteristic of this new research line will be the development of innovative solutions in a multidisciplinary approach, involving guided wave optics, material science, micro and nanofabrication, chemistry, etc.

Outcomes

The central objective that frames the new Research Line is grounded on the broad experience that was gathered with the implementation of the previous Associate Laboratory Programme, from where resulted large R&D background in Optoelectronics.

Optical biochemical sensing and optical imaging will benefit from the R&D going on, or planned to the near future, in the Optoelectronics and Electronics System Unit in topics such as new optical fibre/integrated optics structures with tailored spectral responses, fibre lasers optimized for sensing, thin-film based micro-actuators, micro-optics devices, microfluidics, contactless device electrical powering, multiplexing and signal processing. Of crucial importance is also the reinforcement of the national and international R&D collaborations, in particular with Groups working in biochemical sensing, establishing a network of complimentary competences that is essential when dealing with the multidisciplinary required for addressing optical biochemical sensing.

From the actions to be undertaken to achieve these objectives, it is expectable the following outcomes:

- Acquisition of know-how and competences in several Optoelectronic related technological domains;
- Framework for post-graduation training in the related subjects;
- Test-beds for parameter selective point and multiplexed biochemical optical sensing systems; environmental and medical applications;
- Test-bed for a medical imaging system based on optical interferometry;

2. Future Plans (2000 ca.)

This new Research Line will benefit from on-going or planned R&D activity in integrated and fibre optics structures, thin-films, microfluidics, remote electrical powering, signal processing and multiplexing.

The established internal competences in optical fibre sensing (fibre gratings and other microstructures, interferometry, signal processing, etc.), in integrated optics (photolithography and direct laser writing, sol-gel fabrication techniques, interferometry), and in materials (thin films fabrication supported by several physical/chemical methods), is reflected in a strong potential for biochemical sensing based on refractometry, absorption, fluorescence and electroluminescence. This potential will be explored in the development of promising sensing technologies, such as those that result from the combination of plasmonics with microstructured optical fibres and the combination of electrochemistry with integrated optics (hybrid - electro optic - sensing chips).

The biochemical sensing activities will focus on design, fabrication, characterization and optimization of physical sensing platforms, and also on the functionalization of the sensing heads, through chemical and biochemical processes.

Imaging will also be a strategic focus of the Unit, particularly imaging based in interferometric techniques and oriented to medical applications. In particular, it is foreseen that local recent progresses in micro-optics technology will have substantial impact in optical coherence tomography based imaging configurations, towards higher imaging speed, improved signal-to-noise ratios and, ultimately, to reach cell imaging scales. As a complimentary approach to performance enhancement, it is planned research on signal processing techniques based on detailed physical models as well as in light diffraction tomography.

The general objectives include the perspective of new patents submission and either new technology licensing or new spin-off company launching.

7. Research Lines - General Description

Research Line Title:	ENABLING TECHNOLOGIES FOR NETWORKED AUDIOVISUA SENSING
Principal Investigator	José António Ruela Simões Fernandes
Research Area	Electrical and Computer Engineering

7a. Objectives and Achievements

1. Objectives (1000 ca.)

A variety of digital technologies is necessary to create advanced audiovisual services and distributed multimedia applications, in particular audio, video and image processing, communication systems and networks, knowledge-based systems, metadata and data models. This research line aims at consolidating and exploiting the existing know-how on these technologies in order to design and develop new systems and advanced services for the citizens. This requires the expertise of different R&D groups as well as addressing new research topics; for instance, developing advanced video-surveillance systems implies not only video processing but also multimodal processing, including joint processing of video, audio and signals of other sensors, supported by high capacity communication systems and networks with good quality of service. The research objectives also include the set up of demonstrators and pilot trials, technical advice, strategic consulting and advanced training.

2. Main Achievements (2000 ca.)

Taking into account the general framework and objectives previously outlined, the major achievements of this research line are related with activities carried out in research projects (at European and national level) and contracts, with a focus on integrating and extending the scientific results achieved by the research groups. Most of these results have associated prototypes and a list follows:

- Framework for automatic music generation using gestural controllers
- Creation of an automatic rhythm generator
- Music similarity software modules based on music audio content
- Novel image and video processing algorithms: staff and text line detection in Optical Music and Optical
- Character Recognition Systems, respectively; assessment of spatial segmentations of images and video; content-aware image retargeting
- New results in the evaluation of the breast cancer conservative treatment
- Ontology based context-aware and DRM-enabled approach for content adaptation decision taking in networked multimedia applications
- Machine learning techniques applied to context-aware content adaptation
- Metadata models for the digital cinema content value chain
- NS-3 simulation framework for scalable multi-technology mobile wireless mesh networks (WMN)
- Radio resource management for interconnected multi-technology wireless networks
- Auto-configuration framework for scale-free static WMN
- System specification surveying advances in Ethernet forwarding
- System to analyse the performance of relaying in comparison to multihop routing, for few-hop networks
- Framework for the deployment of user-centric wireless networks
- Printed fractal monopole antenna for WLAN applications

- Algorithms in FPGA for signal estimation in coherent optical systems
- Printed C-Shaped Monopole Antenna Array with High Isolation for MIMO Applications

It should also be mentioned the organization of international conferences and other events (detailed in the respective session).

7b. Research Line Output

This section allows you to provide the productivity of the Research Line during the reporting period.

1. Collaborative Publications in peer review Journals (2000 ca.)

Include only if more than one Research Groups of the LA is involved. Give title and full citation in original language

Total number of publications: 10

List can be consulted in: <http://profile.inescporto.pt>

CALISTRU, C.M., RIBEIRO, C., DAVID, G., "Multimedia in cultural heritage manuscripts: Integrating description, transcription, and image content", EURASIP Journal on Image and Video Processing, 2009.

FONSECA, T., RIBEIRO, C., GRANJA, C., "Vital Signals in Intensive Care: Automatic Acquisition and Consolidation into Electronic Patient Records", Journal of Medical Systems, vol.33, no.1, p.47-57, 2009.

VIANA, P., PIMENTA ALVES, A., "A Semantic Management Model to enable the integrated management of media and devices", Multimedia Tools and Applications, Springer, October 2009, p.1-26.

CARDOSO, J.S., CARVALHO, P.M., TEIXEIRA, L.F., CORTE-REAL, L., "Partition-distance methods for assessing spatial segmentations of images and videos", Computer Vision and Image Understanding, vol.113, no.7, July 2009, p.811-823.

CAMPOS, M.J., CARDOSO, J.S., WILD, T., KROIS, W., FITZAL, F., "Comparing Two Objective Methods for the Aesthetic Evaluation of Breast Cancer Conservative Treatment", Breast Cancer Research and Treatment, vol.116, no.1, p.149-152, July 2009.

CARDOSO, J.S., REBELO, A.M., GUEDES, C.A., PINTO DA COSTA, J., "Staff Detection with Stable Paths", IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.31, no.6, p.1134-1139, June 2009.

PESSOA, L.M., SALGADO, H., DARWAZEH, I., "Performance Evaluation of Phase Estimation Algorithms in Equalized Coherent Optical Systems", Photonics Technology Letters, vol.21, no.17, September 2009, p.1181-1183.

SOFIA, R., "A Survey of Advanced Ethernet Forwarding Approaches", IEEE Communications Surveys & Tutorials, vol.11, no.1, January 2009, p.92-115.

SANTOS, A.P., RICARDO, M., "Header Compressed VoIP in IEEE 802.11", IEEE Wireless Communications Magazine, vol.16, no.3, June 2009, p.69-75.

TEIXEIRA, L.F., CORTE-REAL, L., "Video object matching across multiple independent views using local descriptors and adaptive learning", Pattern Recognition Letters, vol.30, no.2, January 2009, p.157-167.

2. Collaborative Other Publications (2000 ca.)

Include only if more than one group is involved and only include here Books, chapters or full papers published in conference proceedings. Give title and full citation in original language

Total number of publications: 12

List can be consulted in: <http://profile.inescporto.pt>

ANDRADE, M.T., COSTA, A., "Enabling Semantic search in structured P2P Networks via distributed Databases and Web Services", WWW/Internet 2009, Rome, Italy, Nov. 2009.

BARROSO, I., AZEVEDO, M., RIBEIRO, C., "Thematic digital libraries at the University of Porto: metadata integration over a repository infrastructure", ECDL 2009, LNCS, vol.5714, p.392-395.

CAMPOS, R.L., RICARDO, M., "A New Efficient Mechanism for Establishing IP Connectivity between Ambient Networks", ICC 2009, Germany, June 2009.

CARDOSO, J.S., SOUSA, R.J., TEIXEIRA, L.F., CAMPOS, M.J., "Breast Contour Detection with Stable Paths", BIOSTEC08, Funchal, Portugal, 2009.

CARRERAS, A., ANDRADE, M.T., BARBOSA, V.H., DOGAN, S., et al, "Contextual Information in Virtual Collaboration System beyond Current Standards", WIAMIS 2009, London, UK, May 2009.

KONDOZ, A., DOGAN, S., PEREIRA, F., ANDRADE, M.T., RUELA, J., et al, "Visual Media - Coding and Transmission", Wiley, May 2009.

MADISON, G., GOUYON, F., ULLEN, F., "Musical Groove is Correlated With Properties of the Audio Signal as Revealed by Computational Modelling, Depending on Musical Style", SMC 2009, Porto, Portugal, July 2009.

NUNES, S., RIBEIRO, C., DAVID, G., "Improving web user experience with document activity sparklines", EPIA 2009, Aveiro, Portugal.

OANCEA, D., SILVA MOREIRA, R., CORREIA LOPES, J., "Controlling Complex Multimedia Systems via Reflection and Ontologies", ICC-WCSS 2009, Lisboa, Portugal.

SOUSA, R.J., BARBERO, B., CARDOSO, J.S., "An Ordinal Data Method for the Classification with Reject Option", ICMLA2009, Miami Beach, USA, Dec. 2009.

VAN DE VEN, P., BOURKE, A., TAVARES, C.E., FELD, R., ROCHA, A., NELSON, J., "Integration of a suite of sensors in a wireless health sensor platform", IEEE Sensors Conference 2009, Christchurch, New Zealand.

VELOSO, L., CERQUEIRA, E., MENDES, P., MONTEIRO, E., "Seamless Mobility of Senders Transmitting Multi-user Sessions over Heterogeneous Networks", WWIC09, The Netherlands, May 2009.

3. Master and PhD thesis completed (3000 ca.)

Co-supervision or clearly multidisciplinary projects are allowed here

PhD Theses

ABRANTES, F., Explicit Congestion Control Algorithms for Time-Varying Capacity Media

MARTINS, L.G., A computational framework for sound segregation in music signals

CALISTRU, C., Data organization and search in multimedia databases

TEIXEIRA, L.F., Contributions for the Automatic Description of Multimodal Scenes

MSc Theses

BALTAZAR, A.M., Extraction of rhythmic information of dance movement by means of a video signal (P)
 BARBOSA, F.A., Integration of Web services in Peer-to-Peer clients (P)
 RODRIGUES, N.J., Wireless Mesh Networks in Metropolitan Scenarios
 OLIVEIRA, P.M., Service integration in multi-use communications platforms (P)
 FERNANDES, A.J., System for dissemination of energy consumption (P)
 CARRAPA, D., Mobile Router
 SILVA, F.A., DIP based MPEG-21 Player
 LOPES, F.M., Fractal antenna for applications in wireless networks (P)
 PINHEIRO, M.S., Web system for the recognition of music scores (P)
 MAIA, P.M., Authentication of Wi-Fi networks based on DNSSEC (P)
 FRAGA, S.D., Monitoring of multimedia processes (P)
 SÁ, S.M., Predictive Multimedia Content Adaptation
 RAMOS, D.F., Scheduling algorithm for QoS differentiation in MPLS / DiffServ networks (P)
 OLIVEIRA, D.J., CMOS-RF Power Amplifier for Wireless Communications
 ALMEIDA, J.F., Secure domestic networks (P)
 CARVALHO, L.M., User-provided Networks: Relaying vs. ad-hoc routing
 LOPES, M.A., Automatic classification of Latin music
 FERNANDES, A.M., Mobile Environment Context Agent
 ANTUNES, V.H., Web 2.0 frontend for RADIUS management (P)
 REBOREDO, H.P., Processing of Turbo signal in optical communications systems (P)
 PINTO, N.J., FPGA-based implementation of signal estimation algorithms for optical coherent systems (P)
 SANTOS, P.M., FPGA-based system for detecting hand position using stereo images (P)
 RESENDE, C.A., Real-time correspondence processor between stereo images (P)
 RODRIGUES, J.G., Rectification of stereo images in an FPGA-based embedded system (P)
 SANTOS, J.P., Implementation of optical flow algorithms in FPGA platforms (P)
 VIDAL, R.J., System for the calibration of temperature sensors based on fibre optic Bragg gratings (P)
 MANO, L., New user interaction patterns in Web applications using Ajax (P)
 FREITAS, T., Geospatial Data Processing for GPS Navigation Systems
 NUNES, T., Towards a Pedestrian Navigation System
 COUTO, O., Characterizing the Portuguese Blogosphere
 RESENDE, H., Social Web in location-based mobile services (P)
 AZEVEDO, M., Digital library for human food and nutrition (P)
 GONÇALVES, M., Importance maps for the Web (P)
 GONÇALVES, R., Video projection in virtual environments - enrichment of 3D scenarios with images taken with robotic vehicles (P)
 COSTA, T., Evaluation of the "h-index" measure for ordering results in the blogosphere (P)
 VIANA, J.A., Technologies for monitoring the flow of people and control of accesses (P)
 GONÇALVES, A.S., Automatic content generation for Second Life
 MAIA, J.P., Interference of wind parks on the transmission of analogue and digital TV signals (P)
 (P) In Portuguese

7c. Future Research

1. Other Information (4000 ca.)

Include only if more than one group is involved. Patents/prototypes, organization of conferences, industry contract research

Conferences (organization)

SMC 2009 - 6th Sound and Music Computing Conference and SMC Summer School, Porto, Portugal, July 2009

U-NET 2009 - 1st edition of the international workshop "User-provided Networks, Challenges and Opportunities", together with CoNext09, Rome, Dec. 2009

EIFFEL session on "Build your own Networks", Athens, Greece, Oct. 2009

CLOUDVIEWS.ORG - Cloud Computing Conference 2009, Porto, Portugal, May 2009

Conferences (TPC)

CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal

E-DTN 2009 - 1st Workshop on the Emergence of Delay-/Disruption-Tolerant Networks, St. Petersburg, Russia

ICC 2009 - IEEE International Conference on Communications, Dresden, Germany

ICDT 2009 - The Fourth International Conference on Digital Telecommunications, Colmar, France

ICIAR 2009 - International Conference on Image Analysis and Recognition, Halifax, Canada

ICT 2009 - 16th International Conference on Telecommunications, Marrakech, Morocco

JCNN2009 - International Joint Conference on Neural Networks, Atlanta, USA

MICC 2009 - 9th IEEE Malaysia International Conference on Communications

MOBIWAC 2009 - 7th ACM International Symposium on Mobility Management and Wireless Access, Canary Islands

Networking 2009 - 8th IFIP International Conference on Networking, Aachen, Germany

NEW2AN 2009 - 9th IEEE/ITC International Conference on Next Generation Teletraffic and Wired/Wireless Advanced Networking, St. Petersburg, Russia

SMC 2009 (details above)

U-NET 2009 (details above)

WWIC 2009 - 7th IEEE/COST290 International Conference on Wired/Wireless Communications, Twente, The Netherlands

Prototypes

CAALYX - final prototype of the FP6 project "Complete Ambient Assisted Living Experiment" (mobile telephone based system that interacts with several sensors, evaluates the data gathered and, based on context and medical patterns, alerts a care centre)

RAMA - Relational artist maps (web-based application for visualizing and interacting with networks of music artists) / on-line at <http://rama.inescporto.pt>

Music recommender / on-line at <http://www.palcoprincipal.com>

Staff line detection and removal workstation for Optical Music Recognition Systems

Workstation for text line detection in Optical Character Recognition Systems

Platform for the assessment of spatial segmentations of images and video

Simulation platform based on machine learning techniques to predict context changes and automatically adapt video content in multimedia networked applications

Context-aware adaptation decision mechanism based on MPEG-7, MPEG-21 and ontologies

Configurable test platform to browse multimedia content represented as MPEG-21 Digital Items

Metadata management system to convert between metadata formats applied to digital cinema

ReCoop, Wireless Wide Internet Zone (WIZ), pre-product version

WiFix - WMN for extending infrastructure networks

Peer-to-peer video streaming over WMN

Home gateway for secure, customer-defined, friend-to-friend overlay networks

Autoconfiguration and self-management solution for PANs

Devices for for Ku-band VSAT applications

Industry contract research

GrCLIFmcast - management of multicast sessions for IP based services created by users, with PT Inovação

ASP Domestic Networks - Authentication, Security and Privacy solutions for Domestic Network services, with PT Inovação

PALCO 3.0 - Intelligent Web system for supporting the management of music social networks, with Palco Principal

RECOOP - Cooperative wireless networks, with NONIUS Software

MOBILES -Sustainable electric mobility (with electric vehicles), with Ndrive

SITME - Metropolitan multi-technology wireless network for public transportation systems, with Xarevision and STCP

SEMANTIC PACS - Semantic Picture Archiving Communication System, with Emílio Azevedo Campos

SWIOP - Intelligent and secure webmail system, with Portugalmail

AHRS - Attitude-Heading Reference System based on MEMS technology, with Spin.Works

VSAT-1 - Development of devices for Ku-band Very Small Aperture (VSAT) applications, with SINUTA

2. Future Plans (2000 ca.)

The ubiquity of the Internet and the web are fostering the convergence of traditional telecom and broadcast services and new interactive multimedia services, in an environment characterized by heterogeneous wired and wireless access networks and a diversity of fixed and mobile terminal devices with rather different capabilities.

Moreover the traditional roles of customers and providers are also changing. On one hand, the end-user will no longer be a mere customer, but rather an active player in emerging community networks and services; on the other hand, a separation of network access and service providers is already occurring. Such scenarios not only require new technical solutions but also the exploitation of new business models that take into account new players and business roles.

In this context, the planned research work will follow these trends and will focus on “Networked Multimedia Systems and Services in scenarios of convergence”. This work will build on existing know-how and previous achievements, but will go a step forward into integrating them in more advanced systems and services, such as:

- workflow in digital media production and distribution;
- multimedia information archives, with semantic content search and retrieval (with a possible application to the preservation of the cultural heritage);
- content and context-aware service delivery and ontology-based content adaptation;
- automated multiplatform distribution systems;
- semantic analysis of multimedia information and knowledge extraction from data;
- novel Internet architectures (e.g., mobile Internet, delay tolerant networks, self-spreading networks, etc.);
- community networks and services (both from a technical and a business perspective).

To carry out this research plan, strategic partnerships will be sought and established in the framework of research projects and contracts and funding programmes (both European and national) and in close connection with post-graduate research activities.

7. Research Lines - General Description

Research Line Title	ELECTRIC SECTOR AND INTEGRATED TERRITORIAL PLANNING
Principal Investigator	Manuel António Cerqueira Costa Matos
Research Area	Electrical and Computer Engineering

7a. Objectives and Achievements

1. Objectives (1000 ca.)

EU goals. Consultancy to government, agencies and TSO, studies and tools to support the increase of renewable energy, development of new control strategies for distributed generation and forecasting tools for intermittent sources, including large off-shore wind parks.

Iberian Electricity Market. Development of specific simulation tools. Conceptualization of the remuneration of ancillary services by DG. Development of new methodologies for market settlement and tariff design.

Emerging organization schemes for the electric sector. Microgeneration, microgrids and integration of plugged-in electric vehicles. Models for components, monitoring and control mechanisms, evaluation tools and market integration models, including remuneration measures.

Urban and regional integrated territorial planning of energy and environment: creating geo-referenced solutions, addressing interoperability problems, collaborative edition of geographical information, information fusion, open software use and adoption of emergent standards.

2. Main Achievements (2000 ca.)

Electric Sector

- Successful conclusion of the European project “More Microgrids”
- Successful proposals of the two new European projects MERGE (Mobile Energy Resources in Grids of Electricity) and TWENTIES (Transmission system operation with large penetration of Wind and other renewable Electricity sources in Networks by means of innovative Tools and Integrated Energy Solutions), to begin in 2010
- Extension of the contract with REN and REE (Portuguese and Spanish TSO) to deliver an advanced tool for operating reserve evaluation, in the sequence of the studies performed in project RESERVAS
- Development of new models, control solutions and methodologies for wind power safe integration, electric vehicles deployment support, micro-generation integration, forecasting and reliability evaluation
- Important collaborative research (power systems/telecommunications) in project INOVGRID
- Publication of the main results in top international journals of the Power Systems area

- Provisions to create a company able to deliver wind park forecasts, starting from the results of the project PrevEol (concluded in 2008)

Urban and regional integrated territorial planning of energy and environment

- New collaborations with different entities: AMAVE (regional association of local municipalities), ANAFRE (national association of small local authorities) and GENERG (renewable energies producer) and reinforced with CCDR-N and IVDP.

7b. Research Line Output

This section allows you to provide the productivity of the Research Line during the reporting period.

1. Collaborative Publications in peer review Journals (2000 ca.)

Include only if more than one Research Groups of the LA is involved. Give title and full citation in original language

Total number of publications: 8

List can be consulted in: <http://profile.inescporto.pt>

Collaborative papers involving researchers of other units or groups

Bessa, R. J., Miranda, V., Gama, J., "Entropy and Correntropy against Minimum Square Error in Off-Line and On-Line 3-day ahead Wind Power Forecasting", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1657-1666.

Khodr, H., Martinez-Crespo, J., Matos, M., Pereira, J. C., "Distribution Systems Reconfiguration Based on OPF Using Benders Decomposition", IEEE Transactions on Power Delivery, vol.24, no.4, October, 2009, pp.2166-2176.

Matos, M., Peças Lopes, J. A., da Rosa, M. A., Ferreira, R., Leite da Silva, A., Salles, W., Resende, L., Manso, L., Cabral, P., Ferreira, M., Martins, N., Artaiz, C., Soto, F., López, R., "Probabilistic evaluation of reserve requirements of generating systems with renewable power sources: The Portuguese and Spanish cases", Electrical Power and Energy Systems, 2009, pp.562-569.

Miranda, V., Carvalho, L., da Rosa, M. A., Leite da Silva, A., Singh, C., "Improving Power System Reliability Calculation Efficiency With EPSO Variants", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1772-1779.

Miranda, V., Santos, A., Pereira, J., "State Estimation Based on Correntropy: A Proof of Concept", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1888-1889.

Moyano, C. F., Peças Lopes, J. A., "An optimization approach for wind turbine commitment and dispatch in a wind park", Electric Power Systems Research, vol.1, no.79, January, 2009, pp.71-79.

Ramirez-Rosado, I. J., Fernandez-Jimenez, L. A., Monteiro, C., Sousa, J.N., Bessa, R. J., "Comparison of two new short-term wind-power forecasting systems", Renewable Energy, vol.34, no.7, July, 2009, pp.1848-1854.

Schweickardt, G., Miranda, V., "A two-stage planning and control model toward Economically Adapted Power Distribution Systems using analytical hierarchy processes and fuzzy optimization", International Journal of Electrical Power & Energy Systems, vol.31, no.6, July, 2009, pp.277-284.

2. Collaborative Other Publications (2000 ca.)

Include only if more than one group is involved and only include here Books, chapters or full papers published in conference proceedings. Give title and full citation in original language

Collaborative papers involving researchers of other units or groups or with multidisciplinary nature

Total number of publications: 7

List can be consulted in: <http://profile.inescporto.pt>

Blanquet, A., Santos, J., Carrapatoso, A., Teixeira, C., Madureira, A., Alves, F., "From DA to SmartGrids - Evolution or Revolution? A Path to Improve the Utility Efficiency", CIRED2009 - 20th International Conference on Electricity Distribution, Prague, Czech Republic, 8 - 11 June, 2009.

Botterud, A., Wang, J., Monteiro, C., Miranda, V., "Wind Power Forecasting and Electricity Market Operations", IAEE32 - 32nd International Association for Energy Economics (IAEE) International Conference, San Francisco, CA USA, 21 - 24 June, 2009.

Carvalho, A., De Sousa, A.A., Ribeiro, C., Costa, E., Franchin, W., "Interactive focus + context visualization of spatio-temporal urban data models", GeoViz 2009 - Contribution of Geovisualization to the concept of the Digital City 2009, Hamburg, Germany.

da Rosa, M. A., Miranda, V., Matos, M., Sheblé, G., Leite da Silva, A., " Intelligent Agent-based Environment to Coordinate", ISAP 2009 - The 15th International Conference on Intelligent System Applications to Power Systems, Curitiba, Brazil, 8 - 12 November, 2009.

Freitas, T., Coelho, A., Rossetti, R., "Improving Digital Maps Through GPS Data Processing", IEEE ITSC09 - 12th International IEEE Conference on Intelligent Transportation Systems 2009, St. Louis, Missouri, USA, p.480-485.

Tennakoon, A. P., Arulampalam, A., Leite, H., Ekanayake, J. B., "Operations of DFIG with simplified rotor current reference model and solution to the recent grid code requirements", IECON09 - 35th Annual Conference of the IEEE Industrial Electronics Society (IECON 2009), Porto, Portugal, 3 - 5 November, 2009.

Wang, J., Botterud, A., Miranda, V., Monteiro, C., Sheblé, G. "Impact of Wind Power Forecasting on Unit Commitment and Dispatch", 8th Int. Workshop on Large-Scale Integration of Wind Power into Power Systems, Bremen, Germany, 14 - 15 October, 2009.

3. Master and PhD thesis completed (3000 ca.)

Co-supervision or clearly multidisciplinary projects are allowed here

PhD Theses:

Alexandre Miguel Barbosa Valle de Carvalho; Spatio-Temporal Information Management and Visualization; PhD Thesis, 2009. (A. A. de Sousa, Maria Cristina Ribeiro)

Eduardo Gouveia, Avaliação da Adequação da Rede de Transporte de Energia Eléctrica em Ambiente Liberalizado [Adequacy Evaluation of the Electrical Transmission Network in a Liberalized Environment], PhD Thesis, 2009 (Manuel Matos)

Nuno Gil, Identificação de Condições de Operação em Modo Isolado e Procedimentos de Controlo de Emergência para Multi-Micro-Redes [Identification of operating conditions and procedures for emergency islanding mode of multi-microgrids], PhD Thesis, 2009 (João Peças Lopes)

MSc Theses:

António Gaspar, Definição da Arquitectura Empresarial: O Caso do Observatório de Mobilidade na Região Metropolitana de Lisboa [Enterprise Architecture Definition: The Case of the Lisbon Metropolitan Region's Mobility Observatory], MSc Thesis, 2009 (João Pascoal Faria)

António Santos, Estudo do Comportamento Dinâmico de Redes Eléctricas Industriais - Caso da Refinaria de Matosinhos - Leça [Study of the Dynamic Behaviour of Industrial Electrical Grids - The Case of Matosinhos-Leça Refinery], MSc Thesis, 2009 (João Peças Lopes)

Daniel Burnier de Castro, Simulation of Intelligent Active Distributed Networks - Implementation of Storage Voltage Control, MSc Thesis, 2009 (João Peças Lopes)

Mário Neto, Valorização Tarifária de Tecnologias Energéticas Renováveis [Valorization of Tariffs for Renewable Energy Technologies], MSc Thesis, 2009 (Cláudio Monteiro)

Pedro Correia, Concepção de um Módulo de Gestão para Sistemas Energéticos Híbridos em Redes com Funcionamento Isolado [Development of a Management Module for Hybrid Systems in Networks Operating in Isolated Mode], MSc Thesis, 2009 (José Rui Ferreira)

Ricardo Ferreira, Adequação da Reserva em Sistemas com Elevada Integração de Produção Eólica [Reserve Adequacy in Systems with Large-Scale Integration of Wind Power], MSc Thesis, 2009 (Manuel Matos)

Rui Barros, Definição de uma Framework para Municípios de Pequena Dimensão [Definition of a Framework for Small Municipalities], MSc Thesis, 2009 (Ademar Aguiar)

Tiago Morais, Estudo da Operação de Parques de Sistemas de Conversão de Energia das Ondas em Energia Eléctrica [Study of the Operation of Conversion Systems for Wave Energy to Electrical Energy Parks], MSc Thesis, (João Peças Lopes)

New MSc Theses

André Santos, Application of Entropy Concepts to Power System State Estimation, MSc Thesis, 2009 (V Miranda)

Bruno Tomé, Previsão de Preços de Energia Eléctrica em Mercados de Electricidade - Horizonte de 24 horas [Energy Price Forecasting in Electricity Markets] , MSc Thesis, 2009 (JT Saraiva, JN Fidalgo)

Eduardo Gomes Santos, Monitorização de Desempenho de Produção de Microgeração Fotovoltaica Utilizando Sistemas de Inferência e Simulação Computacional [Using inference systems and computational simulation to monitor the performance of micro-PV generation], MSc Thesis, 2009 (Cláudio Monteiro)

7c. Future Research

1. Other Information (4000 ca.)

Include only if more than one group is involved. Patents/prototypes, organization of conferences, industry contract research

Prototypes

DMS/EMS new modules [USE/UESP]

Developed under EFACEC-DMS

Demo Place: EFACEC

Development Period: 2008-2009

Reserve evaluation tool [USE/USIG]

Developed under TSO-Reservas

Demo Place: REN, REE

Development Period: 2009-2010

CAALYX

Developed under CAALYX (FP6 project): mobile telephone based system that interacts with several sensors, evaluates the data gathered and, based on context and medical patterns, alerts a care centre.

Demo Place: INESC Porto

Industry Contract Research

DMS - Development of new modules for the DMS/EMS system of EFACEC, in the framework of a sustained partnership of more than ten years. [USE/UESP]

RESERVAS - Medium and long-term evaluation of operational reserve in the Iberian power systems in the presence of a high penetration of renewable sources. Extension to include new features and deliver a prototype of the simulation tool. REN and REE (the TSO of Portugal and Spain). 2009-2010. [USE/USIG]

INOVGRIID - Development of advanced telemetering systems able to support the technical and commercial management of distribution networks including micro-generation. EDP, 2007-2009. [USE/UTM]

CCR - Characterization of Consumers and Networks. Extension to incorporate new data and update consumer models, EDP Distribution, 2008-09. [USE/INESC Coimbra]

2. Future Plans (2000 ca.)

Development of new managing tools for the dispatch center level, to allow large scale integration of on-shore and off-shore intermittent generation, namely wind power. Identification of new balancing schemes, by energy storage, conventional generation or demand-side participation, involving use of ICT. Identification of new emergency functionalities.

Development of new distributed control architectures for active distribution networks, following the concept of smart grid. This will favor the deployment of distributed generation and microgeneration and will support the networks at times of stress on the main grid, and also enable new actors, such as aggregators and virtual power plants, to enter the market to provide balancing services. This will involve smart metering architectures to address LV distribution grids with active loads and microgeneration.

Analysis of the impact of a large scale integration of electric vehicles (pure electric vehicles and plug in hybrid vehicles). This will require the development of specific monitoring and control schemes and software tools related with smart charging of the vehicle's batteries and the exploitation of the presence of this distributed storage for ancillary services provision. A strong interaction with ICT is foreseen, associated to billing systems. Development of prototypes for smart charging and increase of laboratorial capabilities for testing purposes is envisaged.

Research on modeling and visualization of large and/or complex 3D Virtual Environments, focusing on using and extending the existing Geo-Spatial L-Systems to model historical buildings. Continue research work on methodologies for Spatio-Temporal Information Representation and Visualization.

Develop new metaphors in interactive and immersive environments for collaborative task performance, namely in 3D virtual environments.

Work on new mobile solutions, namely on defining new methodologies for augmented/virtual reality applications on urban environments

7. Research Lines – General Description

1. Research Line Title:	ENTERPRISE COOPERATION NETWORKS SENSING
2. Principal Investigator	Jorge Manuel Pinho de Sousa
3. Research Area	Economics and Management

7a. Objectives and Achievements

1. Objectives (1000 ca.)

Collaborative networks of enterprises are becoming an important research area of a clear interdisciplinary nature. This broad domain encompasses Supply Chain Management, Virtual Organizations, Collaborative Networks, and covers both complex design and management problems.

Traditional research in the area has been concentrated on issues such as distributed information technology infra-structures and architectures, or novel organizational structures, with much less attention paid to important issues related to inter-organizational collaboration, and to the particular roles of the different actors.

Our research is intended to cover this gap. It is focused on a set of topics in which the group has developed competences and know-how for many years: a) models for cooperative networks and business; b) information and knowledge management; c) Decision Support Systems; d) multi-objective heuristic optimization; e) integration in collaborative networked organizations.

2. Main Achievements (2000 ca.)

During 2009 the following important achievements can be highlighted:

- The e-biz-tcf project (Harmonising eBusiness processes and data exchanges for SME's in the textile/clothing and footwear sectors in the Single Market) has implemented and validated innovative architectures for e-business integration in pilot projects at a European level. INESC Porto was responsible for the management of the implementation of the project results in nine Portuguese companies.
- Following the good results achieved in the e-biz-tcf project, INESC Porto participated in the definition of a similar project for the automotive industry, which was the winner of the tender opened by the European Commission. This new project (Assisting SMEs to participate in global digital supply chains in the automotive sector in the Single Market) will start in January 2010.
- Contributions for innovative concepts and solutions for planning and management of complex supply chains, applied in the automotive industry for the fast production of customized cars (under the ongoing AC/DC European project, for the "5 days cars").

- Design, development and demonstration of an aggregate planning system for shoe supply networks, using a large shoe making Group as the focal point for planning and organisation.
- Research on multi-criteria approaches for partner selection in Virtual Organizations and Collaborative Networks.
- Development of the innovative, advanced concept of SME's knowledge community; new empirical knowledge generated about virtual communities in an SME context and new business/IS architecture for information management in industrial associations.

In 2009, a PhD was concluded on "Partner Selection in Virtual Enterprises" (author: José António Crispim) and there were 3 publications in peer review journals, and one other paper has been published on-line (normally this will appear on a printed version during 2010).

7b. Research Line Output

This section allows you to provide the productivity of the Research Line during the reporting period.

1. Collaborative Publications in peer review Journals (2000 ca.)

Include only if more than one Research Groups of the LA is involved. Give title and full citation in original language

José António Crispim, Jorge Pinho de Sousa, "Partner selection in virtual enterprises: a multi-criteria decision support approach", International Journal of Production Research, Volume 47, Issue 17, September 2009, Pages 4791 - 4812.

Claudia Chituc, Américo Azevedo, César Toscano, "A framework proposal for seamless interoperability in a collaborative networked environment", Computers in Industry, vol.60, no.5, June 2009, pp.317-338.

Claudia-Melania Chituc, Américo Azevedo, César Toscano, "Collaborative business frameworks comparison, analysis and selection: an analytic perspective", International Journal of Production Research, vol.47, no.17, January 2009, pp.4855-4883.

2. Collaborative Other Publications (2000 ca.)

Include only if more than one group is involved and only include here Books, chapters or full papers published in conference proceedings. Give title and full citation in original language

Total number of publications: 9

List can be consulted in: <http://profile.inescporto.pt>

Mikio Kubo, J. P. Pedroso, "Metaheuristics: a Programming Guide" (inJapanese). Kyoritsu, Tokyo, 2009 [book].

Roberto Piedade, Américo Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, November, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "Short-term Semantic Consensus: Toward Agile Ontology Specification for Collaborative Networks", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, October, 2009.

Rui J. Rei, Peter Madera, João Pedro Pedroso, "Khronos - a High-level Framework for Discrete Event Simulation in Python", CIE39 - 39th International Conference on computers & Industrial Engineering, July, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A socio-semantic approach to collaborative domain conceptualization", Proceedings of OnToContent 2009 - The 4th International Workshop on Ontology Content - OnToContent 2009, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A Socio-Semantic Approach to the Conceptualization of domains, Processes and Tasks in Large Projects", ICEIS 2009 - 11th International Conference on Enterprise Information Systems, in proceedings, 2009.

Nazaré Rego, Jorge Pinho de Sousa, "Supporting the definition of strategies for the configuration of health care supply chains", Conference on Logistics Management 2009, Hamburg, September 2009.

Nazaré Rego, Jorge Pinho de Sousa, "Virtually centralized Supply Chain coordination in Hospitals", PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

José A Crispim, Jorge P Sousa, "Uncertainty in partner selection for virtual enterprises", PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

3. Master and PhD thesis completed (3000 ca.)

Co-supervision or clearly multidisciplinary projects are allowed here

PhD Theses:

José António Crispim, Partner Selection in Virtual Enterprises, FEUP.

MSc Theses:

Rui Pinto Ferreira, Development of a multi-criteria collaborative decision model for performance management in networks of organizations, FEUP.

Bruno Paulino, Strategies for information classification in RTD organizations, FEUP.

Jorge Silva, Management of information of performance of organizational networks: The case of virtual communities, FEUP.

José Augusto, Approach for the implementation of knowledge communities in enterprise associations, FEUP.

Tiago Leite, Técnicas heurísticas para sequenciamento multi-projecto, ISEP.

João Miguel Rodrigues Carneiro, Estudo de melhoria do processo de subcontratação na ADIRA, FEUP.

João Ricardo Pires Teixeira, Supply Chain Planning na Qimonda, FEUP.

Miguel João da Silva Fonseca, Optimização do QCD nos fornecedores, FEUP.

Alexandre Ferreira, Rotas de "Milk run" no aprovisionamento externo da Bosch Termotecnologia, FEUP.

Miguel Montenegro Aguiar de Araújo, Lean nos Serviços de Saúde, FEUP.

Ricardo Luís Pinheiro Gonçalves Teixeira, Adaptação e implementação do Oracle Retail Merchandising System para suportar adequadamente os processos de negócio do retalhista, FEUP.

Nuno Emanuel Ferreira Fleming de Oliveira, A evolução organizacional das empresas nacionais nas cadeias de fornecimento da indústria de componentes para automóvel, FEUP.

7c. Future Research

1. Other Information (4000 ca.)

Include only if more than one group is involved. Patents/prototypes, organization of conferences, industry contract research

Conferences:

10th EU/MEeting workshop (the European metaheuristics community) - Debating the future: new areas of application and innovative approaches, Porto, Portugal (2009 April 29/30) - Chair: Ana Viana.

Prototypes:

Name: A system for reliable exchange of business documents in the footwear industry

Developed under (Project Name): eBiz-tcf

Demo Place: Fivelarte, Cindicalfe, Centenário, Lusocal, Maximo Internacional, Trielle, Mystic Sea, Globo Vermelho, Santos e Júnior

Development Period: 2008-2009

Name: Methods and tools for benefit balancing in automotive supply chains

Developed under (Project Name): AC/DC

Demo Place: Continental AG

Development Period: 2008-2009

Name: An agile optimization planning system for footwear producing SMEs - first prototype

Developed under (Project Name): AGILPLAN

Demo Place: Oficina de Soluções

Development Period: 2009

Name: A system for the management of standard technical processes in the construction industry at national level (improved version)

Developed under (Project Name): Parque Escolar

Demo Place: INESC Porto

Development Period: 2009

2. Future Plans (2000 ca.)

Our research activity has a strong interdisciplinary nature covering areas such as Decision Support Systems, Multi-objective Optimisation or Operations Management. Competences and know-how on these areas have been consolidated in the last few years and we intend to

strengthen the application of that know-how in the broad domain of Collaborative Networks, with a strong application focus.

In line with these general concerns, our future research will focus on the following themes:

a) Models and integration of cooperative networks

The goal is to develop: a) a global interdisciplinary theory for relationship management in organizational networks; b) business models and planning tools for creating, managing and dissolving collaborative networks.

Research will also be pursued in the domain of semantic integration of organizational structures formed by autonomous, independent and heterogeneous entities acting in dynamic and competitive environments.

b) Information and knowledge management

The focus of this research line will be on the social process perspective of knowledge creation and use of collaboration as the fundamental instrument for that creation. This will involve working on: a) socially constructed socio-technical artifacts; b) collaborative workspaces for management; c) applications of networking theories.

In particular research will be pursued on "socio-semantics in collaborative networks", aiming at developing innovative concepts and applications for the management of information and knowledge in collaborative networks.

c) Decision Support Systems

Our research agenda will be centered in topics such as Multi-objective Metaheuristics, Soft Methods in Decision Making, or Creativity in Optimisation. Innovative concepts previously developed will be enhanced and extended.

A new research line we have started recently and intend to deeply explore is related to the design of new hybrid optimization techniques that merge optimization procedures with metaheuristics.

8. Other Activities

This section is designed so that the LA can report on its efforts to promote activities that include multiple Research Lines and or multiple Research Groups. In this section the LA can also indicate efforts made towards the implementation of services for Researchers Groups within the LA but also for services in collaboration with other Institutions of Research, Higher Education Government or the community in general. This section also contains information regarding the Networking activities of the LA, its involvement in training efforts (PhD programs) and its activities designed to promote communication between Science and Society. The final Section is designed to provide an overview of the original aims of the LA in all these respects and how they compared with their implementation

8.1 Internal Services and Resources (3000).

Indicate here sharing of equipment and other resources both within the LA, between LAs or with other institutions of Higher Education nationally or internationally)

The LA has a deep cooperation with three Departments at FEUP (Fac. Engineering UP): Electrical Engineering; Informatics Engineering; and Management and Industrial Engineering. The same occurs with the Department of Physics at the Faculty of Sciences (FCUP) of the Univ. Porto. The research laboratories created by INESC Porto are shared with these departments on a regular basis, especially for post-graduation studies. However, vast support to under-graduation is also real, especially for final year project or thesis work. Also, a diversity of examples of cooperation with other LAs exists.

The LA has built a strong management structure which allows researchers and research units to share many resources. The following services are centrally provided and shared: juridical, human resources, insurance, administrative and financial management of projects, accounting, media and image, translation, information management, communication and computing support, transportation and fleet management, drivers, facilities management, room and equipment reservation, acquisition of equipment/services, event organization, bar, cleaning, library and secretarial assistance. These services are assured by a team of some 34 full-time contracted personnel, building a highly efficient and qualified pool of people that help creating the high quality environment provided to the researchers.

Software tools are acquired by the LA and made available to researchers and research units through sharing mechanisms. This process is controlled by SCI (Computer Service).

Resource sharing among internal groups and with external entities is regular. Just a few examples in 2009 follow, parallel to 2008:

Under the responsibility of the Power systems Unit (USE), sharing of computer facilities and specific simulation software, like PSS/E, used by FEUP students in their assignments and MSc dissertations. Also, sharing of lab facilities, involving the RTDS hardware/software, installed at FEUP. Simulation software like EUROSTAG and PSSE as well as computer resources installed at FEUP.

In the area of UOSE (optoelectronics), sharing the clean room area with the Physics Department of FCUP, enabling pre- and post-graduation training in micro-fabrication technologies. The clean room is also shared with the Associate Laboratory IFIMUP located at the Physics Department. IFIMUP is together in an Associated Laboratory with INESC-Microelectronics and Nanotechnologies (in Lisbon) and INESC Porto is one of the owners/associates of this institution.

The clean room area is also shared with a set of Brazilian universities that develop theoretical work and come to Porto to manufacture and test devices at INESC Porto. Some of these activities are formally recognized and funded in a project under the FCT-CAPES bi-lateral agreement.

ITQB and REQUIMTE are other Associate Laboratories with whom INESC Porto LA develops partnerships looking for synergies using complementary competences.

In the area of UTM (telecommunications), sharing with UOSE, and also with FEUP and FCUP of a Photonics and Microwaves laboratory, set-up with funding from FCT.

In the area of software, USIG maintains a software infrastructure sharing costs with other Units, particularly an ORACLE DBMS and associated tools (sharing with UTM and UESP) and ESRI GIS (sharing with USE).

The ROBIS group has several robotic equipments (manipulators, mobile platforms, autonomous vehicles) that are used as test beds shared by students both at pre and post-graduation levels.

8.2 External Services and Resources (3000)

Indicate here scientific or technical services provided both nationally or internationally to Governments/Institutions or the community)

In 2009, INESC Porto continued the policy defined in past years of providing assistance to Governmental and other public interest bodies, in the great majority of the cases without any payment for the work done. It must be noted that in many cases this assistance is not liable to be reported. This activity demonstrates the deep involvement of the LA and the sense of mission that presides to its action.

Among the actions developed in 2009, and only as examples mostly of non-paid activities, one may identify

- assistance to the Ministry of Economy and Innovation and to Regional Coordination and Development Commissions in the definition of regulations and tenders for national funding programs in the framework of QREN (the framework of the application of the European Regional Development Fund Programs in Portugal).
- advice on technology trends upon request to INOVCAPITAL, the state controlled risk-capital company (since 1999)
- assistance to the Innovation Agency (AdI)
- preparation for the Regional Government of Madeira of Laws for the electric energy sector
- consultancy to the Regional Coordination and Development Commissions of Northern Portugal (CCDR-N) and Lisbon and Tejo Valley (CCDR-LVT)
- support to a NCP of the IST Program resident at INESC Porto
- activity of researchers as National Delegates to the committees of IST and NMP programs (7FP)
- leadership of the Portuguese participation in the European Technology Platform Manufuture, with roles in the High Level and Implementation Support Groups and founding member of the European Factory of the Future Research Association

As a member of the Council of the Associated Laboratories (CLA)

- Feedback to FCT on rules to be adopted in national calls for grants and on changes to the Public Contracts Law
- Active role in the discussion of models enabling the eventual inclusion of the Associated Laboratories of the University of Porto in the new juridical Foundation format of this University
- Advice to other Associated Laboratories in specific juridical and accounting procedures

8.3 Networking Actions (2000 c.)

Indicate here both national and international activities)

The LA policy is of strongly supporting networking.

INESC Porto LA has several Agreements with foreign Universities with emphasis to Brazil and the EU, and with companies and research centers. These have originated projects and allowed a great number of exchanges of students and post-docs for short and prolonged stays.

Examples of actions led by the Board of Directors:

- Participation in 6 national Technology and Competitiveness Poles and 2 Regional Clusters promoted by the Ministry of Economy
- Involvement in the FCT partnership programs with MIT, CMU and UT Austin, with leadership and management in doctoral programs and research projects.
- Regular activity of the Center of Knowledge on the Railway (consortium with FEUP and institutes in Mechanical and Civil Engineering), including Board of Directors.
- Constitution of the Center of Knowledge on Sustainable Energy (together with other FCT Units including another LA in Chemical Engineering).
- Promotion of a cooperation network with the major Brazilian Universities

Examples of actions led by Units (many more exist):

USE

Governing Board of the EES/UETP Euro consortium for adv. training involving universities and companies.

Euro Working Group of Multiple Criteria Decision Aid

UOSE

National network of competence in Sensors and in Optical Fiber Sensors with IT Aveiro and University of Aveiro

CEMICRO, a Portuguese network in Microfabrication

Various Management Committees of COST Actions (members of the INESC Porto LA are National Delegates in 6 COST Actions)

UTM

VISNET II (Networked audiovisual media technologies), Network of Excellence of the FP6 IST programme

EIFFEL Support Action (<http://www.fp7-eiffel.eu/home.html>) - coordination of the topic “user-provided networking”

Thematic Network on Mobile Communications (<http://rtcm.inescporto.pt>)

UESP

Manufature ETP - A highly relevant network of companies and R&D institutions with centers in all Europe and motivated by INESC Porto in Portugal.

SoColnet - Society of Collaborative Networks

ERIMA - European Research in Innovation and Management Alliance

Footwear ETP - Footwear Products and Processes European Technology Platform

ROBIS

UMS (Unmanned Maritime Systems) initiative of the EDA (European Defence Agency)

USIG

ELANET - European Local Authorities Telematic Network

ADDME - Activating Drivers for Digital eMpowerment in Europe (Digital Divide Thematic Network)

CEDT - Association focused on dematerialization solutions.

8.4 Training Activities (2000 c.)

Indicate here activities of the LA as a whole)

INESC Porto LA provides internal and external training. A recent survey tracking the career of 700 ex-researchers has shown them to have jobs in leading companies in 17 countries.

Internal training is addressed to all its collaborators. The effort in internal training, in 2009, could not benefit from the support that in the past public financing tools were providing, because of a change of policy that left out advanced training from the supported topics. Specific actions supporting individual requests were supported by the LA.

Externally, INESC Porto LA offered advanced training to academics, industry and services, at national and international level. The training offer was carried by the research Units. Some examples are:

SPECIFIC TRAINING COURSES FOR THE INDUSTRY:

Organization of EES/UETP (University Enterprise Training Partnership) courses and participation in lecturing activities in other EES/UETP courses organized by other institutions (European scope with several companies and universities as partners), especially addressing the industry and the power sector. Advanced training of young researchers in the framework of two research contracts with PT Inovação (Portugal Telecom): GrCLIFmcast (Management of multicast sessions for IP based services created by users) and ASP Domestic Networks (Authentication, Security and Privacy solutions for Domestic Network services)

HIGHER EDUCATION:

JADES - Joint Advanced Doctoral programme in Energy Systems (Bosnia and Herzegovina, Macedonia, Serbia), EU-TEMPUS, 2008-2010.

Project “ELLEIEEC-Enhancing Lifelong Learning for the Electrical and Information Engineering Community” (2008-2011) 1428-LLP-1-2008-FR-ERASMUS-ENW.

All Units of INESC Porto LA have also been deeply involved in training actions targeting students at pre-graduation, MSc and PhD levels, namely regular collaboration and student framing by the Research groups in the scope of the MIT-Portugal (area of Engineering Design and Advanced Manufacturing - EDAM), CMU-Portugal and UT Austin Programs.

INVOLVEMENT IN TECHNOLOGY TRANSFER AND TECHNOLOGY-BASED ENTREPRENEURSHIP TRAINING PROGRAMS OF ACADEMIC AND ALSO NON-ACADEMIC STAFF:

Support to MIETE, Master in Innovation and Technological Entrepreneurship, of FEUP

8.5 Outreach/Science and Society (4000 c.)

Indicate here activities that the LA as a whole

INESC Porto gives great importance to communication with citizens. In 2009 this activity followed the general trend of recent years and the condensed report that can be made is no different from past reports in its broad lines.

The Communication Service (CS) includes 2 specialists graduated in Media and Communication. An external service was contracted to watch the media and allow news and press releases to flow to newspapers, radio and tv, in order to promote public awareness (and understanding) of

science and make informal contributions to science education. In 2009, 351 news pieces were identified in the main Portuguese media.

The CS, among other duties, runs a digital monthly Bulletin (BIP, <http://bip.inescporto.pt/>) in Portuguese, with news on science and projects developed, that reaches a vast community of readers in Portugal and Brazil. In 2009 this BIP bulletin completed 10 years and 99 issues, which is remarkable together with the general acceptance it receives.

A version of BIP in English (<http://bip.inescporto.pt/index.php?lng=en>) is also published every 3 months.

Google Analytics provided a counting of accesses to BIP: in the period of October 1-31, 2009, the Bulletin had 2303 hits from 1488 different persons, from 35 countries, the top being Portugal, Brazil, USA, Germany, UK, Spain, France, Argentina, Italy and Belgium. In February 2010 this number amounted to 1714 hits from 1283 visitors in 43 countries.

INESC Porto developed a consistent action of presence in the civil society with participation in a diversity of events and initiatives. As a consequence, experts from INESC Porto are regularly interviewed by tv and radio stations (beside the press) on hot topics that the society is debating.

INESC Porto is a partner of the Ciência Viva (CV) association whose aim is to promote science among youth. It has regularly cooperated with the CV initiatives, namely in the annual programs to receive students from secondary schools for short periods of time in its laboratories. Also, a member of the Board of Directors is a member of the Scientific Advisory Board of the Ciência Viva Center of Bragança.

Support to the University of Porto annual event, Mostra da Ciência (Science Exhibit), has also been given as well as support to Engineering and Sciences Faculties Open Days, highlighting the LA activities. INESC Porto also participated in national Exhibitions organized by the Innovation Agency and the Ministry of Science to disseminate science and technology accomplishments by Portuguese researchers.

The UOSE Research Group (RG) participated actively in the Physics Summer School of the Physics Department of Faculty of Science of Porto University (<http://e-fisica.fc.up.pt/>) directed to high school students. The RG proposed short scientific projects that are realized by groups of five students with ages between 15 and 18 years old during 5 days. Each group of students works under the supervision of a PhD student from the RG. Some projects are: Gas sensors for environmental monitoring, Implementation of a bar code reader, Temperature measurement by luminescence, Holographic interferometry by double exposure: a light ruler, Temperature sensor using Bragg gratings, Fluorescent nanoparticles for sensors and medical imaging, Optical transmission of audio and video signals and Laser scanning system for tridimensional characterization of objects. During the week long period the students also visit the research labs, namely the RG clean room and other microfabrication facilities.

Public talks and lectures were given by the senior members of the LA in various locations, in secondary schools and in Civic Associations, scientific and technical meetings. A few examples (not an exhaustive list) of this participation in the society life collected from the Telecommunications and Multimedia and the Power Systems areas:

J. Ruela, "Quality of Service (QoS) in IP networks", VISNET II Summer School, Koç University, Istanbul, June 2009.

M. T. Andrade / V. Barbosa, "Context-aware content adaptation: standards and research trends", VISNET II Summer School, Koç University, Istanbul, June 2009.

P. Mendes, "BYON: Build your own Network", EIFFEL 3rd think-tank meeting, Athens, October 2009.

R. Sofia, "Ethernet Advanced Forwarding, a Primer", University of Alcalá, Madrid, May 2009.

J. Peças Lopes, "Smart Grids and Mobility", Invited talk, Int. Conf. on Technology Policy and Innovation, Porto, 2009 July

Vladimiro Miranda, "Training intelligent systems with entropy concepts: wind power prediction and other applications", invited plenary speaker at the ISSE 2009 (Int. Workshop on Sustainable Energy), Tokyo, Japan, December 2009

Similar examples would be found in the other areas of expertise of INESC Porto, with impact in schools, industry, media and general public.

8.6 Organization of International Events (2000 c.)

Indicate here events that are international in dimension and required the involvement of the LA for their implementation)

INESC Porto LA was involved in the organization of International Events at various levels: from fully organizing the event to having its researchers serve as Chair of Conferences or as members of Technical or Scientific Committees.

The following is a list with a few examples on events with organization or co-organization of INESC Porto.

ICTPI'09 - Int. Conf. on Technology, Policy and Innovation, Porto, Portugal, July 2009

U-NET 2009 - 1st international workshop "User-provided Networks, Challenges and Opportunities" (<http://conferences.sigcomm.org/co-next/2009/workshops/unet/>), Rome, Dec. 2009

SEON - Symposium on Enabling Networks and Sensors, with IT-Aveiro, Lisboa, 26th June 2009

VIII International Workshop on Cutting, Packing and Related Topics, Vila Nova de Foz Côa, Portugal, September 2009 (<http://www.fe.up.pt/~esicup/extern/8IWCPRT/>).

10th EU/MEeting workshop (the European metaheuristics community) - Debating the future: new areas of application and innovative approaches, Porto, Portugal, April 2009.

SMC 2009 - 6th Sound and Music Computing Conference and SMC Summer School, Porto, July 2009

U-NET 2009 - 1st international workshop "User-provided Networks, Challenges and Opportunities" (<http://conferences.sigcomm.org/co-next/2009/workshops/unet/>), Rome, Dec. 2009

3rd EIFFEL Think-tank meeting, session "BYON: Build Your Own Network", Athens, Oct. 2009

VISNET II Summer School, Koç University, Istanbul, June 2009

A large number of events in which INESC Porto researchers served as Chair/Vice Chair of the Organization or Members of Technical/Scientific Committees could be listed. Two examples from the USIG RG:

WikiSym 2009, 5th International Symposium on Wikis and Open Collaboration, Oct 25-27 , Orlando, USA - Ademar Aguiar: Symposium Committee, Sponsorships Chair; and Program Committee

SIACG 2009, IV Iberoamerican Symposium in Computer Graphics, Margarita, Venezuela, Jun 15-17 - Augusto Sousa - Member of International Organization Committee

9. Internal Evaluations

In this section you should include a summary of internal evaluations during the report period and the future internal evaluation plans for 2010.

9.1 Summary of internal evaluations during 2009 (3000 ca.)

INESC Porto conducts a policy of periodic internal evaluation. In 2009, the procedures adopted were the same as the ones put in place in previous years.

Scientific and technical evaluation:

Every 3 months all researchers, either grantees or faculty from the University schools and other Higher Education schools are subject to a performance evaluation by their hierarchical superiors. This leads to a classification with reflex on performance prizes and bonuses. This classification is discussed in a meeting of the Council of Research Units.

Annually, a global performance assessment is conducted by the Board of Directors, with the cooperation of the Group and Project leaders. This is a participated evaluation exercise beginning with a self-assessment by each researcher. A workflow tool has been put in place to assist in the evaluation procedures.

Regularly the Scientific Council assesses the value of published material and decides on which journal papers should entitle their authors to bonuses or scientific prizes, given by the Board of Directors.

On a case basis, the Board of Directors assesses the merits of new research line proposals, proposed by the research groups, in special presentation sessions, and approves their plan, budget and reinforcement of human resources.

The Board of Directors also always assesses the global performance of each researcher with a Ph.D. degree, contracted under the LA program, following a report and a special presentation, with consequence to the renewal of contracts.

Financial and management evaluation:

The activity of INESC Porto is regulated by an annual plan, approved by its General Council.

Every 3 months an evaluation session is conducted, during a meeting of the Council of research Units, to assess the deviation to the plan as well as the financial health of the institution. Corrections are introduced then in the trajectory.

A midterm evaluation session (in July) assesses the scenario of a simulation of the activity for the whole year. Policy measures are then taken to assure that the year closure will not represent a problem.

Strategic Evaluation

In 2009, taking in account the planned enlargement of INESC Porto LA of the Groups LIAAD and CRACS, plus a new Group UGEI that requested entering the LA, a strategic evaluation was conducted by the President of the SAB in coordination with his Committee fellows. The result was the support of the plans put up by the Board of Directors to admit those Groups and the preparation of written statements that were sent to FCT in due time.

9.2 Future internal Evaluations plan for 2010 (3000 ca.)

INESC Porto has always had a policy of interaction with its SAB (Scientific Advisory Board) while respecting its independence.

One has never had a policy of inducing the SAB to generate a ranking or classification of the LA. On the contrary, INESC Porto LA has always dealt with the SAB as a fundamental tool to influence its strategic planning. The discussions of the SAB with the Board of Directors have been extremely useful and fruitful. However, INESC Porto does not see the SAB as a governing body of the institution nor has the perspective that all the recommendations of the SAB should be followed or implemented. They are a means to provide insight and vision, and highly respected for that - but the policy is dictated by the owners of INESC Porto. Therefore, an evaluation process based on assessing if the recommendations of the SAB are followed (and to

which extent) or not does not seem productive at all nor does it contribute to the independence of the analysis by the SAB and risks limiting the boldness of suggestions.

Furthermore, without the evidence of independent analysis, an evaluation process led by the SAB risks to appear to the public opinion as lacking credibility. The SAB and its members are hosted and have expenses paid by the institutions they are supposed to analyze and this may place its members in an uncomfortable position.

Having stated this, INESC Porto implements a regular evaluation based on a differential principle, i.e., referring to variations relative to a base date. Several criteria are identified (and sub-criteria) but one does not envisage reaching a global and unique mark as a result of the process. The indices associated to each criterion serve as indicators of performance under a multiple criterion framework.

This process will naturally be built on top of the regular evaluation procedures that INESC Porto already has in place:

- Evaluation of individual performance every 3 months
- Complementary evaluation of individual performance on an annual basis
- Evaluation of the performance of the researchers contracted under programs supported by FCT 6 months before contract renewal
- Evaluation of publication performance and other indicators on an annual basis
- Financial and management evaluation every 3 months
- Scientific global evaluation by the SAB on an annual basis.

10. Future Objectives

This section is designed to provide a short summary of future objectives of the LA with respect to its overall aims in Research/Services/Activities.

10.1 Summary of proposed future objectives (2000 ca.)

INESC Porto LS plans to have (as soon as FCT formally recognizes the new LA structure) five main research lines, designed to enhance internal coherence and multi-disciplinarity, maximize external impact and guarantee in Portugal a solid knowledge core in key areas. These lines (subject to redefinition, since the definition of the new scenario is pending since 3 years) will be :

1. Networked Multimedia Systems and Services in scenarios of convergence
2. Photonics for Life Sciences: Optical Biochemical Sensing and Imaging
3. Sustainable Energy Systems - bulk and distributed systems in a market environment
4. Advanced Manufacturing Management, Innovation and Enterprise Cooperation Networks
5. Digital Society - large scale platforms, advanced services, citizen participation and policies

The first 4 lines represent an evolution over the 4 lines defined for the 2002-07 period. There will be some reshaping of the objectives for the coming years. The first line has a strong focus on telecommunications and multimedia, the second on sensor technologies, the third on energy systems, the fourth on industrial systems - which are the traditional strong areas of INESC Porto.

The fifth line represents a new catalyst for the activities whose support is software, computer science and artificial intelligence. This is a direct result of the expected integration in INESC Porto LA of the two new autonomous groups LIAAD and CRACS, to be approved by FCT after the evaluation of INESC Porto. These Groups have had independent evaluations by FCT and their effective integration is one of the objectives of the LA for the coming period.

The activity of the LA will not be restrained to these 5 lines, however.

Other objectives include:

1. The increase in productivity: in publications, projects, patents, highly specialized consultancy
2. The increase in the number of spin-off or spin-out companies
3. The acquisition of a sustained international status and enlargement of the geographical area of activity to South America
4. A full integration and real influence in the strategy designed by the University of Porto as a research university
5. Consolidation of a decisive presence in industry partnerships and networks.



INESCPORTO

INSTITUTO DE ENGENHARIA DE SISTEMAS
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LABORATÓRIO ASSOCIADO

PARTE C

Informação Complementar de Actividade das Unidades

2009

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POWER SYSTEMS

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	17
Papers in National Journals with scientific referees	0
Conference Proceedings in events with scientific referee and selection	48
Books (author)	1
Chapter/paper in books	3
Publications (editor)	0
Other publications (National meetings, local journals, etc.)	4
Theses concluded in 2009 by members of the Unit	4
TOTAL	75

Journal	Number
Electric Power Systems Research	7
IEEE Transactions on Power Delivery	1
IEEE Transactions on Power Systems	3
European Journal of Operational Research	1
International Journal of Electrical Power & Energy Systems	2
IET Renewable Power Generation	2
Renewable Energy	1
TOTAL	17

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	2
European Union Programmes	4
Supply of Services - national	18
Supply of Services - European Union	2
Supply of Services - International	2
Other R&D Services	
Other External Services	1
Internal	
TOTAL	29

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members of the Unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master	0	1	52	53
Doctoral	3	16	3	22
TOTAL	3	17	55	75

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	0
Nº. of External co-authors of Publications of INESC Porto	78

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

Bessa, R. J., Miranda, V., Gama, J., "Entropy and Correntropy against Minimum Square Error in Off-Line and On-Line 3-day ahead Wind Power Forecasting", IEEE Transactions on Power Systems, vol.24, no.4, November, 2009, pp.1657-1666.

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Gomes, M. H., Saraiva, J. T., "A market based active/reactive dispatch including transformer taps and reactor and capacitor banks using Simulated Annealing", Electric Power Systems Research, vol.79, no.6, June, 2009, pp.959-972.

Gomes, B. A., Saraiva, J. T., "Demand and generation cost uncertainty modelling in power system optimization studies", Electric Power Systems Research, vol.79, no.6, June, 2009, pp.1000-1009.

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Miranda, V., Carvalho, L., da Rosa, M. A., Leite da Silva, A., Singh, C., "Improving Power System Reliability Calculation Efficiency With EPSO Variants", *IEEE Transactions on Power Systems*, vol.24, no.4, November, 2009, pp.1772-1779.

Miranda, V., Santos, A., Pereira, J., "State Estimation Based on Correntropy: A Proof of Concept", *IEEE Transactions on Power Systems*, vol.24, no.4, November, 2009, pp.1888-1889.

Moyano, C. F., Peças Lopes, J. A., "An optimization approach for wind turbine commitment and dispatch in a wind park", *Electric Power Systems Research*, vol.1, no.79, January, 2009, pp.71-79.

Ramirez-Rosado, I. J., Fernandez-Jimenez, L. A., Monteiro, C., Sousa, J.N., Bessa, R. J., "Comparison of two new short-term wind-power forecasting systems", *Renewable Energy*, vol.34, no.7, July, 2009, pp.1848-1854.

Schweickardt, G., Miranda, V., "A two-stage planning and control model toward Economically Adapted Power Distribution Systems using analytical hierarchy processes and fuzzy optimization", *International Journal of Electrical Power & Energy Systems*, vol.31, no.6, July, 2009, pp.277-284.

- **National Journals with scientific referees**

N/A

- **Conference Proceedings with scientific referees (international or national)**

Agreira, C. I. F., Ferreira, C. M. M., Maciel Barbosa, F., "Electric Power System's Steady - State Security Analysis Applying the Rough Set Theory Considering an Incomplete Information System", in *UPEC '09 - The 44th International Universities Power Engineering Conference*, Glasgow, United Kingdom, 1 - 4 September, 2009.

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Botterud, A., Wang, J., Monteiro, C., Miranda, V., "Wind Power Forecasting and Electricity Market Operations", IAEE32 - 32nd International Association for Energy Economics (IAEE) International Conference, San Francisco, CA USA, 21 - 24 June, 2009.

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Dialynas, E., Maciel Barbosa, F., Katić, V., Konjić, T., Milanović, J., Todorovski, M., Miranda, V., "Tempus Project JADES - Joint Advanced Doctoral Degree in Energy Systems", XV Skup Trendovi Razvoja "Doctoral studies in Serbia, region and EU", Kopaonik, Servia, 2 - 5 March, 2009.

Duarte, A. F., Fidalgo, N., Saraiva, J.T., "Forecasting Electricity Prices in Spot Markets - One Week Horizon Approach", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Farinha J. M. T., Fonseca, I., Simões, A., Ferreira, L., Marques, V., Maciel Barbosa, F., "Integrating Wind Power Energy into Electric Grids an environmental issue", The 3rd International Conference on Energy Planning, Energy Saving, Environmental Education, La Laguna, Tenerife, Canary Islands, Spain, 1-3 July, 2009.

Fernandes, R.V., de Almeida, S.A.B., Pestana, R., Maciel Barbosa, F., "Load Shedding - Coordination between the Portuguese Transmission Grid and the Distribution Grid with Minimization of Loss of Distributed Generation", 2009 IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

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Fonseca, I., Farinha, J. M. T., Simões, A., Maciel Barbosa, F., "Manutenção Preditiva de Geradores Eólicos", APMI- Associação Portuguesa de Manutenção Industrial, 10.º Congresso Nacional de Manutenção, Figueira da Foz, Portugal, 19 - 20 November, 2009.

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Katić, V., Dialynas, E., Maciel Barbosa, F., Konjić, T., Milanović, J., Todorovski, M., Miranda, V., "Structure of Doctoral Studies - JADES project", XV Skup Trendovi Razvoja "Doctoral studies in Serbia, region and EU", Kopaonik, Servia 2 - 5 March, 2009.

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Miranda, V., Bessa, R. J., outros et al. , "New Concepts in Wind Power Forecasting Models ", WP2009 - WindPower 2009 Conference & Exhibition, Chicago, IL USA, 4 - 7, May, 2009.

Peças Lopes, J. A., Almeida, P. M. R., Soares, F. J., "Using Vehicle-to-Grid to Maximize the Integration of Intermittent Renewable Energy Resources in Islanded Electric Grids", ICCEP 2009 - International Conference On Clean Electrical Power Renewable Energy Resources Impact, Capri, Italy, 9 - 11 June, 2009.

Peças Lopes, J. A., Almeida, P. M. R., Soares, F. J., Hatziargyriou, N., "Electric Vehicles Grid Integration Under the MicroGrid Concept", Smart Grids and Mobility, Würzburg, Germany, 16 - 17 June, 2009.

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Peças Lopes, J. A., Soares, F. J., Almeida, P. M. R., Baptista, P. C., Silva C. M., Farias, T. L., "Quantification of Technical Impacts and Environmental Benefits of Electric Vehicles Integration on Electricity Grids", ELECTROMOTION 2009 - 8th International Symposium on Advanced Electromechanical Motion Systems , Lille, France, 1 - 3 July, 2009.

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Pereira, A. J. C., Saraiva, J. T., "A Decision Support Tool for Generation Expansion Planning in Competitive Markets Using System Dynamics Models", in Proceedings of IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Pereira, R. M. M., Ferreira, C. M. M., Maciel Barbosa, F., "Influence of a wind farm in the dynamic voltage stability of a power network", in UPEC'09 - The 44th International Universities Power Engineering Conference, Glasgow, United Kingdom, 1 - 4 September, 2009.

Pereira, R. M. M., Ferreira C. M. M., Maciel Barbosa, F., "Dynamic Voltage Stability Assessment of an Electric Power System using Trajectory Sensitivity Analysis", IEEE Bucharest PowerTech 2009, Bucharest - Romania, 28 June - 2 July, 2009.

Reis, C., Andrade, A., Maciel Barbosa, F., "Line Stability Indices for Voltage Collapse Prediction, POWERENG 2009, Lisbon, Portugal 18 - 20 March, 2009.

Reis, C., Andrade, A., Maciel Barbosa, F., "Voltage Stability Analysis of Electrical Power System", POWERENG 2009, Lisbon, Portugal 18 - 20 March, 2009.

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- **Books (Author)**

Maciel, N., Villate, J. E., Azevedo, C., Maciel Barbosa, F., *Eu e a Física*, 12 Porto Editora, 2009

- **Chapter/paper in Books**

Fidalgo, N., Fontes, D., Silva, S., "A Decision Support System to Analyze the Influence of Distributed Generation in Energy Distribution Networks", in Optimization in the Energy Industry, Ed. J Kallrath et al, Springer Berlin Heidelberg, 2009, ISBN: 978-3-540-88964-9, pp.59-77.

Peças Lopes, J. A., Madureira, A., "A Voltage Control Optimization for Distribution Networks with DG and MicroGrids", in Optimization Advances in Electric Power Systems, Ed. Edgardo Castronuovo, Nova Science Publishers, January, 2009, ISBN 978-1-60692-613-0, pp.87-112.

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- **Publications (Editor)**

N/A

- **Other Publications**

Peças Lopes, J. A., Messias, A. A., Gonçalves, R. M. P., "Redes de energia inteligentes como contributo da engenharia portuguesa para o desenvolvimento sustentável", InGenium, no.112, July, 2009, pp.44-47.

- **Theses (concluded by members of the Group)**

Marques, P., "Solutions to Improve the Dynamic Security of Interconnected Systems with Large-Scale Integration of Wind Power", PhD Thesis, FEUP, July, 2009.

Ferreira, R., "Reserve Adequacy in Systems with Large-Scale Integration of Wind Power", MSc Thesis, FEUP, November, 2009.

Santos, A., "Study of the Dynamic Behaviour of Industrial Electrical Grids - The Case of Matosinhos-Leça Refinery", MSc Thesis, FEUP, 2009.

Silva, B., "Wind Farms with Ride-through Fault Capability: Validation of a Novel Real-time Protection System with RTDS", MSc Thesis, FEUP, February, 2009.

F) LIST OF PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
CoordEES-UETP	João Peças Lopes	TRAIN	O			INT	PROP	2009-03	CONT
PLASM	Vladimiro Miranda	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-04	CONT
GREENISLAND	Manuel Matos	RES	PROG - NAT	FCT / POFC	PROJ IC&DT	NAT	PAR	2009-02	START
MORE MICROGRIDS	João Peças Lopes	DEV	PROG - EU	FP6		EU	PAR	2009-02	FIN
Anemos.plus	João Peças Lopes	RES	PROG - EU	FP6		EU	PAR	2008-02	CONT
JADES	Vladimiro Miranda	TRAIN	PROG - EU	TEMPUS IV		EU	PAR	2009-01	CONT
SECEEN	Vladimiro Miranda	TRAIN	PROG - EU	TEMPUS IV		EU	PAR	2008-05	FIN
ARGOS	Vladimiro Miranda	DEV	SERV - INT			IND	CONT	2008-01	CONT
Parafuzzy	Jorge Pereira	DEV	SERV - INT			IND	CONT	2008-12	CONT
ASIRP	Nuno Fidalgo	CONS	SERV - NAT			IND	CONT	2009-09	START
CâmaraPB	Claúdio Monteiro	CONS	SERV - NAT			IND	CONT	2007-11	FIN
CARCons	José Nuno Fidalgo	CONS	SERV - NAT			NAT	CONT	2008-09	FIN
Consultoria	Manuel Matos	CONS	SERV - NAT			IND	CONT	2008-09	CONT
DRCIE-RAM	Manuel Matos	CONS	SERV - NAT			IND	CONT	2007-09	FIN
EEM	Tomé Saraiva	CONS	SERV - NAT			IND	CONT	2008-12	FIN
Eneop2	João Peças Lopes	CONS	SERV - NAT			IND	CONT	2008-09	FIN
Enerco-WindStudies	João Peças Lopes	CONS	SERV - NAT			IND	CONT	2009-06	CONT
InovGrid	João Peças Lopes	CONS	SERV - NAT			IND	CONT	2008-04	CONT

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
RAVE-MAT	Pedro Cleto Machado	CONS	SERV - NAT			IND	CONT	2002-01	FIN
REN_RECEP	Peças Lopes	CONS	SERV - NAT			IND	CONT	2008-01	CONT
TSO-reserva	Manuel Matos	CONS	SERV - NAT			IND	CONT	2008-07	CONT
Upinvest	Cláudio Monteiro	CONS	SERV - NAT			IND	CONT	2008-09	START
VENINVESTE	João Peças Lopes	CONS	SERV - NAT			IND	CONT	2008-02	FIN
WPI-GALPVenez	João Peças Lopes	CONS	SERV - NAT			IND	CONT	2007-11	START
EFACEC-DMS	João Peças Lopes	DEV	SERV - NAT			IND	CONT	2008-01	CONT
PrevEol	Cláudio Monteiro	DEV	SERV - NAT			IND	CONT	2007-09	FIN
FORM.EDA	João Peças Lopes	TRAIN	SERV - NAT			IND	CONT	2007-10	FIN
JRC	Manuel Matos	CONS	SERV - EU			EU	CONT	2006-12	FIN
SRBEnergy	João Peças Lopes	CONS	SERV - EU			IND	CONT	2009-11	FIN

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

DMS/EMS new modules
 Developed under EFACEC-DMS
 Demo Place: EFACEC
 Development Period: 2008-2009

Reserve evaluation tool
 Developed under TSO-Reservas
 Demo Place: REN, REE
 Development Period: 2009-2010

Operating reserve advice tool
 Developed under Anemos.Plus
 Demo Place: REN
 Development Period: 2008-2009

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Eduardo Gouveia	FEUP	Manuel Matos	INESC Porto/FEUP	Adequacy evaluation of a transmission network in a liberalized environment	2009
Paulo Moisés	FEUP	Manuel Matos	INESC Porto/FEUP	Regulation for Microgeneration and Microgrid Integration in Distribution Power Systems	2009
Pedro Marques	FEUP	João Peças Lopes	INESC Porto/FEUP	Solutions to Improve the Dynamic Security of Interconnected Systems with Large-Scale Integration of Wind Power	2009
Adelino Pereira	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Reference Planning of the Expansion of the Power Generating System in a Market Environment	2010
André Madureira	FEUP	João Peças Lopes	INESC Porto/FEUP	Coordinated and Optimized Management of Distribution Networks with Multi-Microgrids	2010
Bruno Gomes	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Uncertainty Modeling in Generating Costs and Load Powers in Market Mechanisms and in the Calculation of Nodal Marginal Prices in Power Systems	2010
Inácio Fonseca	FEUP	Maciel Barbosa	INESC Porto/FEUP	Manutenção de Sistemas de Geração de Energia Renovável Eólica através de Redes IP	2010
Mauro da Rosa	FEUP	Vladimiro Miranda	INESC Porto/FEUP	Reliability of Power Systems with distributed generation	2010
Nuno Gil	FEUP	João Peças Lopes	INESC Porto/FEUP	Elaboration of Procedures and Criteria for Definition of Limits of Eligibility of Acceptance of Renewable Production in Isolated Networks	2010
Susana Almeida	FEUP	Maciel Barbosa	INESC Porto/FEUP	Portuguese Transmission Grid Incidents Risk Assessment	2010
Antero da Silva	FEUP	João Peças Lopes	INESC Porto/FEUP	Strategies for energy storage and sustainable mobility in isolated power systems	2011
Filipe Joel Soares	FEUP	João Peças Lopes	INESC Porto/FEUP	Impact of V2G systems in grid operation and expansion	2011
Julija Vasiljevska	FEUP	João Peças Lopes	INESC Porto/FEUP	Evaluation of environmental, economic and technical impacts of large scale integration of microgrids, including responsive demand, in electrical grids	2011
Manuel Rocha	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Transmission expansion planning - a multiyear approach considering uncertainties	2011
Manuel Valdez	FEUP	Maciel Barbosa	INESC Porto/FEUP	Novas Metodologias no Ensino e Aprendizagem na Área da Engenharia Electrotécnica	2011
Paula Vide	FEUP	Maciel Barbosa	INESC Porto/FEUP	Estimação de Estado de um Sistema Eléctrico de Energia, usando Medidas Fasoriais, com Recurso a Metodologias Evolutivas	2011
Pedro Almeida	FEUP	João Peças Lopes	INESC Porto/FEUP	Impact of Vehicle to Grid in the Power System Dynamic Behaviour	2011
Rita Pereira	FEUP	Maciel Barbosa	INESC Porto/FEUP	Estudo da Estabilidade Dinâmica de Tensão em Redes com Elevada Penetração de Energia Eólica	2011
Roque Brandão	FEUP	Maciel Barbosa	INESC Porto/FEUP	Assinatura Digital de Aero geradores	2011
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ricardo Ferreira	FEUP	Manuel Matos	INESC Porto/FEUP	Reserve adequacy in Power Systems with a high penetration of wind power	2009
Tiago Morais	FEUP	João Peças Lopes	INESC Porto/FEUP	Study of the operation of wave energy conversion systems	2009
António Santos	FEUP	João Peças Lopes	INESC Porto/FEUP	Study of the Dynamic Behaviour of Industrial Electrical Grids - The Case of Matosinhos-Leça Refinery	2009
Daniel Burnier Castro	FEUP	João Peças Lopes	INESC Porto/FEUP	Simulation of Intelligent Active Distributed Networks - Implementation of Storage Voltage Control	2009
Mário Neto	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Valorization of Tariffs for Renewable Energy Technologies	2009
Pedro Correia	FEUP	José Rui Ferreira	INESC Porto/FEUP	Development of a Management Module for Hybrid Systems in Networks Operating in Isolated Mode	2009
André Moreira	FEP	Jorge Pereira	INESC Porto/FEP	Market Simulation	2010
Alexandre Santos Dias	FEUP	Maria T. P. Leão	INESC Porto/FEUP	Gestão Sustentável da Procura	2009
André Morais	FEUP	Hélder Leite	INESC Porto/FEUP	Arquitectura de comunicações de SPCC da EDP Distribuição	2009
André Santos	FEUP	Vladimiro Miranda	INESC Porto/FEUP	Application of Entropy Concepts to Power System State Estimation	2009
Bernardo Silva	FEUP	Hélder Leite	INESC Porto/FEUP	Parques Eólicos com "Ride-trough Fault": Validação de um Novo Sistema de Protecção em Tempo Real com Ajuda do RTDS	2009
Bruno Sampaio	FEUP	José Rui Ferreira	INESC Porto/FEUP	Desenvolvimento de Modelo de Ensaio de Sistemas de Protecção, Comando e Controlo Numérico (SPCC) em Dispositivos Electrónicos Inteligentes IED utilizando o Software "OMICRON-Test Universe	2009
Bruno Tomé	FEUP	João Tomé Saraiva / J. Nuno Fidalgo	INESC Porto/FEUP	Previsão de Preços de Energia Eléctrica em Mercados de Electricidade - Horizonte de 24 horas	2009
Carlos Oliveira	FEUP	José Rui Ferreira	INESC Porto/FEUP	Estudo das implicações da utilização de uma rede sem neutro num parque eólico com e sem bancos de baterias de condensadores para correcção do factor de potência	2009
Cláudio Alvez	FEUP	José Rui Ferreira	INESC Porto/FEUP	Desenvolvimento e Implementação de um Plano de Eficiência Energética na Amorim & Irmãos, S.A.	2009
Cristiano Moreira	FEUP	Vladimiro Miranda	INESC Porto/FEUP	Aplicação de Auto-modeladores Entrópicos em Problemas de Optimização	2009
Daniel Lopes	FEUP	José Rui Ferreira	INESC Porto/FEUP	Estabelecimento de uma relação entre as actuações das protecções existentes nas linhas aéreas e a ocorrência de incidentes de origem atmosférica	2009
Daniel Ribeiro	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Trânsitos de Energia em Redes Eléctricas com Elevada Produção Eólica	2009
Diana Costa	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Especificação de um Sistema de Certificados Brancos e Estudo do seu Impacto no Plano Nacional para a Eficiência Energética	2009
Diogo Tavares	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Soluções Técnicas para Sistemas de Carga de Veículos Eléctricos	2009
Domingos Raimundo	FEUP	Hélder Leite	INESC Porto/FEUP	Os Sistemas de Terras de Protecção e de Serviço no Projecto Português para Comboios Alta Velocidade	2009
Eduardo Gomes Santos	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Monitorização de Desempenho de Produção de Microgeração Fotovoltaica Utilizando Sistemas de Inferência e Simulação Computacional	2009
Elsa Ferraz	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Optimização de Estruturas de Modelos de Previsão de Produção Mini-Hídrica	2009
Evandro de Lima	FEUP	Hélder Leite	INESC Porto/FEUP	Análise de Redes de Distribuição de Alta Tensão	2009
Filipa Lourenço	FEUP	José Rui Ferreira	INESC Porto/FEUP	Gestão de Energia	2009
Filipe Rocha	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Definição de um Guia de Procedimento de Medição e Verificação de Projectos de Eficiência Energética	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Filipe Gil	FEUP	F. Maciel Barbosa	INESC Porto/FEUP	Deteção de defeitos em Redes de Distribuição Secundária	2009
Gilberto Silva	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Sistemas de Apoio à Medição e Verificação do Desempenho Energético	2009
Guilherme Fonseca	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Simulação de Sistemas Híbridos Insulares com Elevada Penetração de Energias Renováveis	2009
Helder Teixeira	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Caracterização da produção de centrais mini-hídricas	2009
João Guimarães	FEUP	Cláudio Monteiro	INESC Porto/FEUP	SWGESTIC - Serviços Web de Gestão Energética para Consumidores Domésticos	2009
Jorge Ramos	FEUP	Armando Sousa /Hélder Leite	INESC Porto/FEUP	FEUPowerTool - Ferramenta Pedagógica para Manobras em Subestações	2009
Jorge Salústio	FEUP	Maria T. P. Leão	INESC Porto/FEUP	Análise de Viabilidade de ESCO com Soluções de Aquecimento a Pellets	2009
José Barbosa	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Cálculo de Electricidade de Cogeração de Alta Eficiência	2009
Luís Monteiro	FEUP	F. Maciel Barbosa	INESC Porto/FEUP	Análise estatística das variáveis que influenciam a severidade dos incidentes na Rede de Transporte	2009
Luís Moreira	FEUP	Hélder Leite	INESC Porto/FEUP	Ciclo de Vida de Sistemas de Protecção, Comando e Controlo: Estratégias de Manutenção vs. Investimento	2009
Marcelo Pereira	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Optimização do Programa de Manutenção de Centrais Térmicas Considerando Previsões da Evolução da Procura e dos Preços de Mercado	2009
Márcio Oliveira	FEUP	Hélder Leite	INESC Porto/FEUP	Desenvolvimento de um Procedimento Padrão para a Mudança de Regime de Neutro em Subestações de Distribuição	2009
Márcio Pereira	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Estimativa de Produção de Sistemas Fotovoltáicos Integrados em Edifícios	2009
Marco Postiga	FEUP	Hélder Leite	INESC Porto/FEUP	Desenvolvimento de uma Metodologia para Estudo da Qualidade dos Isolantes em Cabos de Média Tensão	2009
Nuno da Fonseca	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Programa de optimização da procura horária em diagrama de patamares	2009
Paulo Sousa	FEUP	José Rui Ferreira	INESC Porto/FEUP	Distribuição Optimizada dos Aparelhos de Corte Telecomandados numa Rede de Distribuição MT	2009
Paulo Ribeiro	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Optimização de estratégias de operação de sistemas híbridos	2009
Pedro de Oliveira	FEUP	J. Nuno Fidalgo	INESC Porto/FEUP	Estimação e repartição de perdas em redes de distribuição	2009
Pedro Dias	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Indicadores do Potencial de Aproveitamento de Recursos Energéticos Endógenos em Edifícios Residenciais	2009
Pedro Soares	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Análise numérica dos resultados do Mercado de Electricidade	2009
Pedro Vaz	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Previsão Geográfica de Alteração do Padrão de Consumo Eléctrico Devido à Evolução da Penetração de Consumos de Veículos Eléctricos	2009
Ricardo Martins	FEUP	Hélder Leite	INESC Porto/FEUP	As Limitações dos Actuais Esquemas de Protecção das Saídas de Média Tensão no Aumento da Produção Dispersa	2009
Rui Araújo	FEUP	João Tomé Saraiva	INESC Porto/FEUP	Análise das Receitas dos Serviços de Sistema em Portugal - factores explicativos e características das centrais	2009
Rui Mangas	FEUP	J. Nuno Fidalgo	INESC Porto/FEUP	Redes de distribuição de energia com microgeração - Avaliação do impacto de diferentes condições de licenciamento	2009
Rui Silva	FEUP	Maria T. P. Leão	INESC Porto/FEUP	Microgeração na Rede BT - Limites Técnicos	2009
Tiago dos Santos	FEUP	Cláudio Monteiro	INESC Porto/FEUP	Adaptação de estruturas e processos de redes neuronais optimizadas para modelos de previsão produção eólica	2009
Tiago Pires	FEUP	José Rui Ferreira	INESC Porto/FEUP	Desenvolvimento de um Plano de Eficiência Energética para Transporte Vertical	2009
1	2	3	4	5	6

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

TELECOMMUNICATIONS SYSTEMS

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	12
Papers in National Journals with scientific referees	-
Conference Proceedings in events with scientific referee and selection	42
Books (author)	-
Chapter/paper in books	4
Publications (editor)	-
Other publications (National meetings, local journals, etc.)	13
Theses concluded in 2009 by members of the Unit	8
TOTAL	79

Journal	Number of papers
Breast Cancer Research and Treatment	1
Computer Vision and Image Understanding	1
IEEE Communications Surveys & Tutorials	1
IEEE Geoscience and Remote Sensing Letters	1
IEEE Transactions on Pattern Analysis and Machine Intelligence	1
IEEE Wireless Communications Magazine	1
International Journal of Business and Management	1
Journal of Information Science and Engineering	1
Multimedia Tools and Applications	2
Pattern Recognition Letters	1
Photonics Technology Letters	1
TOTAL	12

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	13
European Union Programmes	3
Supply of Services - national	7
Supply of Services - European Union	
Supply of Services - International	
Other R&D Services	
Other External Services	2
Internal	
TOTAL	25

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master	16	3	48	67
Doctoral	9	40	4	53
TOTAL	25	43	52	120

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	6
Nº. of External co-authors of Publications of INESC Porto	52

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

Almeida, F., Oliveira, J.M., Cruz, J.M., “Paths to Innovate Business Models in an Economic Downturn”, International Journal of Business and Management, vol.4, no.11, November 2009, p.29-37.

Viana, P., Pimenta Alves, A., “A Semantic Management Model to enable the integrated management of media and devices”, Multimedia Tools and Applications, Springer, October 2009, p.1-26.

Pessoa, L.M., Salgado, H., Darwazeh, I., “Performance Evaluation of Phase Estimation Algorithms in Equalized Coherent Optical Systems”, Photonics Technology Letters, vol.21, no.17, September 2009, p.1181-1183.

Cardoso, J.S., Carvalho, P.M., Teixeira, L.F., Corte-Real, L., “Partition-distance methods for assessing spatial segmentations of images and videos”, Computer Vision and Image Understanding, vol.113, no.7, July 2009, p.811-823.

Ciobanu, L., Corte-Real, L., “Successive refinement of side information for multi-view distributed video coding”, Multimedia Tools and Applications, July 2009.

Santos, A.P., Ricardo, M., “Header Compressed VoIP in IEEE 802.11”, IEEE Wireless Communications Magazine, vol.16, no.3, June 2009, p.69-75.

Teixeira, L.M., Corte-Real, L., “Statistical Multiplexing of H.264 Video Streams Using Structural Similarity”, Journal of Information Science and Engineering, vol.25, no.3, May 2009, p.703-715.

Gonçalves, H., Gonçalves, J.A., Corte-Real, L., “Measures for an Objective Evaluation of the Geometric Correction Process Quality”, IEEE Geoscience and Remote Sensing Letters, vol.6, no.2, April 2009, p.292-296.

Sofia, R., “A Survey of Advanced Ethernet Forwarding Approaches”, IEEE Communications Surveys & Tutorials, vol.11, no.1, January 2009, p.92-115.

Teixeira, L.F., Corte-Real, L., “Video object matching across multiple independent views using local descriptors and adaptive learning”, Pattern Recognition Letters, vol.30, no.2, January 2009, p.157-167.

Campos, M.J., Cardoso, J.S., Wild, T., Krois, W., Fitzal, F., “Comparing Two Objective Methods for the Aesthetic Evaluation of Breast Cancer Conservative Treatment”, Breast Cancer Research and Treatment, vol.116, no.1, p.149-152, July 2009.

Cardoso, J.S., Rebelo, A.M., Guedes, C.A., Pinto da Costa, J., “Staff Detection with Stable Paths”, IEEE Transactions on Pattern Analysis and Machine Intelligence, vol.31, no.6, p.1134-1139, June 2009.

- **National Journals with scientific referees**

N/A

- **Conference Proceedings with scientific referees (international or national)**

Sousa, R.J., Barbero, B., Cardoso, J.S., “An Ordinal Data Method for the Classification with Reject Option”, ICMLA2009 - Eighth Int. Conf. on Machine Learning and Applications, Miami Beach, USA, Dec. 2009.

Cardoso, J.S., “Stable Text Line Detection”, WACV2009 - IEEE Workshop on Applications of Computer Vision, Snowbird, USA, Dec. 2009.

Andrade, M.T., Costa, A., “Enabling Semantic search in structured P2P Networks via distributed Databases and Web Services”, WWW/Internet 2009 - IADIS Int. Conf., Rome, Italy, Nov. 2009.

Veiga, R., Mota, P.M., Machado da Silva, J., “Estimation of RF PA Nonlinearities after Cross-Correlating Power Supply Current and Output Voltage”, DCIS 2009 - XXIV Conf. on Design of Circuits and Integrated Systems, Zaragoza, Spain, Nov. 2009.

Luo, Q., Pereira, J.R., Salgado, H., “Fractal Monopole Antenna for WLAN USB Dongle”, LAPC 2009 - Loughborough Antennas & Propagation Conf., Loughborough, UK, Nov. 2009.

Castro, H., Alves, A.P., “Cognitive Object Format”, KEOD 2009 - Int. Conf. on Knowledge Engineering and Ontology Development, Funchal, Portugal, Oct. 2009.

Carneiro, G., Santos, A.P., Ricardo, M., “FlowMonitor - a network monitoring framework for the Network Simulator 3 (NS-3)”, NSTOOLS 2009 - Int. Workshop on Network Simulation Tools, Pisa, Italy, Oct. 2009.

Carvalho, L.M., Sofia, R., “A Performance Evaluation of Multihop Relaying vs. Multihop Routing”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

Del Monego, H., Oliveira, J.M., Ricardo, M., “Analyzing the Impact of Real and Non-Real Time Traffic on Joint Radio Resource Management”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

Ferreira, M.L., Queirós, J.I., Morla, R., “Automatic Retrieval of Network Traffic Data for Analysis of Network-In-World Action Relations in MMOGs”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

Campos, R.L., Duarte, R., Sousa, F., Ricardo, M., Ruela, J., “WiFIX: A New Solution for 802.11-based Wireless Mesh Networks”, CRC 2009 - 9ª Conferência sobre Redes de Computadores, Oeiras, Portugal, October 2009.

Del Monego, H., Oliveira, J.M., Ricardo, M., “A Resource Management Strategy for Interconnected WLAN and UMTS Networks based on User Mobility, Call Renegotiation, and Call Reallocation”, ISWCS'09 - Sixth Int. Symp. on Wireless Communication Systems, Siena, Italy, Sept. 2009.

Silva, S.R., Amaral, L.S., Sigaud, C., Salgado, H. et al, “Characterization of Semiconductor Lasers for Radiation Hard High Speed Transceivers”, TWEPP'09 - Topical Workshop on Electronics for Particle Physics, Paris, France, Sept. 2009.

Pássaro, N., Pinto, A.A., Ricardo, M., et al, “Management of User Generated Multicast Sessions in IMS-based Networks”, NGMAST'09 - Int. Conf. and Exhibition on Next Generation Mobile Applications, Services, and Technologies, Cardiff, UK, Sept. 2009.

Del Monego, H., Oliveira, J.M., Ricardo, M., “Performance Analysis of Joint Radio Resource Management Strategies for Beyond 3G Networks”, NGMAST'09 - Int. Conf. and Exhibition on Next Generation Mobile Applications, Services, and Technologies, Cardiff, UK, Sept. 2009.

Costa, S., Magalhães, A., Sousa, R.J., Santos Cardoso, J., Campos, M.J., “Prediction Model of Asymmetry in Breast Cancer Conservative Treatment (BCCT)”, ORBS 2009 - The Int. Meeting of Oncoplastic and Reconstructive Breast Surgery, Nottingham, UK, Sept. 2009.

Pinheiro, B., Nascimento, W., Moreira, W., Abelém, A., “Abaré: A Deployment and Management Framework for Wireless Mesh Network”, IEEE LatinCom 2009 - The First IEEE Latin-American Conf. on Communications, Medellín, Colombia, Sept. 2009.

Gomes, R., Ferreira, J., Moreira, W., Abelém, A., “QoE and QoS in Wireless Mesh Networks”, IEEE LatinCom 2009 - The First IEEE Latin-American Conf. on Communications, Medellín, Colombia, Sept. 2009.

Naveda, L., Gouyon, F., Guedes, C.A., Leman, M., “Multidimensional microtiming in Samba music”, SBCM 2009 - 12º Simpósio Brasileiro de Computação Musical, Recife, Brasil, Sept. 2009.

Farias, F., Esteves, R., Moreira, W., Abelém, A., Stanton, M., “Reactive Management of Quality of Service in Multimedia OBS Networks Based on GMPLS”, EuropeComm 2009 - First Int. ICST Conf. on Communications Infrastructure, Systems and Applications in Europe, London, UK, Aug. 2009.

Moreira, A., Machado da Silva, J., Tao, G., “Influence of Parasitic Capacitances in Modeling and Analysis of Advanced Floating Gate Memory Devices”, IPFA 2009 - 16th IEEE Int. Symp. on Physical and Failure Analysis of Integrated Circuits, Suzhou, China, July 2009.

Madison, G., Gouyon, F., Ullen, F., “Musical Groove is Correlated With Properties of the Audio Signal as Revealed by Computational Modelling, Depending on Musical Style”, SMC 2009 - 6th Sound and Music Computing Conf., Porto, Portugal, July 2009.

Campos, R.L., Ricardo, M., “A New Efficient Mechanism for Establishing IP Connectivity between Ambient Networks”, ICC 2009 - IEEE Int. Conf. on Communications, Dresden, Germany, June 2009.

Veiga, R., Mota, P.M., Machado da Silva, J., “Estimation of RF PA non-linearities after cross-correlating power supply current and output voltage”, IMS3TW '09 - IEEE 15th Int. Mixed-Signals, Sensors, and Systems Test Workshop, Scottsdale, USA, June 2009.

Moreira, W., Gomes, R., C “A Multiple-Metric Approach for Routing in Wireless Mesh Networks”, IEEE WoWMoM 2009 - 10th IEEE Int. Symposium on a World of Wireless, Mobile and Multimedia Networks, Island of Kos, Greece, June 2009.

Coelho, D., Salgado, H., “OFDM Signals in WDM Radio-Over-Fiber Networks with Fiber Bragg Grating Selection”, ICTON 2009 - 11th Int. Conf. on Transparent Optical Networks, S. Miguel, Azores, Portugal, June 2009.

Pessoa, L.M., Salgado, H., Darwazeh, I., “Simplified Backpropagation Equalization in WDM Coherent Polarization Multiplexed Systems”, ICTON 2009 - 11th Int. Conf. on Transparent Optical Networks, S. Miguel, Azores, Portugal, June 2009.

Silva, S.R., “VCSEL Laser Characterization and Modelling for Future Optical Transceiver at the Super Large Hadron Collider”, ICTON 2009 - 11th Int. Conf. on Transparent Optical Networks, S. Miguel, Azores, Portugal, June 2009.

Almeida, J.N., Ribeiro, E., “Linux software and Bluetooth: a formula to improve accessibility by using Interactive Voice Response systems”, DSAI 2009 - The Int. Conf. on Software Development for Enhancing Accessibility and Fighting Info-exclusion, Lisbon, Portugal, June 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “Mitigating the Security Risks of Unified Communications”, ICTTA 2009 - Int. Conf. on Telecom Technology and Applications, Manila, Philippines, June 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “Unified communications: different approaches for different types of enterprises”, MCCSIS 2009 - Multi Conf. on Computer Science and Information Systems, Algarve, Portugal, June 2009.

Carreras, A., Andrade, M.T., Barbosa, V.H., Dogan, S., et al, “Contextual Information in Virtual Collaboration System beyond Current Standards”, WIAMIS 2009 - 10th Int. Workshop on Image Analysis for Multimedia Interactive Services, London, UK, May 2009.

Barbosa, V.H., Andrade, M.T., “MULTICAO: A Semantic Approach to Context-aware Adaptation Decision Taking”, WIAMIS 2009 - 10th Int. Workshop on Image Analysis for Multimedia Interactive Services, London, UK, May 2009.

Alves, P., Ferreira, J.C., “Non-Rectangular Reconfigurable Cores for Systems-on-Chip”, MNM 2009 - SPIE Europe: Conf. on Microtechnologies for the New Millenium, Dresden, Germany, May 2009.

Veloso, L., Cerqueira, E, Mendes, P., Monteiro, E., “Seamless Mobility of Senders Transmitting Multi-user Sessions over Heterogeneous Networks”, WWIC09 - Wired / Wireless Internet Communications, Twente, The Netherlands, May 2009.

Sarmiento, L., Gouyon, F., Oliveira, E., “Music Artist Tag Propagation with Wikipedia abstracts”, ECIR 2009 - European Conf. on Information Retrieval, Toulouse, France, April 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “New revenue streams with IMS and Mobile Web 2.0”, CSGCT 2009 - Int. Computer Science and Global Communication Technology Conference, Kathmandu, Nepal, April 2009.

Campos, M.J., Costa, S., Santos Cardoso, J., et al, “Aesthetic Results Evaluation of Reduction Mammoplasties in Breast Cancer Treatment”, IBCM-2 - Interconference Breast Cancer Meeting, Sarajevo, Bosnia and Herzegovina, April 2009.

Costa, S., Sousa, R.J., Santos Cardoso, J., Campos, M.J., “Prediction of the aesthetic result in breast cancer conservative treatment”, IBCM-2 - Interconference Breast Cancer Meeting, Sarajevo, Bosnia and Herzegovina, April 2009.

Sarmiento, L., Gouyon, F., Costa, B., Oliveira, E., “Visualizing Networks of Music Artists with RAMA”, WEBIST 2009 - 5th Int. Conf. on Web Information Systems and Technologies, Lisbon, Portugal, March 2009.

Oliveira, H.P., Cardoso, J.S., “Image Retargeting Using Stable Paths”, VISAPP2009 - Int. Conf. on Computer Vision Theory and Applications, Lisbon, Portugal, Feb. 2009.

Oancea, D., Moreira, R.S., Correia Lopes, J., “Controlling Complex Multimedia Systems via Reflection and Ontologies”, 2nd ICC Winter Workshop on Complexity in Social Systems, Lisbon, Portugal, Jan. 2009.

- **Books (Author)**

N/A

- **Books (Author)**

N/A

- **Chapter/paper in Books**

Teixeira, L.M., Corte-Real, L., “H.264 Rate-Distortion Analysis Using Subjective Quality Metric”, Future Multimedia Networking, Lecture Notes in Computer Science, vol. 5630, p.248-253, June 2009.

Kondo, A., Dogan, S., Pereira, F., Andrade, M.T., Ruela, J., et al, “Visual Media - Coding and Transmission”, Wiley, May 2009.

Oliveira, H. P., Sousa, A-J., Moreira, A.P., Costa, P.J., “Modeling and Assessing of Omni-directional Robots with Three and Four Wheels”, Contemporary Robotics - Challenges and Solutions, A. D. Rodic (Ed.), pp. 207-230, INTECH, Dec. 2009.

Cardoso, J.S., Sousa, R.J., Teixeira, L.F., Campos, M.J., “Breast Contour Detection with Stable Paths”, Communications in Computer and Information Science, vol. 25 (Biomedical Engineering Systems and Technologies), p.439-452, Springer Berlin Heidelberg, 2009.

- **Publications (Editor)**

N/A

- **Other Publications**

Costa, D., Sarmiento, L., Gouyon, F., “RAMA: An Interactive Artist Network Visualization Tool”, ISMIR 2009 - 10th International Society for Music Information Retrieval Conference, Late-Breaking / Demo Session, Kobe, Japan, Oct. 2009.

Gomes, R., Ferreira, J., Moreira, W., ABELÉM, A., “Suporte a QoE e QoS em Redes em Malha Sem Fio”, WebMedia 2009 - XV Simpósio Brasileiro de Sistemas Multimidia e Web, Fortaleza, Brasil, Oct. 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., A Proposed Unified Communications Platform based on Open Source Technologies”, CISTI 2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, Póvoa de Varzim, Portugal, June 2009.

Afonso, A.P., Cardoso, J.S., Campos, M.J., Cota, M.P., “A Avaliação da Usabilidade de um Sistema Médico Inteligente: BCCT.core”, CISTI 2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, Póvoa de Varzim, Portugal, June 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “Creation of Value with Open Source Software in the Telecommunications Field”, InterTech 2009 - II International Interdisciplinary Technical Conference of Young Scientists, Poznan, Poland, May 2009.

Oliveira, J., Rodrigues, M., Salgado, H., “MMSE Receivers for Non-Linearly Distorted OFDM Signals”, Conftele 2009 - Conference on Telecommunications, Santa Maria da Feira, Portugal, May 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “Risks of Migration to IMS and a Way to their Mitigation”, Conftele 2009 - Conference on Telecommunications, Santa Maria da Feira, Portugal, May 2009.

Almeida, F., Oliveira, J.M., Cruz, J.M., “Open innovation in SMEs that create value with open source software”, 29th PODIM - PODIM Conference, Maribor, Slovenia, March 2009.

Alves, P., Ferreira, J.C., “Generation of Non-Rectangular Reconfigurable Cores for System-on-Chip”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009.

Silva, M.L., Ferreira, J.C., “Run-Time Generation of Configurations for Dynamically Reconfigurable”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009.

Damásio, E., Ferreira, J.C., “Suporte para Reconfiguração Dinâmica Parcial em Linux”, REC'2009 - V Jornadas sobre Sistemas Reconfiguráveis, Monte de Caparica, Portugal, Feb. 2009.

Kandasamy, S., Morla, R., Ricardo, M., “Improving the Performance of IEEE802.11s Networks using Directional Antennas over Multi-Radio/Multi-Channel Implementation - The Research Challenges”, DSIE 2009 - 4th Doctoral Symposium on Informatics Engineering, Porto, Portugal, Feb. 2009.

Salta, N., Morla, R., Ricardo, M., “Optimizing Video P2P Streaming over Wireless Mesh Networks”, DSIE 2009 - 4th Doctoral Symposium on Informatics Engineering, Porto, Portugal, Feb. 2009.

- **Theses**

Abrantes, F., “Explicit Congestion Control Algorithms for Time-Varying Capacity Media”, July 2009, PhD thesis.

Martins, L.G., “A computational framework for sound segregation in music signals”, Februray 2009, PhD thesis.

Calistru, C., “Data organization and search in multimedia databases”, Februray 2009, PhD thesis.

Teixeira, L.F., “Contributions for the Automatic Description of Multimodal Scenes”, November 2009, PhD thesis.

Baltazar, A.M., “Extracção de Informações Rítmicas de Movimentos de Dança Através de Um Sinal de Vídeo” (“Extraction of rhythmic information of dance movement by means of a video signal”), February 2009, MSc thesis.

Almeida, J.F., “Redes Domésticas Seguras” (“Secure domestic networks”), July 2009, MSc thesis.

Carvalho, L.M., “User-provided Networks: Relaying vs. ad-hoc routing”, July 2009, MSc thesis.

Lopes, M.A., “Automatic classification of Latin music”, July 2009, MSc thesis.

F) LIST OF PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Satus 2009-12
SMC2009	Fabien Gouyon	CONF	O			INT	PROP	2009-02	FIN
U-Net09	Helena Rute Sofia	CONF	O			INT	PROP	2009-06	FIN
BCCT	Jaime Santos Cardoso	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2007-12	CONT
DR-Vids	João Canas Ferreira	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2007-02	CONT
MuMoMgt	José Ruela	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-09	START
OMR	Jaime Santos Cardoso	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-06	CONT
ROFWDM	Henrique Salgado	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2008-12	CONT
VECTOR	José Carlos Alves	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2009-01	CONT
KINETIC	Carlos Alberto Guedes	RES	PROG - NAT	FCT / POFC	PROJ UTEN	NAT	PROP	2009-10	START
AHRS	Vitor Grade Tavares	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2007-10	CONT

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
Palco 3.0-1	Fabien Guyon	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2007-11	CONT
SemanticPACS	Jaime Santos Cardoso	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2009-02	START
Mobiles	José Ruela	RES	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2007-10	START
ReCoop	Helena Rute Sofia	NET	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2007-10	START
Portal Douro-1	José Manuel Oliveira	DEV	PROG - NAT	POR Norte		NAT	PAR	2007-11	START
EDCine	Jaime Santos Cardoso	RES	PROG - EU	FP6		EU	PAR	2009-04	FIN
VISNET II	José Ruela	RES	PROG - EU	FP6		EU	PAR	2008-10	FIN
Daphne	Henrique Salgado	RES	PROG - EU	FP7		EU	PAR	2008-12	START
SWIOP	Manuel Ricardo	DEV	SERV - NAT	POFC / POR	PROJ INDIV	IND	SUB	2009-01	START
NZY	José Ruela	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-05	START
REFER-Serves	Mário Jorge Leitão	CONS	SERV - NAT			IND	CONT	2009-01	FIN
V-SAT	Henrique Salgado	CONS	SERV - NAT			IND	CONT	2009-07	FIN
ASP-RedesDomesticas	Manuel Ricardo	DEV	SERV - NAT			IND	CONT	2007-07	START
ACEOLE	José Machado da Silva	TRAIN	SERV - NAT			EU	CONT	2006-07	FIN
GeCLIFmcast	Manuel Ricardo	TT	SERV - NAT			IND	CONT	2009-09	FIN

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

RAMA - Relational artist maps (web-based application for visualizing and interacting with networks of music artists)

Developed under internal project

Demo Place: INESC Porto / on-line at <http://rama.inescporto.pt>

Type: National

Development Period: May 2008 - September 2009

Automatic music generation using a Wii remote controller (with run-time control of tempo and density of events)

Developed under KINETIC (FCT / Univ. Texas at Austin programme)

Demo Place: INSEC Porto

Type: National

Development Period: August - November 2009

Real-time human body skeletonization from a video signal implemented as a Jitter external for MaxMSP

Developed under KINETIC (FCT / Univ. Texas at Austin programme)

Demo Place: INSEC Porto

Type: National

Development Period: August - December 2009

Prototype for adding groove to musical signals

Developed under internal project

Demo Place: INESC Porto

Type: National

Development Period: May 2009 - October 2009

Music recommender, integrated in the web portal of Palco Principal

Developed under Palco3.0 (QREN)

Demo Place: INESC Porto / on-line at <http://www.palcoprincipal.com>

Type: National

Development Period: January 2009 - December 2009

Staff line detection and removal workstation for Optical Music Recognition Systems

Developed under OMR (FCT)

Demo Place: INESC Porto

Type: National

Development Period: April 2008 - March 2009

Workstation for text line detection in Optical Character Recognition Systems

Developed under OMR (FCT)

Demo Place: INESC Porto

Type: National

Development Period: January 2009 - December 2009

Platform for image retargeting

Developed under internal project

Demo Place: INESC Porto

Type: National

Development Period: March 2008 - February 2009

Platform for the assessment of spatial segmentations of images and video

Developed under VISNET II (IST FP6)

Demo Place: INESC Porto

Type: International

Development Period: July 2008 - June 2009

Context-aware adaptation decision mechanism based on MPEG-7, MPEG-21 and ontologies

Developed under VISNET II (IST FP6)

Demo Place: INESC Porto

Type: International

Development Period: July 2008 - June 2009

Simulation platform based on machine learning techniques to predict context changes and automatically adapt video content in multimedia networked applications

Developed under internal project (MSc programme)

Demo Place: INESC Porto
Type: National
Development Period: January - July 2009

Configurable test platform to browse multimedia content represented as MPEG-21 Digital Items
Developed under internal project (MSc programme)
Demo Place: INESC Porto
Type: National
Development Period: January - July 2009

Metadata management system to convert between metadata formats applied to digital cinema
Developed under EDCINE (IST FP6)
Demo Place: INESC Porto
Type (National or International): International
Development Period: July 2009 - June 2009

Opportunistic routing protocol for vehicular networks
Developed under SitMe (QREN)
Demo Place: INESC Porto
Type: National
Development Period: September - December 2009

Peer-to-peer video streaming over WMN
Developed under internal project (PhD programme)
Demo Place: INESC Porto
Type: National
Development Period: January - December 2009

Home gateway for secure, customer-defined, friend-to-friend overlay networks
Developed under ASP (R&D contract with PT Inovação)
Demo Place: INESC Porto
Type: National
Development Period: March - December 2009

Autoconfiguration and self-management solution for PANs
Developed under internal project (PhD programme)
Demo Place: INESC Porto
Type: National
Development Period: January - December 2009

WiFix - WMN for extending infrastructure networks
Developed under MuMoMgt (FCT) and internal project (PhD programme)
Demo Place: INESC Porto
Type: National
Development Period: July 2008 - October 2009

Authentication of Wi-Fi networks based on DNSSEC
Developed under internal project (PhD programme)
Demo Place: INESC Porto
Type: National
Development Period: October 2008 - December 2009

Simulator for routing in large scale networks
Developed under internal project (PhD programme)
Demo Place: INESC Porto
Type: National

Development Period: October 2008 - December 2009

WIZ - Wireless Wide Internet Zone (pre-product version)

Developed under ReCoop (QREN)

Demo Place: Nonius Software

Type: National

Development Period: January - November 2009

Printed fractal monopole multiband antenna for wireless LAN applications

Developed under internal project (PhD programme)

Demo Place: INESC Porto

Type: National

Development Period: Development Period: July - December 2009

Algorithms in FPGA for signal estimation in coherent optical systems

Developed under internal project (MSc programme)

Demo Place: INESC Porto

Type: National

Development Period: January - July 2009

Printed C-Shaped Monopole Antenna Array with High Isolation for MIMO Applications

Developed under internal project (PhD programme)

Demo Place: INESC Porto

Type: National

Development period: July - December 2009

Orthomode transducer for Ku-band VSAT applications

Developed under VSAT-1 (QREN)

Demo Place: INESC Porto

Type: National

Development Period: April - December 2009

Transmit-reject filter for Ku-band VSAT applications

Developed under VSAT-1 (QREN)

Demo Place: INESC Porto

Type: National

Development Period: April - December 2009

Cylindrical horn for Ku-band VSAP applications

Developed under VSAT-1 (QREN)

Demo Place: INESC Porto

Type: National

Development Period: April - December 2009

Optoelectronic transceiver for UWB over fiber

Developed under ROFWDM (FCT)

Demo Place: INESC Porto

Type: National

Development Period: July - December 2009

RAFTPA (Radio-Frequency Testable Power Amplifier) integrated circuit

Developed under internal project (PhD programme)

Demo Place: INESC Porto

Type: National

Development Period: January - December 2009

Wireless readout of biomedical signals
 Developed under internal project (MSc programme)
 Demo Place: INESC Porto
 Type: National
 Development Period: September - December 2009

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Filipe Lameiro Abrantes	FEUP	Manuel Ricardo	INESC Porto/FEUP	Explicit Congestion Control Algorithms for Time-Varying Capacity Media	2009
Luís Gustavo Martins	FEUP	Aníbal Ferreira	INESC Porto/FEUP	A computational framework for sound segregation in music signals	2009
Luís Filipe Teixeira	FEUP	Luís Corte-Real Aníbal Ferreira	INESC Porto/FEUP	Contributions for the Automatic Description of Multimodal Scenes	2009
Pedro Manuel Marques	FEUP	Silvío Abrantes	INESC Porto/FEUP	MIMO Transmission Techniques in 4G Systems	2009
Fernando L. Almeida	FEUP	José M. Oliveira José M. Cruz	INESC Porto/FEP FEUP	Creation of Value with Open Source Software in the Telecommunications Field	2010
António Alberto Santos Pinto	FEUP	Manuel Ricardo	INESC Porto/FEUP	Key Distribution Technique for IPTV Services with Support for Admission Control and User Defined Groups	2010
Rui Lopes Campos	FEUP	Manuel Ricardo	INESC Porto/FEUP	Multi-technology personal area networks	2010
Hermes Irineu Del Monego	FEUP	José Oliveira Manuel Ricardo	INESC Porto/FEP INESC Porto/FEUP	Multi radio resource management	2010
Luís Miguel Teixeira	FEUP	Artur P. Alves Luís Corte-Real	INESC Porto/FEUP	Joint Source Video Coding	2010
Ricardo J. T. Sousa	FEUP	Aníbal Ferreira	INESC Porto/FEUP	Audio signal processing applied to speech rehabilitation	2010
António C. Martins	FEUP	E. Carrapatoso	INESC Porto/FEUP	Adaptive Hypermedia Systems	2010
João Paulo Sousa	UTAD	E. Carrapatoso	INESC Porto/FEUP	Dynamic Composition of Services	2010
Isabel S. Azevedo	FEUP	E. Carrapatoso Carlos V. Carvalho	INESC Porto/FEUP ISEP/IPP	Semantic contextualization of educational objects	2010
António Abel Castro	FEUP	E. Carrapatoso Carlos V. Carvalho	INESC Porto/FEUP ISEP/IPP	Use of multimedia learning objects with a semantic context for the Health area	2010
João Manuel Barbosa de Oliveira	FEUP	H. Salgado	INESC Porto/FEUP	Design and Optimisation of Fibre Radio Systems	2010
Luís Manuel de Sousa Pessoa	FEUP	H. Salgado	INESC Porto/FEUP	Compensation of Fibre Impairments in Coherent Optical Systems	2010
Pedro Mota	FEUP	J. Machado Silva	INESC Porto/FEUP	In-circuit testing of adaptive RF front-end circuits	2010
Miguel Magalhães Silva	FEUP	João C. Ferreira José Carlos Alves	INESC Porto/FEUP	Management of dynamically reconfigurable resources in CPU/FPGA systems	2010
Lucian Ciobanu	FEUP	Luís Corte-Real	INESC Porto/FEUP	Distributed video coding for systems with multiple cameras	2010
Gustavo Carneiro	FEUP	Manuel Ricardo	INESC Porto/FEUP	Simulation framework for very large multitechnology wireless mesh networks	2010
Hernâni Gonçalves	FCUP	José A. Gonçalves Luís Corte-Real	FCUP INESC Porto/FEUP	Multi-spectral satellite images identification	2010
Paulo Alexandre Duarte Ferreira	FEUP	José Carlos Alves João C. Ferreira	INESC Porto/FEUP	Computational systems based on heterogeneous parallel architectures	2011
Manuel Cândido Santos	FEUP	Vítor G. Tavares	INESC Porto/FEUP	Ultra-low power RF circuits for wireless sensor networks	2011
Hélder Castro	FEUP	Artur P. Alves	INESC Porto/FEUP	P2P Strategies for the Safe Distribution of Rich Media Content	2011
Mário Rui Silveira Pereira	FEUP	H. Salgado	INESC Porto/FEUP	Electromagnetic Bandgap Antennas and Components for Broadband Communications	2011
Daniel Oancea	FEUP	João C. Lopes Rui Moreira	INESC Porto/FEUP INESC Porto/UFP	Adaptive multimedia components in distributed environments	2011
Pedro Miguel Carvalho	FEUP	Luís Corte-Real Jaime Cardoso	INESC Porto/FEUP	Analysis and representation of video based on 3D models	2011

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Tânia Calçada	FEUP	Manuel Ricardo	INESC Porto/FEUP	Integration of ad-hoc with infrastructured networks	2011
Jaime Sousa Dias	FEUP	Manuel Ricardo	INESC Porto/FEUP	Security in Mobile IP Networks with Multicast Traffic	2011
António Pedro Fortuna Santos	FEUP	Manuel Ricardo	INESC Porto/FEUP	Very large Mobile Networks	2011
Nuno Fonseca	FEUP	Aníbal Ferreira Ana Paula Rocha	INESC Porto/FEUP FEUP	Transcription from natural singing to synthetic singing	2011
António Constantino Martins	FEUP	E. Carrapatoso	INESC Porto/FEUP	Sistemas de Hipermedia Adaptativa para Suporte de Ambientes Aprendizagem Construtivistas	2011
Bruno G. Marques	FEUP	Manuel Ricardo	INESC Porto/FEUP	Application Driven Wireless Sensor Networks	2012
Paulo Coelho	FEUP	Manuel Ricardo	INESC Porto/FEUP	Gestão de grupos multicast em redes móveis	2012
Qi Luo	FEUP	H. Salgado	INESC Porto/FEUP	Design Synthesis and Optimization of Single and Multiband Electromagnetic Band-Gap Structures for Microwave Circuits and Antenna Applications	2012
Nuno Salta	FEUP	Manuel Ricardo	INESC Porto/FEUP	Optimizing the Transmission of P2P Video Distribution over Wireless Mesh Networks	2012
Saravanan Kandasamy	FEUP	Manuel Ricardo Ricardo Morla	INESC Porto/FEUP INESC Porto/FEUP	Utilizing Smart Antennas for Improving the Performance of Mobile Wireless Mesh Network	2012
David Rua	FEUP	João Peças Lopes José Ruela	INESC Porto/FEUP INESC Porto/FEUP	Integrated Communication Systems for Large Scale Distributed Energy Resources and V2G	2013
Ana Maria Rebelo	FEUP	Jaime Cardoso	INESC Porto/FEUP	Robust optical recognition of handwritten musical scores based on music rules fusion	2013
Ricardo J. G. Sousa	FEUP	Jaime Cardoso	INESC Porto/FEUP	Modelos multicritério para a previsão de relações de preferência	2013
João Lobato Oliveira	FEUP	Luís P. Reis Fabien Gouyon	FEUP INESC Porto	Cooperative and Interactive Robot Dancing Through Multi-Modal Rhythmic Perception	2013
Hélder Oliveira	FEUP	Jaime Cardoso	INESC Porto/FEUP	Advanced 3D Computational Models for the Aesthetic Result Assessment on Breast Cancer Surgeries	2013
Conceição Tavares	UA	André Zúquete Paulo Mendes	UA INESC Porto	Security architectures for shared access networks	2013
António C. Júnior	FEUP	Rute Sofia Artur P. Alves	INESC Porto INESC Porto/FEUP	User-centric Routing	2013
Namusale Chama	FEUP	Rute Sofia Artur P. Alves	INESC Porto INESC Porto/FEUP	Impact of Mobility on Multihop Routing	2013
Dossa Massa	FEUP	Ricardo Morla	INESC Porto/FEUP	Understanding user behavior based on their usage patterns from 802.11 logs	2013
Abayomi Otebolaku	FEUP	Maria Teresa Andrade	INESC Porto/FEUP	Context-aware mobile applications	2013
Tauseef Jamal	FEUP	Paulo Mendes Artur P. Alves	INESC Porto INESC Porto/FEUP	Design and Performance of Wireless Cooperative Relaying	2014
Saulo Queiroz	U. Coimbra	Paulo Mendes Edmundo Monteiro	INESC Porto U. Coimbra	Cooperative Resource Management	2014
Diogo Coelho	FEUP	H. Salgado	INESC Porto/FEUP	Radio over fiber	2014
Fernando J. L. Pereira	FEUP	Manuel Ricardo	INESC Porto/FEUP	Overlay networks	2014
Pedro F. C. Pinto	FEUP	Manuel Ricardo	INESC Porto/FEUP	Network security	2014
José Pedro Cardoso	FEUP	J. Machado Silva	INESC Porto/FEUP	Project and test of micro-electronic systems	2014
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Alexandre Fernandes	FEUP	M. T. Andrade	INESC Porto/FEUP	Mobile Environment Context Agent	2009
Alfredo V. Moreira	FEUP	João C. Ferreira	INESC Porto/FEUP	Comparative study of CMOS low-power multipliers (*)	2009
Ana Mafalda Cortez	FEUP	J. Machado Silva	INESC Porto/FEUP	Design, simulation, and electrical characterization of mechanically moving components (MEMS) in SOI	2009
Ana Raquel Faria	FEUP	Manuel Ricardo	INESC Porto/FEUP	Robust header compression in IEEE 802 networks	2009
André A. Moreira	FEUP	J. Machado Silva	INESC Porto/FEUP	Reliability of Non-Volatile Devices During Process Development	2009
André Passos Baltazar	FEUP	Jaime S. Cardoso	INESC Porto/FEUP	Extraction of rhythmic information of dance movement by means of a video signal (*)	2009
António J. Fernandes	FEUP	J. Ruela	INESC Porto/FEUP	System for dissemination of energy consumption (*)	2009
António S. Gonçalves	FEUP	Ricardo Morla	INESC Porto/FEUP	Automatic content generation for Second Life	2009
Bruno Falcão Dantas	FEUP	Hélio Mendonça	INESC Porto/FEUP	Dynamically reconfigurable modules for processing of video images	2009
Bruno Monteiro	FEUP	João C. Ferreira	INESC Porto/FEUP	Linux support for dynamic reconfiguration of hardware (*)	2009
Carlos A. Resende	FEUP	João C. Ferreira	INESC Porto/FEUP	Real-time correspondence processor between stereo images	2009
Daniel Carrapa	FEUP	Manuel Ricardo	INESC Porto/FEUP	Mobile Router	2009
Daniel Oliveira	FEUP	Vítor G. Tavares	INESC Porto/FEUP	CMOS-RF Power Amplifier for Wireless Communications	2009
Daniel Ramos	FEUP	José Ruela	INESC Porto/FEUP	Scheduling algorithm for QoS differentiation in MPLS / DiffServ networks (*)	2009
Fernando G. Silva	FEUP	M. T. Andrade	INESC Porto/FEUP	DIP based MPEG-21 Player	2009
Filipe J. P. Sousa	FEUP	J. Machado Silva	INESC Porto/FEUP	Radiation Tolerant Low power 12 bit ADC in 130 nm CMOS technology	2009
Filipe Lopes	FEUP	H. Salgado	INESC Porto/FEUP	Fractal Antennas for Wireless Communication Systems	2009
Francisco Basadre	FEUP	José C. Alves	INESC Porto/FEUP	Integration of flash memory units in embedded systems over FPGA platforms (*)	2009
Francisco M. Barbosa	FEUP	M. T. Andrade	INESC Porto/FEUP	Integration of Web services in Peer-to-Peer (p2p) clients (*)	2009
Hugo Reboredo	FEUP	Henrique Salgado M. Rodrigues	INESC Porto/FEUP FCUP	Processing of Turbo signal in optical communications systems (*)	2009
João F. P. Almeida	FEUP	Manuel Ricardo	INESC Porto/FEUP	Secure domestic networks (*)	2009
João G. Rodrigues	FEUP	João C. Ferreira	INESC Porto/FEUP	Rectification of stereo images in an FPGA-based embedded system (*)	2009
João Luís C. Pereira	FEUP	José Carlos Alves	INESC Porto/FEUP	Training package based on the MIPS architecture for FPGA platforms (*)	2009
João Neves Viana	FEUP	J. Ruela	INESC Porto/FEUP	Technologies for monitoring the flow of people and control of accesses (*)	2009
João Pedro Maia	FEUP	M. J. Leitão	INESC Porto/FEUP	Interference of wind parks on the transmission of analogue and digital TV signals (*)	2009
João Pedro Santos	FEUP	José Carlos Alves	INESC Porto/FEUP	Implementation of optical flow algorithms in FPGA platforms (*)	2009
Joaquim P. Carvalho	FEUP	J. Machado Silva	INESC Porto/FEUP	Implementation of the International Railway Industry standard (*)	2009
José I. Queirós	FEUP	Ricardo Morla	INESC Porto/FEUP	3D online multiplayer game network performance evaluation	2009
Luís Carvalho	FEUP	Rute Sofia José Ruela	INESC Porto INESC Porto/FEUP	User-provided Networks: Relaying vs. ad-hoc routing	2009
M. Raquel Patrício	FEUP	E. Carrapatoso	INESC Porto/FEUP	Evaluation of the usability of a child's portal - a new interactive multimedia application (*)	2009
Márcia Pinheiro	FEUP	Jaime Cardoso		Web system for the recognition of music scores (*)	2009
Miguel Lopes	FEUP	Fabien Gouyon José Ruela	INESC Porto INESC Porto/FEUP	Automatic classification of Latin music	2009
Miguel Pina	FEUP	Vítor G. Tavares	INESC Porto/FEUP	Adaptive filter of switched capacitors (*)	2009
Nuno Farias Rodrigues	FEUP	Manuel Ricardo	INESC Porto/FEUP	Wireless Mesh Networks in Metropolitan Scenarios	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Nuno J. M. Pinto	FEUP	H. Salgado	INESC Porto/FEUP	FPGA-based implementation of signal estimation algorithms for optical coherent systems (*)	2009
Nuno M. T. Pinto	FEUP	E. Carrapatoso	INESC Porto/FEUP	eTSP - TSP based pedagogical module for combinatorial optimization problems (*)	2009
Pedro Miguel Alves	FEUP	João C. Ferreira	INESC Porto/FEUP	Flexible programmable cores for SOC applications	2009
Pedro Miguel Maia	FEUP	Manuel Ricardo	INESC Porto/FEUP	Authentication of Wi-Fi networks based on DNSSEC (*)	2009
Pedro Miguel Oliveira	FEUP	Manuel Ricardo	INESC Porto/FEUP	Service integration in multi-use communications platforms (*)	2009
Pedro S. Santos	FEUP	João C. Ferreira	INESC Porto/FEUP	FPGA-based system for detecting hand position using stereo images (*)	2009
Ricardo A. Veiga	FEUP	J. Machado Silva	INESC Porto/FEUP	In-circuit observation of RF amplifier's distortion (*)	2009
Ricardo Costa	FEUP	Anibal Ferreira	INESC Porto/FEUP	Spectral reorganization of speech signals in the [0, 2] kHz band (*)	2009
Ricardo J. Vidal	FEUP	H. Salgado	INESC Porto/FEUP	System for the calibration of temperature sensors based on fibre optic Bragg gratings (*)	2009
Sandro Fraga	FEUP	M. T. Andrade	INESC Porto/FEUP	Monitoring of multimedia processes (*)	2009
Sérgio Sá	FEUP	M. T. Andrade	INESC Porto/FEUP	Predictive Multimedia Content Adaptation	2009
Tiago Azevedo	FEUP	Henrique Salgado	INESC Porto/FEUP	Study of techniques for pre-compensation of downlink impairments in "Wireless Radio-over-Fiber" systems, using OFDM signals (*)	2009
Vitor Antunes	FEUP	Manuel Ricardo	INESC Porto/FEUP	Web 2.0 frontend for RADIUS management (*)	2009
Vitor M. Gil	FEUP	M. J. Leitão	INESC Porto/FEUP	Femtocells: technical impact, regulation and new services (*)	2009
Andreas Seufert	FEUP	Jaime Cardoso	INESC Porto/FEUP	Research and improvement of algorithms for the recognition of musical symbols	2010
Armando C. Fernandes	FEUP	António J. Araújo	INESC Porto/FEUP	Characterization of modular operators implemented with FPGAs	2010
Bártolo Maia	FEUP	Anibal Ferreira	INESC Porto/FEUP	Disguise and human recognition of vocal signature	2010
Bruno Ferreira	FEUP	José Ruela	INESC Porto/FEUP	Intelligent lighting control system based on wireless sensor networks	2010
Bruno Ribeiro	FEUP	Ricardo Morla	INESC Porto/FEUP	Simulation of urban computing applications	2010
Décio Macedo	FEUP	Hélio Mendonça	INESC Porto/FEUP	System for extending IR signals using ZigBee technology	2010
Elísio Melo	FEUP	M. J. Leitão	INESC Porto/FEUP	Network and applications in the Information System of Secondary Schools	2010
Fernando Romão	FEUP	Manuel Ricardo	INESC Porto/FEUP	Design and implementation of an 802.16 wireless network for the FEUP Campus	2010
Filipe Meireles	FEUP	António J. Araújo	INESC Porto/FEUP	Approximation of elementary functions without reduction of argument	2010
Hélder Fontes	FEUP	Manuel Ricardo	INESC Porto/FEUP	Router for mobile networks	2010
João F. Castro	FEUP	J. Machado Silva	INESC Porto/FEUP	Modelling and design of inductors for medical micro-devices	2010
Licínio E. Sousa	FEUP	João C. Ferreira	INESC Porto/FEUP	ESL design and verification methodology using TLM-2.0 standard and SystemC modelling	2010
Luís R. Neves	FEUP	Jaime Cardoso	INESC Porto/FEUP	Semi-automatic Web system for collaborative annotation of H.264 media and Flash Video	2010
Nuno Pássaro	FEUP	Manuel Ricardo	INESC Porto/FEUP	Management of multicast sessions with origin on clients (GeCLIFmcast)	2010
Paulo Magalhães	FEUP	Manuel Ricardo	INESC Porto/FEUP	IP header compression in heterogeneous networks	2010
Pedro Vitoriano	FEUP	Jaime Cardoso	INESC Porto/FEUP	Automatic evaluation of the result of surgeries	2010
Vitor Barros	FEUP	Manuel Ricardo	INESC Porto/FEUP	S/MIME module for a webmail system	2010
João Mota	IST	Arur Arsénio Rute Sofia	IST INESC Porto	User-provided networks	2010
João Maurício	IST	Arur Arsénio Rute Sofia	IST INESC Porto	User-provided networks	2010
1	2	3	4	5	6

(*) Portuguese

1 - Name of the post-graduation student

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

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5 - Title of the thesis

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

OPTOELECTRONICS AND ELECTRONICS SYSTEMS

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	33
Papers in National Journals with scientific referees	0
Conference Proceedings in events with scientific referee and selection	59
Books (author)	0
Chapter/paper in books	0
Publications (editor)	1
Other publications (National meetings, local journals, etc.)	0
Theses concluded in 2009 by members of the Unit	3
TOTAL	95

Journal	Number
Measurement Science & Technology	5
Photonics Technology Letters	4
Optics Express	2
Optics Letters	2
MDPI Sensors Journal	2
Materials & Design	2
Journal of Sensors	1
IEEE Sensors Journal	1
Thin Solid Films	1
Sensors and Actuators B - Chemical	1
Electronic Letters	1
Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy	1
Journal of Lightwave Technology	1
Materials Research Bulletin	1
Optical Engineering	1
The Open Optics Journal	1
Microwave and Optical Technology Letters	1
International Journal of Nano and Biomaterials	1
International Journal of Polymeric Materials	1
Journal of the European Optical Society Rapid Publications	1
Fiber and Integrated Optics	1
Physical Review B	1
TOTAL	33

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	14
European Union Programmes	1
Supply of Services - national	5
Supply of Services - European Union	
Supply of Services - International	
Other R&D Services	
Other External Services	
Internal	
TOTAL	20

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master	7	1	2	10
Doctoral	3	14	1	18
TOTAL	10	15	3	28

D) SUMMARY ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	2
Nº. of External co-authors of Publications of INESC Porto	121

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

Perez-Herrera, R.A., Frazão, O., Santos, J.L., Araújo, F., Ferreira, L.A., Baptista, J.M., Lopez-Amo, M., "Frequency Modulated Continuous Wave System for Optical Fiber Intensity Sensors With Optical Amplification", IEEE Sensors Journal, December 2009, vol.9, no.12, p.1647-1653.

Gouveia, C.A., Silva, S.O., Castanheira, M., Aguilar, G., Frazão, O., Jorge, P., Baptista, J.M., "Measurement of acetic acid using a fibre Bragg grating interferometer", Measurement Science & Technology, December 2009, vol.20, no.12.

Aref, S.H., Frazão, O., Caldas, P., Ferreira, L.A., Araújo, F., Santos, J.L., Latifi, H., Foy, P., Hawkins, T., Ballato, J., Her, T., Farahi, F., "Modal Interferometer Based on ARROW

Fiber for Strain and Temperature Measurement", Photonics Technology Letters, November 2009, vol.21, no.21, p.1636-1638.

Díaz-Herrera, N., Viegas, D., Jorge, P., Araújo, F., Santos, J.L., Cruz Navarette, M., Gonzalez-Cano, A., "Fiber-optic SPR sensor with a FBG interrogation scheme for readout enhancement", SENSORS AND ACTUATORS B-CHEMICAL, October 2009, vol.144, no.1, p.226-231.

Becker, M., Fernandes, L.A., Rothhardt, M., Bruckner, S., Schuster, K., Kobelke, J., Frazão, O., Bartelt, H., Marques, P., "Inscription of Fiber Bragg Grating Arrays in Pure Silica Suspended Core Fibers", Photonics Technology Letters, October 2009, vol.21, no.19, p.1453-1455.

Aref, S.H., Amezcua-Correa, R., Carvalho, J., Frazão, O., Caldas, P., Santos, J.L., Araújo, F., Farahi, F., Ferreira, L.A., Knight, J.C., "Modal interferometer based on hollow-core photonic crystal fiber for strain and temperature measurement", Optics Express - The International Electronic Journal of Optics, October 2009, 12 October 2009 / Vol. 17, No. 21 / OPTICS EXPRESS, vol.17, no.21, p.18669-18675.

Rego, G., "Annealing of Arc-Induced Gratings at High Temperatures", ELECTRONICS LETTERS, September 2009, vol.45, no.19, p.972-974.

Frazão, O., Aref, S.H., Baptista, J.M., Santos, J.L., Latifi, H., Koelke, J., Schuster, K., "Fabry-Perot Cavity Based on a Suspended-Core Fiber for Strain and Temperature Measurement", IEEE Photonics Technology Letters, September 2009, vol.21, no.17, p.1229-1231.

Frazão, O., Gouveia, C.A., Baptista, J.M., Santos, J.L., Roy, P., "Fiber-Optic Interferometric Torsion Sensor Based on a Two-LP-Mode Operation in Birefringent Fiber", IEEE Photonics Technology Letters, September 2009, vol.21, no.17, p.1277-1279.

Frazão, O., Caldas, P., Marques, P., Turck, T., Loughnot, D.J., Soppera, O., "Fabry-Perot refractometer based on an end-of-fiber polymer tip", OPTICS LETTERS, August 2009, vol.34, no.16, p.2474-2476.

Caldas, P., Jorge, P., Araújo, F., Ferreria, L.A., Rego, G., Santos, J.L., "Geometrical effects on the refractive index sensitivity of Mach-Zehnder fibre modal interferometers based on long-period gratings", Measurement Science & Technology, July 2009, vol.20, p.75201-75201.

Tafalo, P.A., Queirós, R., Aguilar, G., "On the "concentration-driven" methylene-blue dimerization", Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, July 2009, vol.73, no.2, p.295-300.

Viegas, D., Goicoechea, J., Corres, J., Santos, J.L., Ferreira, L.A., Araújo, F., Matias, I., "Fibre optic humidity sensor based on a long-period fibre grating coated with a SiO₂-nanospheres thin film", Measurement Science & Technology, March 2009, vol.20, no.3.

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N/A

- **Conference Proceedings with scientific referees (international or national)**

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- **Books (Author)**

N/A

- **Chapter/paper in Books**

N/A

- **Publications (Editor)**

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- **Theses concluded in 2009 by members of the Unit**

Abrantes, F., "Explicit Congestion Control Algorithms for Time-Varying Capacity Media", PhD thesis, FEUP, July 2009.)

Orlando Frazão, O. J. R., "Optical Fibre Sensors Based on Non-Linear Effects", PhD thesis, FCUP, December 2009

Gouveia, C. A. J. "Optical fiber sensors for environmental monitoring", MSc thesis, Univ. da Madeira, December 2009

F) LIST OF PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Satus 2009-12
Amdraphyd II	José Luís Santos	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2009-01	FIN
Biomotion	Miguel Fernando Correia	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-10	CONT
Biopelvic	Luís Alberto Ferreira	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2007-10	CONT
Bioswim	Miguel Fernando Correia	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2007-11	CONT
ENDURANCE	Francisco Araújo	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-02	CONT
MOTION	Orlando Frazão	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2007-10	CONT

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Satus 2009-12
Nanocrystalline	Paulo Marques	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2007-10	CONT
Optic-Algae	José Manuel Baptista	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2007-11	CONT
Oreo2	Paulo Marques	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2009-04	CONT
SENRRONS	Pedro Jorge	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2008-10	CONT
SmartBio	Ireneu Dias	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2008-12	CONT
Welding	José Luís Santos	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PAR	2009-01	FIN
Retinocortical	Miguel Fernando Correia	RES	PROG - NAT	FCT / POFC	PROJ IC&DT	NAT	PROP	2009-05	CONT
Memimetria	Carla Susana Rosa	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2009-01	START
NextGenPCF	Luís Alberto Ferreira	RES	PROG - EU	FP6		EU	PAR	2009-07	FIN
SensKanoë	Ireneu Dias	DEV	SERV - NAT	POFC / POR	NUCLEO I&DT	IND	SUB	2007-07	START
E-Têxtil	Gerardo Aguilar	DEV	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2006-07	START
FiberVale	Ireneu Dias	DEV	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-09	FIN
FiberSensing	José Luís Santos	DEV	SERV - NAT			IND	CONT	2009-09	FIN
ONC	José Luís Santos	DEV	SERV - NAT			IND	CONT	2009-12	FIN

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

Name: Interferómetro híbrido em fibra óptica, Optical fiber hybrid interferometer,
 Application No.104711
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Development Period: 1/1/2009-31/7/2009
 Type (National or International): Provisional national patent application
 Submission Date: 7-8-2009

H) LIST OF PROTOTYPES

Name: Prototypes of methane gas detection based in photonic crystal fibers and wavelength modulation spectroscopy for application in the environmental area
 Developed under (Project Name): NEXTGENPCF
 Demo Place: FCUP
 Type (National or International): International
 Development Period: 1/1/2010-31/12/2010

Name: Interrogation unit for gas sensing
 Developed under (Project Name): NEXTGENPCF
 Demo Place: FCUP
 Type (National or International): International
 Development Period: 1/1/2010-31/12/2010

Name: Laser direct writing unit
 Developed under (Project Name): OREO2
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

Name: Refractometers based on end of fiber polymer tips (Fabry-Perot cavities)
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

Name: Refractometer based on FBG in a H-shaped fiber
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

Name: Optical fiber torsion sensor
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

Name: Strain and temperature sensor based in a modal interferometer design
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

Name: Novel smart composite structures for sensing heads
 Developed under (Project Name): Internal project
 Demo Place: FCUP
 Type (National or International): National
 Development Period: 1/1/2010-31/12/2010

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Orlando Frazão	FCUP	José Luís Santos	INESC Porto/FCUP	Optical Fibre Sensors Based on Non-Linear Effects	2009
Askari Ghasempour Khordoni	FCUP	Paulo Garcia / José Luís Santos	INESC Porto/FCUP	Guided Optics for Astronomic Interferometry	2010
Daniel Alexandre	FCUP	Paulo Marques	INESC Porto/FCUP	Fabrication of integrated optics devices by laser direct writing	2010
Dionísio Pereira	FCUP	Manuel J. Marques	INESC Porto/FCUP	Optical fiber technologies	2010
Jaime Ribeiro Viegas	FCUP	Paulo Marques / José Luís Santos	INESC Porto/FCUP	Integrated optics	2010
Michael Leitner	FCUP	Carla Rosa	INESC Porto/FCUP	Optical coherence tomography	2010

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Sanderson Emanuel Uchôa de Lima	FCUP	José Luís Santos Vladimiro Miranda	INESC Porto/FCUP INESC Porto/FEUP	Optical fiber sensors	2010
Cesar Maule	FCUP	Pedro Jorge / Carla Rosa	INESC Porto/FCUP	Fluorescence for Optical Sensing	2010
Diana Viegas	FCUP	Francisco Araújo / José Luís Santos	INESC Porto/FCUP	Microoptics	2010
Joel Carvalho	FCUP	José Luís Santos / José Manuel Baptista	INESC Porto/FCUP	Photonic crystal fibers	2010
Paulo Caldas	FCUP	José Luís Santos / Gaspar Rego	INESC Porto/FCUP	Optical structures for environmental applications	2010
Yonny Barcelay	FCUP	Javier de La Cruz	INESC Porto	Magneto-electric thin films	2010
Filipe Magalhães	FEUP	Miguel Correia	INESC Porto/FCUP	Image processing	2011
Luís André Neves Paiva Fernandes	FCUP	Paulo Marques	INESC Porto/FCUP	Integrated optics	2011
Raquel Barbosa Queirós	FCUP	Gerardo Aguilar	INESC Porto	Chemical detection of bacteria in water	2011
Ana Sofia Matos Silva	FEUP	Miguel Correia	INESC Porto / FEUP	Wearable electronics	2012
Susana Ferreira Oliveira Silva	Univ. Católica (UCP)	Xavier Malcata / José Luís Santos	UCP / INESC Porto	Optical fiber sensors for bioreactors monitoring	2012
Miguel Melo	FCUP	Paulo Marques / João Sousa	INESC Porto / Multiwave Photonics	High power fiber lasers	2012
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Carlos Avelino de Jesus Gouveia	Univ. da Madeira	José Manuel Baptista	INESC Porto / Univ. da Madeira	Optical fiber sensors for environmental monitoring	2009
Ana Sofia Vieira Silva	FCUP	Javier de La Cruz	INESC Porto	CdS/CdTe solar cells prepared by RF-magnetron sputtering	2009
Carina Quintal Correia	Univ. da Madeira	José Manuel Baptista	INESC Porto / Univ. da Madeira	High power guided optics for telecommunications and sensors applications	2010
Norberto Bruno Serrão de Freitas	Univ. da Madeira	José Manuel Baptista	INESC Porto / Univ. da Madeira	Optical fiber intensity sensors as load cells	2010
Leonardo Correia Gonçalves	Univ. da Madeira	José Manuel Baptista	INESC Porto / Univ. da Madeira	Differential interferometric configurations for biochemical sensors	2010
Eduardo Correia Velosa	Univ. da Madeira	José Manuel Baptista	INESC Porto / Univ. da Madeira	Automatic control of an interferometer for monitoring and characterization of interferometric sensors	2010
Fábio Dario Vieira Baptista	Univ. da Madeira	Luís Gomes	INESC Porto / Univ. da Madeira	Study of the spectral behaviour of long period optical fiber gratings	2010
Vitor Manuel Sousa Rodrigues	Univ. da Madeira	Luís Gomes	INESC Porto / Univ. da Madeira	Development of interrogation systems for biochemical sensors	2010
Luís Guerra	FCUP	Paulo Marques	INESC Porto	Optical tweezers	2010
Miguel Canhota	FCUP	Paulo Marques	INESC Porto	High speed integrated optical modulators	2010
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MANUFACTURING SYSTEMS ENGINEERING

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	6
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	9
Books (author)	1
Chapter/paper in books	
Publications (editor)	
Other publications (National meetings, local journals, etc.)	3
Theses concluded in 2009 by members of the Unit	2
TOTAL	19

Journal	Number of papers
International Journal of Production Research	2
Journal of the Operational Research Society	1
European Journal of Operational Research	1
Computers in Industry	1
OR Spectrum	1
TOTAL	6

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	3
European Union Programmes	7
Supply of Services - national	21
Supply of Services - European Union	
Supply of Services - International	
Other R&D Services	
Other External Services	
Internal	1
TOTAL	32

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master	0	0	39	39
Doctoral	8	13	1	22
Total	8	13	40	61

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	2
Nº. of External co-authors of Publications of INESC Porto	6

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

M Teresa Costa, A. Miguel Gomes, José F. Oliveira, "Heuristic approaches to large-scale periodic packing of irregular shapes on a rectangular sheet", European Journal of Operational Research, vol. 192, January 2009, pp.29-40.

José António Crispim, Jorge Pinho de Sousa, "Partner selection in virtual enterprises: a multi-criteria decision support approach", International Journal of Production Research, Volume 47, Issue 17, January 2009, Pages 4791 - 4812.

Julia A. Bennell, José F. Oliveira, "A tutorial in irregular shape packing problems", Journal of the Operational Research Society, vol. 60, Supplement 1, May 2009, pp.S93-S105.

Claudia Chituc, Américo Azevedo, César Toscano, "A framework proposal for seamless interoperability in a collaborative networked environment", Computers in Industry, vol.60, no.5, June 2009, pp.317-338.

Claudia-Melania Chituc, Américo Azevedo, César Toscano, "Collaborative business frameworks comparison, analysis and selection: an analytic perspective", International Journal of Production Research, vol.47, no.17, January 2009, pp.4855-4883.

Ana Moura, José F. Oliveira, "An integrated approach to the Vehicle Routing and Container Loading Problem", OR Spectrum, vol.31, no.4, October 2009, pp.775-800.

- National Journals with scientific referees**

N/A

- Conference Proceedings with scientific referees (international or national)**

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A Socio-Semantic Approach to the Conceptualization of domains, Processes and Tasks in Large Projects", ICEIS 2009 - 11th International Conference on Enterprise Information Systems, in proceedings, May 2009.

Rui J. Rei, Peter Madera, João Pedro Pedroso, "Khronos - a High-level Framework for Discrete Event Simulation in Python", CIE39 - 39th International Conference on computers & Industrial Engineering, July, 2009.

Rui Gomes, Jorge Pinho de Sousa, "Dynamic Vehicle Routing for Demand Responsive Transportation", EWGT2009 - 13th Euro Working Group on Transportation Meeting, Padua (Italy), September 2009.

Nazaré Rego, Jorge Pinho de Sousa, "Supporting the definition of strategies for the configuration of health care supply chains", Conference on Logistics Management 2009, Hamburg, September 2009.

Roberto Piedade, Américo Azevedo, "An SSM-Based Approach to Implement a Dynamic Performance Management System", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, October, 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "Short-term Semantic Consensus: Toward Agile Ontology Specification for Collaborative Networks", in Proceedings of PRO-VE'09 - 10th IFIP Working Conference on Virtual enterprises, October, 2009.

Nazaré Rego, Jorge Pinho de Sousa, "Virtually centralized Supply Chain coordination in Hospitals", PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

José A Crispim, Jorge P Sousa, "Uncertainty in partner selection for virtual enterprises", PRO-VE'09 - 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, October 2009.

Carla Pereira, Cristovão Sousa, António Lucas Soares, "A socio-semantic approach to collaborative domain conceptualization", Proceedings of OnToContent 2009 - The 4th International Workshop on Ontology Content - OnToContent 2009, November 2009.

- **Books (Author)**

Mikio Kubo, J. P. Pedroso, "Metaheuristics: a Programming Guide" (in Japanese). Kyoritsu, Tokyo, 2009

- **Chapter/paper in Books**

N/A

- **Publications (Editor)**

N/A

- **Other Publications**

Ana Rodrigues, José Soeiro Ferreira, "Rural Postman Problem and Related Problems", VIII IWCPRT - VIII International Workshop on Cutting, Packing and Related Topics, 2009.

José Soeiro Ferreira, "Creativity, Soft Methods and Metaheuristics", pp 81-89, EU/Meeting 2009, 29-30 April 2009, Porto, Portugal

Jorge Pinho de Sousa, Luís Guardão, "A flexible multi-objective scheduling system based on configurable heuristics", EURO - 23rd European Conference on Operational Research, Bonn, July 2009.

- **Theses Concluded in 2009 by members of the Unit**

Rui Rei, “Development of an OSS Shop-Floor Simulation Engine”, MSC thesis, FCUP, 2009.

Nuno Paulo Caseiro Trindade, “A integração de fornecedores em sistemas de produção pull: aplicação a uma empresa metalomecânica”, MSC thesis, FEUP, 2009.

F) LIST PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
EU Meeting	Ana Viana	CONF	O			INT	PROP	2007-09	FIN
CROME	José Soeiro Ferreira	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2008-12	CONT
PMCOLNET	António Lucas Soares	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2008-09	CONT
Agilplan	Rui Diogo Rebelo	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2009-06	CONT
AC-DC	Jorge Pinho de Sousa	RES	PROG - EU	FP6		EU	PAR	2008-04	CONT
H-Know	António Lucas Soares	DEV	PROG - EU	FP7		EU	PAR	2002-01	START
Fit4U	Rui Diogo Rebelo	RES	PROG - EU	FP7		EU	PAR	2008-01	START
Net-Challenge	Luís Carneiro	RES	PROG - EU	FP7		EU	PROP	2008-07	START
VFF	Américo Azevedo	RES	PROG - EU	FP7		EU	PAR	2008-09	START
Dinamic	António Correia Alves	DEV	PROG - EU	INTERREG		EU	PAR	2008-02	START
eBiz-Tcf	Luís Carneiro	CONS	PROG - EU	N/A		EU	PAR	2007-11	FIN
Inovultus	Luís Guardão	DEV	SERV - NAT	POFC / POR	PROJ INDIV	IND	SUB	2008-01	START
3M2P	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2007-09	START
ANARIC	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2007-10	FIN
ANARIC2	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2006-12	START
CONFMIRENE	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-11	START
DigitalPartners-1	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-04	START
Metalfer	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-02	START
Oxisol	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2001-04	CONT
PADINHO	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2006-05	FIN
Pedrosa & Rodrigues	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-02	FIN
PHCNorte	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-03	START
Silampos	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-11	FIN
Sopsec	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2007-10	START
Sosoares	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2008-02	START
Waldemar	António Correia Alves	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2008-07	START

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
Consultoria	Luís Carneiro	CONS	SERV - NAT			IND	CONT	2008-12	START
FLEX2000	Paula Silva	CONS	SERV - NAT			IND	CONT	2009-05	FIN
Primavera	Paula Silva	CONS	SERV - NAT			IND	CONT	2009-07	FIN
Enabler	Abdur Rais	DEV	SERV - NAT			IND	CONT	2009-05	FIN
IZARO GREY	António Correia Alves	DEV	SERV - NAT			IND	CONT	2009-11	FIN
ParqueEscolar	Luís Guardão	DEV	SERV - NAT			IND	CONT	2009-01	START

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

Name: A multi-objective optimization system for production scheduling - an updated version enhanced with new functionality

Developed under (Project Name): Iزارo Grey

Demo Place: INESC Porto, Softi9

Development Period: 2007-2009

Name: A system for reliable exchange of business documents in the footwear industry

Developed under (Project Name): eBiz-tcf

Demo Place: Fivelarte, Cindicalfe, Centenário, Lusocal, Maximo Internacional, Trielle, Mystic Sea, Globo Vermelho, Santos e Júnior

Development Period: 2008-2009

Name: A framework for demand forecast in the retail industry

Developed under (Project Name): SPRY

Demo Place: Wipro Retail

Development Period: 2008-2009

Name: Methods and tools for benefit balancing in automotive supply chains

Developed under (Project Name): AC/DC

Demo Place: Continental AG

Development Period: 2008-2009

Name: An agile optimization planning system for footwear producing SMEs - first prototype

Developed under (Project Name): AGILPLAN

Demo Place: Oficina de Soluções

Development Period: 2009

Name: A system for the management of standard technical processes in the construction industry at national level (improved version)
 Developed under (Project Name): Parque Escolar
 Demo Place: INESC Porto
 Development Period: 2009

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
José António Crispim	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Partner Selection in Virtual Enterprises	2009
Carla Sofia Pereira	FEUP	António Lucas Soares	INESC Porto/FEUP	Information and knowledge sharing in collaborative networks as a process of social construction of meaning: a theory and practical approach	2010
Teresa Neto	FCUP	João Pedro Pedroso Miguel Constantino	INESC Porto/FCUP FCUL	Mathematical models and algorithms for forest management	2010
Marisa Oliveira	FEUP	António Miguel Gomes Eduarda Pinto Ferreira	INESC Porto/FEUP	Positioning and Routing Problems in the design of Integrated Circuits (VLSI e ASICs)	2010
Ana Maria Rodrigues	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Combinatorial Optimization with Metaheuristics	2011
Maria do Rosário Moreira	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Combinatorial Optimisation in Graph Problems	2011
Bruno Prata	FEUP	Jorge Pinho de Sousa Teresa Galvão	INESC Porto/FEUP FEUP	An integrated approach to vehicle and crew scheduling based on multi-objective metaheuristics	2011
Nazaré Rego	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Supporting the definition of strategies in the configuration of health care supply chains	2011
Roberto da Piedade Francisco	FEUP	Américo Azevedo	INESC Porto/FEUP	Performance Management and Alignment on Collaborative Networks of SME	2011
Vitor Santos	UM	João Álvaro Carvalho António Lucas Soares	EE-UMinho/INESC Porto	Information and knowledge behaviour in large-scale/complex projects	2012
Cristovão Sousa	FEUP	António Lucas Soares	INESC Porto/FEUP	Semantics in large-scale/complex projects	2013
Rui Rei	FCUP	João Pedro Pedroso	INESC Porto/FEUP	Simulation and Optimization for Production Planning	2013
Marta Soares Rocha	FEUP	José Fernando Oliveira M. Antónia Carravilla	INESC Porto/FEUP	Hospitality Management - optimization and heuristic algorithms for human resources management	2011
Fernando Cosme	FEUP	M. Antónia Carravilla	INESC Porto/FEUP	Strategic management of passenger transportation systems	2011
Manuel Fernando Silva	FEUP	Rute Costa António Lucas Soares	UNL INESC Porto/FEUP	Terminology contributions for the development and operation of semantic platforms supporting knowledge communities	2012
Fernando Teodósio	FEUP	António Lucas Soares	INESC Porto/FEUP	Construction and reconstruction of learning content in collaborative networks using epistemic networks	2012
Reza Fazeli	FEUP	Vítor Leal Jorge Pinho de Sousa	FEUP INESC Porto/FEUP	Design of Pathways for sustainable road transportation accounting for uncertainty	2012
Rui Jorge Gomes	FEUP	Jorge Pinho de Sousa Teresa Galvão	INESC Porto/FEUP FEUP	Dynamic Vehicle Routing for Demand Responsive Transportation Services	2012

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Lia Oliveira	FEUP	Jorge Pinho de Sousa João Claro	INESC Porto/FEUP INESC Porto/FEUP	Increasing flexibility and collaboration in the automotive supply chain network	2011
Ricardo Almeida	FEUP	Américo Azevedo	INESC Porto/FEUP	Flexible information technologies for complex and non-hierarchical supply chain networks	2012
Carla Oliveira	FEUP	Jorge Pinho de Sousa Michiel de Bok	INESC Porto/FEUP FEUP	Strategies for locating charge points for electrical car batteries in urban regions	2012
João Augusto de Sousa Bastos	FEUP	Américo Azevedo	INESC Porto/FEUP	Dynamic supply networks: Models, Organizational Issues and Supporting Technologies	2012
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Rui Pinto Ferreira	FEUP	António Lucas Soares	INESC Porto/FEUP	Development of multi-criteria collaborative decision model for performance management in networks of organizations	2009
Bruno Paulino	FEUP	António Lucas Soares	INESC Porto/FEUP	Strategies for information classification in RTD organizations	2009
Jorge Silva	FEUP	António Lucas Soares	INESC Porto/FEUP	Management of information of performance of organizational networks: The case of virtual communities	2009
José Augusto	FEUP	António Lucas Soares	INESC Porto/FEUP	Approach for the implementation of knowledge communities in enterprise associations	2009
Joana Hora	INEGI	José Soeiro Ferreira	INESC Porto/FEUP	Desenvolvimento e Implementação do Processo de Gestão de Projectos	2009
Leticia da Silva Loureiro	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Water Spider - Balanceamento de linhas de produção	2009
Pedro Igor Matilde da Cunha	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	RIP & Slow moving Inventory	2009
João Miguel Oliveira Castro Ferreira	FEUP	José Soeiro Ferreira	INESC Porto/FEUP	Análise, Definição e Implementação de Medidas Correctivas dos INPUTs num MRP	2009
Gabriela Soares	INESC	José Soeiro Ferreira João P. Pedroso	INESC Porto/FEUP	Tools for Metaheuristics Experience Planning	2009
Rui Rei	FCUP	João Pedro Pedroso Peter Madera	INESC Porto/FCUP Qimonda	Development of an OSS Shop-Floor Simulation Engine	2009
Tiago Leite	ISEP	Ana Viana	INESC Porto/ISEP	Técnicas heurísticas para sequenciamento multi-projecto	2009
Fábio Freitas	ISEP	Ana Viana Adriana Alvim	INESC Porto/ISEP UNIRIO (Brazil)	POPMUSIC (Partial Optimization Metaheuristic Under Special Intensification Conditions) para problemas de rotas de veículos.	2009
Luís Miguel Machado Lima Branco	FEUP	António Miguel Gomes	INESC Porto/FEUP	Implementação de cartas de controlo nos equipamentos de produção	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Mauro Henrique Alves Pereira	FEUP	António Miguel Gomes	INESC Porto/FEUP	Melhoria dos planos e métodos de manutenção preventiva	2009
João Miguel Rodrigues Carneiro	FEUP	José F Oliveira	INESC Porto/FEUP	Estudo de melhoria do processo de subcontratação na ADIRA	2009
João Ricardo Pires Teixeira	FEUP	José F Oliveira	INESC Porto/FEUP	Supply Chain Planning na Qimonda	2009
Miguel João da Silva Fonseca	FEUP	José F Oliveira	INESC Porto/FEUP	Optimização do QCD nos fornecedores	2009
Américo Gabriel da Costa Gomes	FEUP	José F Oliveira	INESC Porto/FEUP	Um Sistema de Apoio à Decisão para a Afectação do Parque de Equipamentos de Diagnóstico Clínico	2009
Lourenço Cabrita Gonçalves	FEUP	José F Oliveira	INESC Porto/FEUP	Gestão de armazéns de produção na Adira: Diagnóstico para a melhoria de processos e implementação tecnológica	2009
Nuno Paulo Caseiro Trindade	FEUP	José F Oliveira	INESC Porto/FEUP	A integração de fornecedores em sistemas de produção pull: aplicação a uma empresa metalomecânica	2009
Luísa Helena Santos Vieira	FEUP	José F Oliveira	INESC Porto/FEUP	Balanceamento de uma linha de montagem na ADIRA, SA	2009
Alexandre Ferreira	FEUP	M Antónia Carravilla	INESC Porto/FEUP	Rotas de "Milk run" no aprovisionamento externo da Bosch Termotecnologia SA	2009
Cristina Landim Duarte	FEUP	M Antónia Carravilla	INESC Porto/FEUP	Operação e distribuição na Worten.pt	2009
Bruno Falco Amaral Carvalho	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Desenvolvimento de Software de Gestão da Produção para Adegas	2009
Miguel Montenegro Aguiar de Araújo	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Lean nos Serviços de Saúde	2009
Fabiana Pais	FEUP	Jorge Pinho de Sousa	INESC Porto/FEUP	Manual de Produção (empresa Lourenço)	2009
Ricardo Luís Pinheiro Gonçalves Teixeira	FEUP	Américo Azevedo	INESC Porto/FEUP	Adaptação e implementação do Oracle Retail Merchandising System para suportar adequadamente os processos de negócio do retalhista	2009
Joaquim Pedro dos Santos Carvalho	FEUP	Américo Azevedo	INESC Porto/FEUP	Inspecções e Ensaios em Equipamentos para Automação de Sistemas de Energia	2009
Paula Velho Azevedo Costa	FEUP	Américo Azevedo	INESC Porto/FEUP	"Gestão Energética - Eliminação de desperdício" na ColepCCL	2009
Pedro Miguel Vasconcelos	FEUP	Américo Azevedo	INESC Porto/FEUP	Sistema Gestão de Activos e Manutenção - MAXIMO	2009
António Gonçalo Feio de Mendonça	FEUP	Américo Azevedo	INESC Porto/FEUP	Normalização de fluxos produtivos - criação de fluxo numa linha de montagem final	2009
Paulo Alberto Pires Ribeiro Soares	FEUP	Américo Azevedo	INESC Porto/FEUP	Implementação de um Novo Modelo de Pull Levelling	2009
João Manuel Mariz Cabeço Teixeira Pinto	FEUP	Américo Azevedo	INESC Porto/FEUP	Implementação do Projecto Kaizen na Amorim & Irmãos, S.A.	2009
Fernando Jorge Vila Verde Freitas	FEUP	Américo Azevedo	INESC Porto/FEUP	Automatização na implementação do Balanced Scorecards	2009
Ana Fernanda Almeida de Alvim Barroso	FEUP	Américo Azevedo	INESC Porto/FEUP	Reengenharia de modelo de negócio: Um caso prático no sector industrial de produção de torneiras	2009
Rebecca Lee Guilherme	FEUP	Américo Azevedo	INESC Porto/FEUP	Modelo de Gestão Orientado a Processos de Negócio - Aplicação a uma Empresa de Serviços de Formação	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Nuno Emanuel Ferreira Fleming de Oliveira	FEUP	Américo Azevedo	INESC Porto/FEUP	A evolução organizacional das empresas nacionais nas cadeias de fornecimento da indústria de componentes para automóvel	2009
António Barny Monteiro	FEUP	Américo Azevedo	INESC Porto/FEUP	Inovação como resultado dos programas e actividades Espaciais - Opções futuras para o Sector Espacial em Portugal	2009
José Augusto Silva	FEUP	Américo Azevedo	INESC Porto/FEUP	Plataforma para Suporte de Aplicações Ocasionalmente Conectadas em Sistemas ERP Baan	2009
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

ROBOTICS AND INTELLIGENT SYSTEMS

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	2
Papers in National Journals with scientific referees	
Conference Proceedings in events with scientific referee and selection	22
Books (author)	
Chapter/paper in books	4
Publications (editor)	
Other publications (National meetings, local journals, etc.)	
Theses completed by members of the unit in 2009	2
Total	28

Journal	Number of papers
Emerald Industrial Robot	1
Ingenieria del Agua	1
TOTAL	2

B) SUMMARY OF PROJECTS

N/A

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master	11	0	11	22
Doctoral	5	4	3	12
TOTAL	16	4	14	34

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	
Nº. of External co-authors of Publications of INESC Porto	6

E) LIST OF PUBLICATIONS

- **International Journals with scientific referees**

Neto, P, Pires, JN, Moreira, AP, "High-level programming and control for industrial robotics: using a hand-held accelerometer-based input device for gesture and posture recognition", Emerald Industrial Robot, Vol. 37, Nº 2, Pages 137-147, 2010

Patrícia Ramos, M. V. Neves, Monitorização de Descargas de Águas Residuais no Mar através de Veículos Submarinos Autónomos (VSAs), Ingeniería del Agua, vol.16, no.3, pp.201-216, Julho, 2009.

- **National Journals with scientific referees**

N/A

- **Conference Proceedings with scientific referees (international or national)**

"A Passive System Approach to Increase the Energy Efficiency in Walk Movements Based in a Realistic Simulation Environment", José L. Lima, José A. Gonçalves, Paulo G. Costa and A. Paulo Moreira, ROBOTICA 2009 - 9th International Conference on Mobile Robots and Competitions, pp.73-78, 7th May, 2009, Castelo Branco, Portugal, ISBN 978-972-99143-8-6

"Humanoid Realistic Simulator - The Servomotor Joint Modeling", José L.Lima, José A. Gonçalves, Paulo G. Costa, A.Paulo Moreira, ICINCO 2009 - 6th International Conference on Informatics in Control, Automation and Robotics, pp 396-400, 2-5 July 2009., Milan, Italy

"Robust and Real-time Motion Capture of Rigid Bodies Based on Stereoscopic Vision", Paulo Malheiros, Paulo Rosa Santos, A. Paulo Moreira, Paulo Costa, Fernando Veloso Gomes, Francisco Taveira Pinto, IRF'2009 - 3rd International Conference on Integrity, Reliability and Failure, 20-24 July 2009, Porto, Portugal

"PLC and Petri Net Training Based on a 3D Virtual Car Park Modeling and Control", José L. Lima, José C. Gonçalves, Paulo G. Costa and A. Paulo Moreira, PAEE'2009 - IBERO-AMERICAN Symposium on Project Approaches in Engineering Education, pp 135-143, 21-22 July 2009, Guimarães, Portugal

"Target Controlled Infusion Algorithms for Anesthesia: Theory vs Practical Implementation", Nadja Bressan, A.Paulo Moreira, Pedro Amorim, Catarina S. Nunes, pp. 6234:37 - Proceedings of the 31st Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Minneapolis, Minnesota, USA, September 2-6, 2009.

"Accelerometer-Based Control of an Industrial Robotic Arm", Pedro Neto, J. Norberto Pires and A. Paulo Moreira, IEEE International Symposium on Robot and Human Interactive Communication, pp 1191-1197, Sep. 27 - Oct. 2, 2009, Toyama International Conference Center, Japan

"Using Barcodes for Robotic Landmarks", Armando Sousa, Catarina Santiago, Paulo Malheiros, Paulo Costa, António Paulo Moreira, IROBOT - 14th Portuguese Conference on Artificial Intelligence, EPIA 2009, pp 299-311, Oct. 12-15, 2009, Aveiro, Portugal

"Robustness and Precision Analysis in Map-Matching based Mobile Robot Self-Localization", Manuel Gouveia, A. Paulo Moreira, Paulo Costa, Luís P. Reis, Marcos Ferreira, IROBOT - 14th Portuguese Conference on Artificial Intelligence, EPIA 2009, pp 243-253, Oct. 12-15, 2009, Aveiro, Portugal

“Robust and Real-time Teaching of Industrial Robots for Mass Customisation Manufacturing Using Stereoscopic Vision”, Paulo Malheiros, Paulo Costa, António Paulo Moreira and Marcos Ferreira, IECON 2009 - 35th Annual Conference of the IEEE Industrial Electronics Society, pp 2356-2361, Nov. 3-5, 2009, Porto, Portugal

Bruno Ferreira, Miguel Pinto, Aníbal C. Matos, Nuno A. Cruz, "Hydrodynamic modeling and motion limits of AUV MARES", Proceedings of the 35th Annual Conference of the IEEE Industrial Electronics Society, IECON'2009, Porto, Portugal, November 2009.

Miguel Pinto, Bruno Ferreira, Aníbal C. Matos, Nuno A. Cruz, "Using Side Scan Sonar for Relative Navigation", Proceedings of the 35th Annual Conference of the IEEE Industrial Electronics Society, IECON'2009, Porto, Portugal, November 2009.

Bruno Ferreira, Miguel Pinto, Aníbal C. Matos, Nuno A. Cruz, "Control of the MARES Autonomous Underwater Vehicle", Proceedings of the MTS-IEEE Conference Oceans'2009, Biloxi, MS, October 2009.

Bruno Ferreira, Miguel Pinto, Aníbal C. Matos, Nuno A. Cruz, "Modeling and Motion Analysis of the MARES Autonomous Underwater Vehicle", Proceedings of the MTS-IEEE Conference Oceans'2009, Biloxi, MS, October 2009.

Miguel Pinto, Bruno Ferreira, Aníbal C. Matos, Nuno A. Cruz, "Side Scan Sonar Image Segmentation and Feature Extraction", Proceedings of the MTS-IEEE Conference Oceans'2009, Biloxi, MS, October 2009.

Miguel Pinto, Bruno Ferreira, Aníbal C. Matos, Nuno A. Cruz, "Using Side Scan Sonar to Relative Navigation", Proceedings of the MTS-IEEE Conference Oceans'2009, Biloxi, MS, October 2009.

André Carvalhosa, Pedro Machado, Armando Sousa, José Carlos Alves "Soft Core Robot with Joint Wheel Motion Controller" - IECON 2009 - The 35th Annual Conference of the IEEE Industrial Electronics Society, 3-5 November 2009, Porto, Portugal, pp. 3168-3173

Armando Sousa, Catarina Santiago, Luís Paulo Reis, M. Luísa Estriga "Automatic Detection and Tracking of Handball Players" - VipIMAGE 2009 - II ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, 14 a 16 de Outubro 2009, pp.213-219

Luís Paulo Reis, António J. R. Neves, Armando Sousa "Real-Time Vision in the RoboCup - Robotic Soccer International Competitions"
Computer Vision in Robotics - VipIMAGE 2009 - II ECCOMAS Thematic Conference on Computational Vision and Medical Image Processing, 14 a 16 de Outubro 2009, pp.319-324

Raquel Pinho, Armando Sousa, André Restivo "ILAB - Inventory Manager for Electronics Laboratory" - CISTI'2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, 17 a 20 de Junho de 2009, pp. 537-541

Rui Filipe Guedes, Luís Paulo Reis and Armando Sousa "Surpassing the Limitations of the NXT Lego Robot with Distributed Computing" - CISTI'2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, 17 a 20 de Junho de 2009, pp 633-638

Erik Moreira Pegoraro, Armando Sousa "FEUP Fuzzy Tool - Renewed and Extended, for Intelligent Control and Education"
WISA - Workshop in Intelligent Systems and Applications, CISTI'2009 - 4ª Conferência Ibérica de Sistemas e Tecnologias de Informação, 17 a 20 de Junho de 2009, pp. 639-644

Patrícia Ramos, Nuno Cruz, Aníbal Matos, Nuno Abreu, "Avaliação de Impacte Ambiental e Modelização de Descargas de Águas Residuais usando Observações Bio-ópticas de Veículos

Submarinos Autónomos”, Actas das 4as Jornadas de Hidráulica Recursos Hídricos e Ambiente, FEUP, 31 de Outubro 2009, Porto, Portugal

- **Books (Author)**

N/A

- **Chapter/paper in Books**

Helder P. Oliveira, Armando J. Sousa, A. Paulo Moreira and Paulo J. Costa (2009). Modeling and Assessing of Omni-directional Robots with Three and Four Wheels, CONTEMPORARY ROBOTICS - Challenges and Solutions, A D Rodi (Ed.), ISBN: 978-953-307-038-4, INTECH, Available from: <http://sciyo.com/articles/show/title/modeling-and-assessing-of-omni-directional-robots-with-three-and-four-wheels?PHPSESSID=igdafbub08h352319uu8kt6197>

Aníbal Matos, Nuno Cruz, "MARES - Navigation, Control and On-board Software", in Underwater Vehicles, A. Inzartsev (ed.), ISBN 978-953-7619-49-7, In-Tech, Austria, 2009.

Patrícia Ramos, Mário Neves, "Environmental Impact Assessment and Management of Sewage Outfall Discharges using AUV's", in Underwater Vehicles, A. Inzartsev (ed.), ISBN 978-953-7619-49-7, In-Tech, Austria, 2009.

Sérgio Silva, Sérgio Cunha, Aníbal Matos, Nuno Cruz, "Synthetic Aperture Techniques for Sonar Systems", in Advances in Sonar Technology, S. Silva (ed.), ISBN 978-3-902613-48-6, In-Tech, Austria, 2009.

- **Publications (Editor)**

N/A

- **Other Publications**

N/A

- **Theses completed by members of the unit**

Lima, J. L. , “Construção de um Modelo Realista e Controlo de um Robô Humanóide”, PhD Thesis, FEUP, 2009.

Gonçalves, J., “Modelação e simulação realista de sistemas no domínio da robótica móvel”, PhD Thesis, FEUP, 2009

F) LIST OF PROJECTS

N/A

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

Name: MARES - Modular Autonomous Robot for Environment Sampling
 Developed under (Project Name): Autonomous Underwater Vehicle (FEUP-DEEC)
 Demo Place: Laboratório de Robótica e Sistemas Inteligentes (Piso -1 DEEC-FEUP)
 Type (National or International): National
 Development Period: 2006-2009

Name: ZARCO ASV - Autonomous Surface Vessel
 Developed under (Project Name): INCORP (Improved Navigation with Cooperating Robotic Platforms)
 Demo Place: Laboratório de Robótica e Sistemas Inteligentes (Piso -1 DEEC-FEUP)
 Type (National or International): National
 Development Period: 2005-2009

Name: GAMA ASV - Autonomous Surface Vessel
 Developed under (Project Name): INCORP (Improved Navigation with Cooperating Robotic Platforms)
 Demo Place: Laboratório de Robótica e Sistemas Inteligentes (Piso -1 DEEC-FEUP)
 Type (National or International): National
 Development Period: 2008-2010

Name: SmallAGV - AGV para pequenas cargas
 Developed under (Project Name): DELTAMATIC-QREN
 Demo Place: Laboratório de Robótica e Sistemas Inteligentes (Piso -1 DEEC-FEUP)
 Type (National or International): National
 Development Period: 2009-2010

Name: SRP - Smart Robotic Painting
 Developed under (Project Name): FLUPOL - QREN
 Demo Place: Laboratório de Robótica e Sistemas Inteligentes (Piso -1 DEEC-FEUP)
 Type (National or International): National
 Development Period: 2008-2009

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
José Luis Sousa Magalhães Lima	FEUP	Paulo Gomes da Costa Co-orientador: António Paulo Moreira	FEUP/InescPorto	Construção de um Modelo Realista e Controlo de um Robô Humanóide	2009
José Gonçalves	FEUP	Paulo Gomes da Costa	FEUP/InescPorto	Modelação e simulação realista de sistemas no domínio da robótica móvel	2009
Pedro Luís Cerqueira Gomes da Costa	FEUP	António Paulo Moreira	FEUP/InescPorto	Planeamento cooperativo de tarefas e trajectórias de múltiplos robôs	2010
Rodrigo António Marques Braga	FEUP	Luís Paulo Reis + António Paulo Moreira	FEUP/LIACC + FEUP/InescPorto	Planeamento e Controlo de Acções de uma Cadeira de Rodas Inteligente	2011
Pedro Mariano Simões Neto	FCTUC	Norberto Pires + António Paulo Moreira	FCTUC + FEUP/InescPorto	Programação de robôs industriais usando linguagens naturais: exploração de mecanismos de programação gráfica, por gestos, com fusão visual e de ensino por demonstração	2012
Nadja Mench Bressan	FEUP	Catarina Sofia Nunes Duarte + António Paulo Moreira	King's College London + FEUP/InescPorto	Software Integrado para Anestesia: Aquisição de Dados, Estratégias de Controle de Infusão e Alarmes Inteligentes	2011
Bruno Miguel Mateus Ferreira	FEUP	Anibal Matos + António Paulo Moreira	FEUP/InescPorto	Controlo de equipas de robots sob restrições de comunicação	2013
Miguel Armando Migueis Pinto	FEUP	António Paulo Moreira + Anibal Matos	FEUP/InescPorto	Navegação de robots guiada pela interacção entre a incerteza na localização e o tipo de missão a cumprir	2013

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Marcos André Magalhães Ferreira	FEUP	António Paulo Moreira + Norberto Pires	FEUP/InescPorto + FCTUC	Programação de Alto Nível para Células Robotizadas Industriais	2013
Héber Miguel Plácido Sobreira	FEUP	António Paulo Moreira + Paulo Costa	FEUP/InescPorto	Localização de veículos autónomos baseada em balizas	2013
Marcelo Roberto Petry	FEUP	António Paulo Moreira + Luis Paulo Reis	FEUP/InescPorto + FEUP/LIACC	Desenvolvimento de um Protótipo e de Metodologias de Controlo de uma Cadeira de Rodas Inteligente	2013
Maurici Monego	FEUP	Mário V. Neves + Patrícia Ramos	FEUP/InescPorto	Aplicação de métodos geostatísticos na modelação e caracterização de descargas de águas residuais	2009
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
André Manuel Ferraz Carvalhosa	FEUP	Armando Jorge Sousa	FEUP/InescPorto	Driving Actuators in a Suzaku board featuring FPGA + PowerPC	2009
Catarina Maria Brito de Noronha Santiago	FEUP	Armando Jorge Sousa Luís Paulo Reis	FEUP/InescPorto FEUP/LIACC	Image analysis of sports events	2009
Erik Joaquin Moreira Pegoraro	FEUP	Armando Jorge Sousa	FEUP/InescPorto	Neuro-Fuzzy Software for Intelligent Control and Education	2009
Rui Filipe Lourenço Guedes	FEUP	Luís Paulo Reis Armando Jorge Sousa	FEUP/LIACC + FEUP/InescPorto	Navegação e Orientação de Agentes Lego NXT	2009
Miguel A. M. Pinto	FEUP	Aníbal Matos	FEUP/InescPorto	Sonar de Varrimento Lateral para Navegação Relativa	2009
Bruno M. M. Ferreira	FEUP	Aníbal Matos	FEUP/InescPorto	Modelação e controlo de veículo submarino com quatro graus de liberdade	2009
André S. B. Sá	FEUP	Aníbal Matos	FEUP/InescPorto	Modelação e Controlo Dinâmico de uma Embarcação Autónoma	2009
Ricardo J. G. Costa	FEUP	Aníbal Matos	FEUP/InescPorto	Navegação Acústica Robusta	2009
Carlos Eduardo Pinto Teixeira	FEUP	António Paulo Moreira + Paulo Costa	FEUP/InescPorto	Ensinarmento Rápido de Manipuladores Industriais	2009
Marcos André Magalhães Ferreira	FEUP	António Paulo Moreira	FEUP/InescPorto	Pintura Robotizada com Adaptação Auto	2009
Héber Miguel Plácido Sobreira	FEUP	António Paulo Moreira + Paulo Costa	FEUP/InescPorto	Clever-Robot	2009
Ana Ponte	FEUP	António Paulo Moreira + Luis Almeida	FEUP/InescPorto IETA	Cooperação e Comunicação Robusta e Fiável Entre Robôs Móveis	2010
João Rodrigo	FEUP	António Paulo Moreira + Fernando Fontes	FEUP/InescPorto FEUP/ISR	Controlo Coordenado de equipas de robôs móveis	2010
Paulo Gouveia	FEUP	António Paulo Moreira	FEUP/InescPorto	SINCROVISION aplicado ao ensinamento rápido de manipuladores industriais	2010
David Lima	FEUP	Paulo Costa + António Paulo Moreira	FEUP/InescPorto	Localização Absoluta de robôs móveis em ambientes industriais	2010
Andry Pinto	FEUP	António Paulo Moreira + Paulo Costa	FEUP/InescPorto	Localização e mapeamento na robótica móvel em ambientes não industriais	2010
Luis Rocha	FEUP	António Paulo Moreira + Américo Azevedo	FEUP/InescPorto	Logística flexível baseada em AGV's	2010
Luis Filipe Silva	FEUP	António Paulo Moreira	FEUP/InescPorto	Utilização de Manipuladores em Ambientes Não Estruturados	2010
Pedro Gomes	FEUP	Luís Paulo Reis + António Paulo Moreira	FEUP/LIACC FEUP/InescPorto	FEUPCar: Condução Autónoma no Festival Nacional de Robótica	2010

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Jorge Luis	WUT/PWR	Andrzej Wolczowski + António Paulo Moreira	WUT/PWR FEUP/InescPorto	Perceptual Feedback of Grasping Touch to Prosthesis Hand User	2010
Daniel Pina	FEUP	António Paulo Moreira	FEUP/InescPorto	Apparatus for Dynamic Adjustment of the Rotation Axis on a Flexible Fluidic Actuator	2010
Hugo Sérgio Pinto Alves	FEUP	António Paulo Moreira + Paulo Costa	FEUP/InescPorto	Navegação e Controlo de um Veículo Móvel	2010
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

INNOVATION AND TECHNOLOGY TRANSFER

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	11
Papers in National Journals with scientific referees	1
Conference Proceedings in events with scientific referee and selection	14
Books (author)	
Chapter/paper in books	2
Publications (editor)	8
Other publications (National meetings, local journals, etc.)	12
Theses concluded in 2009 by members of the Unit	3
TOTAL	48

Journal	Number of papers
Journal of Evolutionary Economics	1
Revista Portuguesa de Clínica Geral	1
European Planning Studies	1
International Journal of Management Science and Engineering Management	1
International Journal of Entrepreneurship and Innovation Management	1
International Journal of Iberian Studies	1
IJSS	1
Journal of Business Chemistry	1
Journal of Evolutionary Economics	1
Structural Change and Economic Dynamics	1
TOTAL	10

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	2
European Union Programmes	
Supply of Services - national	8
Supply of Services - European Union	
Supply of Services - International	
Other R&D Services	
Other External Services	4
Internal	
TOTAL	14

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master			32	32
Doctoral	3	1	0	4
TOTAL	3	1	32	36

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	6
Nº. of External co-authors of Publications of INESC Porto	6

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

Silva, S.T. and Teixeira, A.A.C. (2009), "On the divergence of evolutionary research paths in the past fifty years: a comprehensive bibliometric account", Journal of Evolutionary Economics, Springer, Vol. 19 (5): 605-642

Torkkeli Marko, Wim Vanhaverbeke and Anna Trifilova "«Открытые инновации»: вопросы исследования" Innovacii, No 11, 2009

Torkkeli Marko, Karl Kock and Irina Savitskaya Open approach for innovation management in Russia, "Инновационный менеджмент в России и концепция "Open Innovation»: первые результаты исследований" Innovacii, No 11, 2009

Salmi, P. & Torkkeli, M.: Inventions utilizing satellite navigation systems in the railway industry - An analysis of patenting activity, Journal of Technology Management & Innovation, Vol 4, No 3 (2009), pp. 46-58

Podmetina Daria, Smirnova Maria, Väättänen Juha, Torkkeli Marko, Innovativeness and Internationalisation - Empirical Study of Russian R&D Oriented Companies, International Journal of Innovation Management, Vol. 13, No. 2, (June 2009), pp. 1-23

Kyrki Anna and Torkkeli Marko, Subcontracting product development - creating competitiveness through networking, International Journal of Technology Intelligence and Planning, Vol. 5, No. 3, 2009, pp. 241-257

Kock Carl, Salmi Pekka, and Torkkeli Marko; The "Open Innovation" Paradigm: A Contingency Perspective" Journal of Industrial Engineering and Management, Vol 2, No 1, pp 176-207, 2009

Torkkeli Marko, Podmetina Daria, Ylä-Kojola Anna-Mari, and Väättänen Juha, Knowledge Absorption in Emerging Economy -Role of Foreign Investments and Trade Flows in Russia, International Journal of Business Excellence, Vol 2 No 3/4, 2009

Conn Steffen, Torkkeli Marko and Bitran Iain; Assessing the management of innovation with software tools: An application of innovationEnterprizer, International Journal of Technology Management, vol 45, no ¾, 2009, pp. 323-336

Salmi Pekka and Torkkeli Marko; Knowledge Transfer in Collaborative Public-Private R&D Project, Journal of Business Innovation and Research, vol 3, no 3, 2009

Hilmola Olli-Pekka, Torkkeli Marko and Savolainen Ville-Veikko, Intangibles and business performance - a technical efficiency approach, International Journal of Entrepreneurship and Innovation, Vol. 9, No. 4, 2009

- **National Journals with scientific referees**

Dieguez, T. and Teixeira, A.A.C. (2009), “A utilização das Tecnologias de Informação e Comunicação pelos Médicos de Família portugueses. Um estudo exploratório”, Revista Portuguesa de Clínica Geral, Vol. 25, Nº 3, pp. 281-304

- **Conference Proceedings with scientific referees (international or national)**

Manuel Au-Yong Oliveira, Ramiro Gonçalves, José Miguel Oliveira, Manuel Aroso, Miguel Barbosa, Romão Santos, João José Pinto Ferreira; “Social Entrepreneurship and the Role of Universities A rationale for guiding social entrepreneur coaching along the social business development process”, International Conference - “Employability and

Entrepreneurship” Universidade Católica, Porto - 1-2 July 2009, ISBN: 978-989-95577-9-6
Podmetina Daria, Väättänen Juha, Torkkeli Marko, and Smirnova Maria, open innovation Business Models in Russia: Role of clusters, stakeholders and networks, ISPIM 2009 Symposium, 6-9.12.2009 New York, USA

Lääperi Antti and Torkkeli Marko, Disruptive Elements in the OLED Business Ecosystem, ISPIM 2009 Symposium, 6-9.12.2009 New York, USA

Savitskaya Irina and Torkkeli Marko, Outbound open innovation: a model for external technology commercialization, ISPIM 2009 Symposium, 6-9.12.2009 New York, USA

Savitskaya Irina and Torkkeli Marko, Markets for Technology in an Emerging Economy: Case of St. Petersburg Russia, International Symposium of Management of Technology ISMOT October 23-25 2009, Zhejiang, China

Savitskaya Irina and Torkkeli Marko, Governmental Reforms for Innovation Systems in Emerging Economies: Case Russia, 4th European Conference on Entrepreneurship and Innovation ECEI September 10-11, 2009, Antwerp Belgium

Kutvonen Antero and Torkkeli Marko, Opening the Fuzzy Front End: A Synthesis of Two Theories, PICMET, August 2 - 6, 2009, Portland, Oregon, USA

Lääperi Antti and Torkkeli Marko, Disruptive Innovation and Innovation Ecosystem in the Display Industry, ISPIM June 21-24 2009, Vienna Austria

Savitskaya, Irina and Torkkeli Marko, Implementation of Open Innovation Paradigm in Russia. Case studies, ISPIM June 21-24 2009, Vienna Austria

Kutvonen Antero and Torkkeli Marko, Enabling innovativeness: Parallel development of business plan and technology, ISPIM June 21-24 2009, Vienna Austria

Smirnova Maria, Podmetina Daria, Väättänen Juha, Torkkeli Marko, and Kouchtch Sergey , The Role of Cooperation with Internal and External Stakeholders in NPD processes: the Case of Russia, ISPIM June 21-24 2009, Vienna Austria

Podmetina Daria, Väättänen Juha, Torkkeli Marko, Smirnova Maria, and Aleksandrova Marina, Open Innovation vs. Technology Commercialization in Russia. Conceptualization and New challenges, ISPIM June 21-24 2009, Vienna Austria

Torkkeli Marko, Podmetina Daria, Väättänen Juha, and Aleksandrova Marina, The study of innovations in Russia: Possibilities for Open innovations, Eleventh International Conference of the Society for Global Business & Economic Development , May 27-30, 2009, Bratislava, Slovak Republic

Podmetina Daria, Torkkeli Marko and Väättänen Juha, Towards Open Innovations: Technology Acquisition and Technology Commercialization. Case of Russia, IAMOT conference, April 5-9 2009, Orlando Florida, USA

- **Books (Author)**

N/A

- **Chapter/paper in Books**

Teixeira, A.A.C. and Dieguez, T. (2009), "ICTs and Portuguese Family Physicians Human Capital Upgrading - Delightful Chimera or Harsh Reality?“, in M. Manuela Cunha, Antonio Tavares; Ricardo Simões (eds.), Handbook of Research on Developments in e-Health and Telemedicine: Technological and Social Perspectives, Ch. 37, IGI Global

Torkkeli Marko, The future of innovation in emerging markets, In: Future of Innovation, edited by Bettina von Stamm & Anna Trifilova, 2009

- **Publications (Editor)**

Chiaromonte Ferdinando, Torkkeli Marko and Zutshi Ravinder (Eds.), The role of Knowledge in Innovation Management, International Journal of Technology Management, vol 45, no ¾, 2009, pp. 323-336

Torkkeli Marko, Chiaromonte Ferdinando, and Conn Steffen (Eds.), Networks Innovation, International Journal of Entrepreneurship and Innovation Management, vol. 10, no ¾, 2009, pp. 227-393

Huizingh Eelko, Torkkeli Marko and Conn Steffen (Eds.), Innovation for Growth, International Journal of Entrepreneurship and Innovation Management, vol 10 , no 2, 2009, pp.111-226

Tidd Joe, Torkkeli Marko, Huizingh Eelko, and Conn Steffen (Eds.), International Journal of Entrepreneurship and Innovation Management, vol 13 , no 2, 2009, pp.157-317

Huizingh Eelko, Conn Steffen, Marko Torkkeli, and Bitran Iain, The Future of Innovation: Proceedings of The XX ISPIM Annual conference Vienna, Austria 21-24, June 2009. ISBN 978-952-214-767-7

Huizingh Eelko, Conn Steffen, Marko Torkkeli, and Bitran Iain, The Future of Innovation: The XX ISPIM Annual conference book of abstracts Vienna, Austria 21-24, June 2009.

Huizingh Eelko, Conn Steffen, Marko Torkkeli, and Bitran Iain, Stimulating recovery - The role of Innovation Management: Proceedings of The II ISPIM Annual Symposium New York, 6-9 Dec 2009. ISBN 978-952-214-864-3

Huizingh Eelko, Conn Steffen, Marko Torkkeli, and Bitran Iain, Stimulating recovery - The role of Innovation Management: The II ISPIM Annual Symposium book of abstracts ISBN 978-952-214-863-6

- **Other Publications**

Caiado, A.; Africano, A.P. and Teixeira, A.A.C., "Firms' perceptions on the usefulness of State trade missions: an exploratory micro level empirical analysis", FEP Working Papers N° 347 - December 2009

Pinheiro, L. and Teixeira, A.A.C., "Bridging University-Firm relationships and Open Innovation literature: a critical synthesis", FEP Working Papers N° 346 - November 2009
Catarino, M. and Teixeira, A.A.C., "International R&D cooperation: the perceptions of SMEs and Intermediaries", FEP Working Papers N° 344 - November 2009

Santos, C. and Teixeira, A.A.C., "The evolution of the literature on entrepreneurship. Uncovering some under researched themes", FEP Working Papers N° 335 - September 2009

Oliveira, M. and Teixeira, A.A.C., "Policy approaches regarding technology transfer: Portugal and Switzerland compared", FEP Working Papers N° 334 - September 2009
Almodovar, J. and Teixeira, A.A.C., "Conceptualizing clusters through the lens of networks: a critical synthesis", FEP Working Papers N° 328 - July 2009

Teixeira, A.A.C. and Rosa Portela Forte, "Unbounding entrepreneurial intents of university students: a multidisciplinary perspective", FEP Working Papers N° 322 - April 2009

Teixeira, A.A.C. and José Sequeira, "Determinants of the international influence of a R&D organisation: a bibliometric approach", FEP Working Papers N° 319 - March 2009

José Sequeira and Teixeira, A.A.C., "Assessing the influence of R&D institutions by mapping international scientific networks: the case of INESC Porto", FEP Working Papers N° 318 - March 2009

Ester Gomes da Silva and Teixeira, A.A.C., "Does structure influence growth? A panel data econometric assessment of 'relatively less developed' countries, 1979-2003", N° 316 - March 2009

Mariana Lopes and Teixeira, A.A.C., "Open Innovation in firms located in an intermediate technology developed country", FEP Working Papers N° 314 - March 2009

Marko Torkkeli & Olli-Pekka Hilmola (Eds.), Exploring new research avenues of industrial management, 151 p., 978-952-214-893-3, Research report 217, Lappeenranta 2009

- **Theses concluded in 2009 by members of the Unit**

Pedrosa, Cristiana, "Assessing the range of influence of technology transfer research institutions. The case of INESC Porto, FEUP, 2009

Sequeira, José, "Mapping the scientific network of INESC Porto. An international overview", FE-UP, 2009

Lopes, Mariana, "Open Innovation. Are technological intermediate countries different from the frontier ones?", FEP, 2009

F) LIST OF PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
Next2You	Alexandra Xavier	INC	O			IND	CONT	2009-06	CONT
ProcessNet	Alexandra Xavier	INC	O			IND	CONT	2009-07	CONT
SMARTWATT	Alexandra Xavier	INC	O			IND	CONT	2008-06	CONT
XAREVISION	Alexandra Xavier	INC	O			IND	CONT	2006-12	CONT
El Nautilus-1	Alexandra Xavier	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2008-01	CONT
FADIS	Alexandra Xavier	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2007-09	START
Mar Kayaks	Alexandra Xavier	CONS	SERV - NAT	POFC / POR	NUCLEO I&DT	IND	SUB	2009-12	START
SGIDI Shortcut	Alexandra Xavier	CONS	SERV - NAT	POFC / POR	NUCLEO I&DT	IND	SUB	2009-02	START
DigitalPartners	Alexandra Xavier	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2009-06	START
PIPPA Audolici	Alexandra Xavier	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2007-12	START
SantosCamiseiros	Alexandra Xavier	CONS	SERV - NAT	POFC / POR	VALE INOV	IND	SUB	2007-02	START
Bolsas BIM2	Alexandra Xavier	CONS	SERV - NAT			IND	CONT	2009-09	CONT
Consultoria	Alexandra Xavier	CONS	SERV - NAT			IND	CONT	2009-06	CONT
Formação COTEC	Alexandra Xavier	CONS	SERV - NAT			IND	CONT	2008-12	CONT

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD - Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

N/A

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Manuel Au-Yong Oliveira	UA/FEUP-DEIG/INESC Porto	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Enterprise interoperability in collaborative networks: The strategic role of IT in the promotion of dynamic capabilities and collaborative innovation	2009
Susana Cláudia Nicola de Araújo	ISEP	J.J.Pinto Ferreira Co-supervisor: M.E.P Ferreira	FEUP-DEIG/INESC Porto Co-supervisor: ISEP-GE CAD	Apoio à Negociação em Redes de Empresas	2009
Cláudio Barradas	E.S.Gestão do I. P. Santarem	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Information Technology & Enterprise Integration for the Fuzzy Front End of Innovation	2009
Manuel Eduardo Aroso	Aroso Associados	PETER PRUD'HOMME van REINE Co-Supervisor: J.J.Pinto Ferreira	Supervisor: School of Management/ Radboud University Nijmegen Co-supervisor: FEUP-DEIG/INESC Porto	Influence of cross-cultural values on the negotiation process for start-ups	2009
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Carlos Cordeiro	FEP-UP	Aurora Teixeira	INESC Porto/FEP	Spin-outs universitários. Que impacto ao nível da internacionalização da economia	2009
Cristiana Pedrosa	FEUP	Aurora Teixeira	INESC Porto/FEP	Assessing the range of influence of technology transfer research institutions. The case of INESC Porto	2009
Elsa Ferreira	FEP-UP	Aurora Teixeira	INESC Porto/FEP	Human Capital and Entrepreneurship. An International Database Assessment	2009
Wei Heyuan	FEP/UP	Aurora Teixeira	INESC Porto e FEP	A importância do capital humano para a atracção do IDE - uma aplicação ao caso Chinês	2009*
Joana Coutinho	UMINHO	Aurora Teixeira	INESC Porto e UMINHO	"Qualifications and mobility into the higher education systems. The perception of students"	2009
José Sequeira	FEP-UP	Aurora Teixeira	INESC Porto/FEP	Mapping the scientific network of INESC Porto. An international overview	2009
Mafalda Soeiro	FEP/UP	Aurora Teixeira	INESC Porto e FEP	"Valuing risk reduction reduction benefits of crime prevention: the economic value of life. A contingent valuation study"	2009
Margarida Catarino	FEP/UP	Aurora Teixeira	INESC Porto e FEUP	"The role of R&D+I Intermediates in international firms R&D cooperation"	2009
Maria do Céu Moreira Lobarinhas	FEUP	João José Pinto Ferreira	INESC Porto e FEUP	"Empreendedorismo, o MIETE no Contexto de uma Aprendizagem ao Longo da Vida"	2009
Maria Oliveira	FEUP	Aurora Teixeira	INESC Porto e FEUP	"Technology Transfer Offices: which factors are determinant in increasing their efficiency?"	2009
Mariana Lopes	FEP-UP	Aurora Teixeira	INESC Porto/FEP	Open Innovation. Are technological intermediate countries different from the frontier ones?"	2009
Natália Martins	FEUP	Aurora Teixeira	INESC Porto/FEUP	O papel dos Parques Empresariais no desenvolvimento do empreendedorismo local	2009
Odília Meneses	FEP-UP	Aurora Teixeira	INESC Porto/FEP	"Is innovation in tourism a way out poverty? The forgotten Sub-Saharan Africa depressed economies"	2009
Li Shu	FEP-UP	Aurora Teixeira	INESC Porto/FEP	"A intensidade do capital humano nas empresas inovadoras Chinesas: comparação entre multinacionais e empresas domésticas"	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Teresa Martins	FEUP	Aurora Teixeira	INESC Porto/FEP	Cooperação empresarial em ID+I. O papel das Instituições de Apoio ao ID+I em Portugal	2009
Pedro Tiago Cardoso Teixeira	FEUP	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Análise de Capacidade e Performance de Servidores Aplicacionais	2009
Nuno Tiago Maia dos Santos	FEUP	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Oracle Retail Planning System	2009
Miguel Ângelo Oliveira Lima	FEUP	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Adaptação da interface de webmail às actividades de cada utilizador	2009
Rui Pedro Silva Sá Guerra	FEUP	J.J.Pinto Ferreira	FEUP-DEIG/INESC Porto	Integration using Oracle SOA Suite	2009
Väyrynen Johanna	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Innovation center services in St Petersburg: effects on expertise centers in Finland	2009
Nuottanen Jukka		Marko Torkkeli and Vesa Harmaakorpi		Kouvola seudun innovaatiojärjestelmän kuvaus ja rakentaminen	2009
Maksimainen Anna		Marko Torkkeli		The Possibilities of Open Innovation in Development of Personal Health Record Based Services	2009
Savitskaja Irina	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Open Innovation in Russia	2009
Moiseenko Andrey	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Intermediaries in open innovation	2009
Sergeeva Rita	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Innovativeness in SMEs	2009
Tiilikainen Antti	LUT, Department of Industrial Engineering and Management	Timo Kärrä and Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Assessment of an information product project success: case business blueprint	2009
Väyrynen Johanna	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Innovation center services in St Petersburg: effects on expertise centers in Finland	2009
Nuottanen Jukka	LUT, Department of Industrial Engineering and Management	Marko Torkkeli and Vesa Harmaakorpi	LUT, Department of Industrial Engineering and Management	Kouvola seudun innovaatiojärjestelmän kuvaus ja rakentaminen	2009
Maksimainen Anna	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	The Possibilities of Open Innovation in Development of Personal Health Record Based Services	2009
Savitskaja Irina	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Open Innovation in Russia, LUT, Department of Industrial Engineering and Management.	2009
Moiseenko Andrey	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Intermediaries in open innovation, LUT, Department of Industrial Engineering and Management.	2009
Sergeeva Rita	LUT, Department of Industrial Engineering and Management	Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Innovativeness in SMEs, LUT, Department of Industrial Engineering and Management	2009
Tiilikainen Antti	LUT, Department of Industrial Engineering and Management	Timo Kärrä and Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Assessment of an information product project success: case business blueprint	2009
Fedoruk Andrey	St. Petersburg State University, Graduate School of Management, Russia	Sergey Kouchtch and Marko Torkkeli	LUT, Department of Industrial Engineering and Management	Innovative Approach in Supply Chain Management	2009

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
Ezhova Jana	St. Petersburg State University, Graduate School of Management, Russia	Olga Verkhovskaya and Marko Torkkeli	LUT, Department of Industrial Engineering and Management	<i>The Development of Entrepreneurship Based on Innovation</i>	2009
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

INFORMATION AND COMMUNICATIONS SYSTEMS

A) SUMMARY OF PUBLICATIONS

Summary of publications by members of the Unit in 2009

Type of publication	Number
Papers in International Journals with scientific referees	4
Papers in National Journals with scientific referees	0
Conference Proceedings in events with scientific referee and selection	47
Books (author)	1
Chapter/paper in books	2
Publications (editor)	1
Other publications (National meetings, local journals, etc.)	0
Theses concluded in 2009 by members of the Unit	3
TOTAL	58

Journal	Number of papers
Eurasip Journal on Image and Video Processing	1
Journal of Medical Systems	1
ACM Journal on Computing and Cultural Heritage	1
Journal of Neuroscience Research	1
TOTAL	4

B) SUMMARY OF PROJECTS

Summary of projects with activity in the Unit in 2009

Source of funding	Number
National Programmes	6
European Union Programmes	3
Supply of Services - national	14
Supply of Services - European Union	
Supply of Services - International	
Other R&D Services	
Other External Services	
Internal	
TOTAL	23

C) SUMMARY OF POST-GRADUATION ACTIVITIES

Summary of theses supervised by members of the unit in 2009

Tipo	Starting	On-going	Concluded	Total
Master			42	42
Doctoral			2	2
TOTAL			44	44

D) SUMMARY OF ACTIVITIES OF COOPERATION OR DISSEMINATION

Summary of Cooperation and dissemination actions

Type	Number
Conferences with INESC Porto in the organization (in the organizing committee or chairing technical committees)	12
Nº. of External co-authors of Publications of INESC Porto	86

E) LIST OF PUBLICATIONS

- International Journals with scientific referees**

Pereira, J.E., Costa, L.M., Cabrita, A.M., Couto, P.A., Filipe, V.M., Magalhães, L.G., Fornaro, M., Di Scipio, F., Geuna, S., Mauricio, A.C., Varejão, A.S., "Methylprednisolone fails to improve functional and histological outcome following spinal cord injury in rats", *Experimental Neurology, a Journal of Neuroscience Research*, November 2009, vol.220, no.1, p.71-81.

Gonçalves, A., Magalhães, L.G., Chalmers, A., "High Dynamic range - A gateway for predictive ancient lighting", *ACM Journal on Computing and Cultural Heritage*, July 2009, Article 3, vol.2, no.1.

Calistru, C.M., Ribeiro, C., David, G., "Multimedia in cultural heritage: Integrating description, transcription, and image content", *EURASIP Journal on Image and Video Processing* 2009.

Fonseca, T., Ribeiro, C., Granja, C., "Vital Signals in Intensive Care: Automatic Acquisition and Consolidation into Electronic Patient Records", *Journal of Medical Systems* 2009, vol.33, no.1, p.47-57.

- National Journals with scientific referees**

N/A

- Conference Proceedings with scientific referees (international or national)**

Rocha, T., Gonçalves, M., Magalhães, L.G., Godinho, F., Bessa, M., "Accessibility and Usability on the Internet for people with intellectual disabilities", *DSAI 2009 - The International Conference on Software Development for Enhancing Accessibility and Fighting Info-exclusion* 2009, Lisboa, Portugal.

Carvalho, R., Portela, L., Varajão, J., Magalhães, L.G., "Actividades do gestor de sistemas de informação", *ADM 2009 - Congresso Internacional de Administração* 2009, Ponta Grossa, Brasil.

Rodrigues, N., Lino Oliveira, J., Coelho, A., "Adapting traditional web applications to new user interfaces provided by rich internet applications", *IADIS 2009 - IADIS International Conference www/Internet* 2009, vol.2, Roma, Itália, p.395-398.

Silva, A.R., Meziani, R., Magalhães, R., Martinho, D., Aguiar, A., Flores, N., "AGILIPO: Embedding Social Software Features into Business process Tools", BPMS2'09 - The Second Workshop on Business Process Management and Social Software 2009, Ulm, Alemanha.

Silva, A.R., Martinho, D., Aguiar, A., Flores, N., Correia, F.F., Ferreira, H.J., "An Implementation Model for Agile Business Process Tools", in Proceedings of IWODE09 - International Workshop on Organizational Design and Engineering 2009, Lisboa, Portugal.

Sousa Rodrigues, N.C., Magalhães, L.G., Moura, J., Santos, F., Morgadop, L., Chalmers, A., "ArchHouseGenerator - A Framework for House Generation", Slactions 2009 - Internacional Conference Life, Imagination and work using metaverse platforms 2009, Braga, Portugal.

Cruz, A.M.R., Pascoal Faria, J., "Automatic Generation of User Interface Models and Prototypes from Domain and Use Case Models ", ICSoft 2009 - 4th International Conference on Software and Data Technologies 2009, vol.1, Sofia, Bulgaria.

Couto, T., Ribeiro, C., Nunes, S., "Characterizing the portuguese blogosphere", ICWSM 2009 - 3rd International AAAI Conference on Weblogs and Social Media 2009, San José - Califórnia, Estados Unidos da América.

Cunha, N., Moreira, M., Varejão, A., Costa, L., Pereira, J., Couto, P., Melo-Pinto, P., Bulas-Cruz J., Magalhães, L.G., Filipe, V., "Colour Marker Segmentation in Biomechanics Applications", RECPAD 2009 - 15th Edition of the Portuguese Conference on Pattern Recognition 2009, Aveiro, Portugal.

Morais, R., Cunha, C.R., Peres, E., Bessa, M., Reis, M.C., "Contextualized Ubiquity: A New Opportunity for Rendering Business Information and Services", Centeris'2009 - Conference on ENTERprise Information Systems 2009, Proceedings of CENTERIS'2009, Ofir, Portugal, p.573-581.

Oancea, D., Silva Moreira, R., Correia Lopes, J., "Controlling Complex Multimedia Systems via Reflection and Ontologies", ICC-WCSS - 2nd icc Winter Workshop on Complexity in Social Systems 2009, Lisboa, Portugal.

Urbano, C., Magalhães, L.G., Moura, J.P., Bessa, M., Marcos, A.F., "Desenvolvimento de um operador de tone mapping para dispositivos com ecrã pequeno", 17º EPCG - 17º Encontro Português de Computação Gráfica 2009, Covilhã, Portugal.

Correia, F.F., Ferreira, H.J., Aguiar, A., "Design for an Adaptive Object-Model Framework; An Overview", PLOP'2009 - 16th Conference on Pattern Languages of Programs 2009, Workshop MODELS@runtime2009, Chicago-Illinois, Estados Unidos da América.

Restivo, A., Aguiar, A., "drUID - Unexpected Interactions Detection", AOSD.09 - 8th International Conference on Aspect-Oriented Software Development 2009, Charlottesville, Virginia, USA.

Pereira, F., Moura, J.P., Bulas-Cruz, J.A., Magalhães, L.G., Chalmers, A., "Efficient use of Multiple Hardware Components for Image Synthesis", 17º EPCG - 17º Encontro Português de Computação Gráfica 2009, Covilhã, Portugal.

Freitas, M., de Sousa, A.A., Coelho, A., "Evaluation of Visualization Features in Three-Dimensional Location-Based Mobile Devices", GRAPP 2009 - Fourth International Conference in Computer Graphics Theory and Applications 2009, Proceedings, Lisboa, Portugal, p.328-336.

Peres, E., Liberato, N., Bessa, M., , ., "Events Promotion: An E-Business Solution", 13th IBIMA conference on - 13th IBIMA conference on Knowledge Managemet and Innovation in Advancing Economies 2009, vol.11, no.11, Marraquexe, Marrocos, p.255-265.

Cunha, V., Leitão, M., "Exploração da Remoção Hierárquica por Oclusão em Simulações em Tempo Real", 17º EPCG - 17º Encontro Português de Computação Gráfica 2009, Covilhã, Portugal.

Freitas, T., Coelho, A., Rossetti, R., "Improving Digital Maps Through GPS Data Processing", IEEE ITSC09 - 12th International IEEE Conference on Intelligent Transportation Systems 2009, St. Louis, Missouri, USA, p.480-485.

Nunes, S., Ribeiro, C., David, G., "Improving web user experience with document activity sparklines", EPIA 2009 - 14th Portuguese Conference on Artificial Intelligence 2009, Aveiro, Portugal, p.601-604.

Correia, F.F., Ferreira, H.J., Flores, N., Aguiar, A., "Incremental Knowledge Acquisition in Software Development using a weakly-Typed Wiki", WikiSym 2009 - The 5th International Symposium on Wikis and Open Collaboration 2009, Orlando, Estados Unidos da América.

Vand De Ven, P., Bourke, A., Tavares, C.E., Feld, R., Rocha, A., Nelson, J., "Integration of a suite of sensors in a wireless health sensor platform", IEEE SENSORS 2009 - IEEE Sensors Conference 2009 2009, Christchurch, New Zealand.

Carvalho, A., De Sousa, A.A., Ribeiro, C., Costa, E., Franchin, W., "Interactive focus + context visualization of spatio-temporal urban data models", GeoViz 2009 - Contribution of Geovisualization to the concept of the Digital City 2009, Hamburg, Germany.

Amaro Oliveira, M., "Interoperable Geographic Information Services from crisis Management perspective", DSIE 2009 - 4th Doctoral Symposium on Informatics Engineering 2009, Porto, Portugal.

Moreira, P.M., Reis, L.P., DE Sousa, A.A., "Jumping Jack: A Parallel Algorithm for Non-Monotonic Stream Compaction", GRAPP 2009 - Fourth International Conference in Computer Graphics Theory and Applications 2009, Lisboa, Portugal, p.137-146.

Liberato, N., Peres, E., Varajão, J., Bessa, M., "LBES:Location-Based E-Commerce System", Centeris'2009 - Conference on ENTERprise Information Systems 2009, Ofir, Portugal, p.145-151.

Kajko-Mattsson, M., Aguiar, A., Boness, K., Kaindl, H., Pooley, R., Tael, A., "Long-Term Perspective of Agile Methods", ICSEA 2009 - The Fourth International Conference on Software Engineering Advances 2009, Porto, Portugal.

Rahman, A., David, G., Ribeiro, C., "Model Migration Approach for Database Preservation", IDCC - 5th International Digital Curation Conference 2009, London, United Kingdom.

Rodrigues, R., Coelho, A., Reis, L.P., "Modelação Expedita de Edifícios Monumentais a partir de Descrições Textuais" [Expeditious Modelling of Monumental Buildings from Textual Descriptions], 17º EPCG - 17º Encontro Português de Computação Gráfica 2009, Covilhã, Portugal, p.35-43.

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Aguiar, A., Merson, P., Dekel, U., "Wikis for Software Engineering Workshop", ICSE 2009 - 31st International Conference on Software Engineering 2009, Vancouver, Canada.

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- **Books (Author)**

Bessa, M., Bulas-Cruz, J.A., Chambers, A., "Selective Rendering for 3D Maps: High-Fidelity Graphics on Mobile Devices" 2009.

- **Chapter/paper in Books**

Silva, M.J., Gomes, C.A., Pestana, B., Correia Lopes, J., Marcelino, M.J., Gouveia, C., Fonseca, A., "Adding Space and Senses to Mobile World Exploration" 2009, Cap.8, Mobile Technology for Children: Designing for Interaction and Learning, p.147-169.

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- **Publications (Editor)**

Aguiar, A., Merson, P., Dekel, U., "Proceedings of the Wikis dor Software Engineering Workshop" 2009.

- **Other Publications**

N/A

- **Theses concluded in 2009 by members of the Unit**

Carvalho, A., "Spatio-Temporal Information Management Visualization", PhD thesis, FEUP, July 2009.

Gaspar, A., "Definição de uma Arquitectura Empresarial: Caso do Observatório de Mobilidade da Região Metropolitana de Lisboa", MSc thesis, FEUP, November 2009.

Barros, R., "Definição de uma Framework para Municípios de Pequena Dimensão", MSc thesis, FEUP, December 2009.

F) LIST OF PROJECTS

Short Name	Leader	Dominant Activity Type	Funding			Cooperation		Execution	
			Source	Programme	Project Typology	Type	Role INESCP	Start	Status 2009-12
DBPreserve	Gabriel David	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-04	CONT
URBIS	Augusto Sousa	RES	PROG - NAT	FCT	PROJ IC&DT	NAT	PROP	2009-02	CONT
El Nautilus	António Gaspar	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2001-04	CONT
Palco 3.0	António Gaspar	DEV	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2006-05	CONT
Mobiles-1	José Correia	RES	PROG - NAT	POFC / POR	PROJ CO-PROM	NAT	PAR	2009-02	START
Portal Douro	António Coelho	DEV	PROG - NAT	POR Norte		NAT	PAR	2009-03	START
eCAALYX	Ângelo Martins	DEV	PROG - EU	AAL		EU	PAR	2009-11	START
ADD-ME	Rui Barros	RES	PROG - EU	CIP		EU	PAR	2007-10	START
RAIA	Artur Rocha	RES	PROG - EU	INTERREG		EU	PAR	2008-02	START
NIDT FORUM	António Gaspar	CONS	SERV - NAT	POFC / POR	NUCLEO I&DT	IND	SUB	2008-07	START
NIDT PROCESS.NET	António Gaspar	CONS	SERV - NAT	POFC / POR	NUCLEO I&DT	IND	SUB	2008-12	START
CCDRN-RJUE	Rui Barros	CONS	SERV - NAT			IND	CONT	2009-05	FIN
CCDRN-TIC	António Gaspar	CONS	SERV - NAT			IND	CONT	2009-07	FIN
Consultoria	António Gaspar	CONS	SERV - NAT			IND	CONT	2009-05	CONT
EOLOS	António Gaspar	CONS	SERV - NAT			IND	CONT	2009-11	CONT
Escolinhas	António Gaspar	CONS	SERV - NAT			IND	CONT	2009-01	START
GENERG-Auditoria	António Gaspar	CONS	SERV - NAT			IND	CONT	2009-06	START
SAMA 2007	Paulo Monteiro	CONS	SERV - NAT			IND	CONT	2009-07	START
SIVIDA	José Correia	CONS	SERV - NAT			IND	CONT	2008-06	CONT
WINESLOT	António Gaspar	CONS	SERV - NAT			IND	CONT	2006-12	CONT
SIGAVE	Lígia Silva	DEV	SERV - NAT			IND	CONT	2008-01	START
SIGFREG	Rui Barros	TT	SERV - NAT			IND	CONT	2007-09	START
WIKI WIPRO	Ademar Aguiar	TT	SERV - NAT			IND	CONT	2009-12	FIN

Dominant Activity Type:

RES - Research
 DEV - Development
 CONS - Consulting
 TT - Technology Transfer
 NET - Network
 CONF - Conference
 TRAIN - Advanced Training
 INC - Incubation
 O - Other

Source:

PROG - NAT - National Programmes
 PROG - EU - European Union Programmes
 SERV - NAT - Supply of Services - national
 SERV - EU - Supply of Services - European Union
 SERV - INT - Supply of Services - International
 ORD - Other R&D Services
 O - Other External Services
 INT - Internal

Type:

IND - Individual Project
 NAT - National Cooperation
 EU - European Union Cooperation (EU+Associated Countries)
 INT - Internal Cooperation

Role INESCP:

PROP - Proponent
 PAR - Partner
 CONT - Prime Contractor
 SUB - Subcontractor
 MEMB - Membre
 O - Other

G) LIST OF PATENTS

N/A

H) LIST OF PROTOTYPES

Name: Caalyx Mobile Application
 Developed under (Project Name): Caalyx - Complete Ambient Assisted Living Experiment
 Demo Place: Ancona- Italy
 Type (National or International): International
 Development Period: 2007-2009

Name: Uni-net Classroom
 Developed under (Project Name): EI-NAUTILUS
 Demo Place: NAUTILUS - Portugal
 Type (National or International): International
 Development Period: 2009-2011

Name: Wiki Wipro
 Developed under (Project Name): Wiki Wipro
 Demo Place: Wipro Retail - Portugal
 Type (National or International): National
 Development Period: 2009

I) LIST OF THESES SUPERVISED BY MEMEBERS OF THE UNIT

PhD Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
André Restivo	FEUP	Ademar Aguiar Ana Moreira	INESC Porto/FEUP UNL/FCT	Disciplined Reuse of Aspect	2010
António Miguel R.S.R. Cruz	FEUP	João Pascoal Faria	INESC Porto/FEUP	Automatic Generation of User Interfaces from Rigorous Domain and Use Case Models	2010
Artur Rocha	FEUP	Ademar Aguiar Augusto Sousa	INESC Porto/FEUP	Cooperative and Distributed Location-Based Decision Support	2010
Daniel Oancea	FEUP	João Correia Lopes Rui Moreira	INESC Porto/FEUP INESC Porto/UFP	An Adaptive Cross-Layer Framework for Media Delivery over Heterogeneous Networks	2010
Fernando Sérgio Barbosa	FEUP	Ademar Aguiar	INESC Porto/FEUP	Generic Roles: Reducing Code Replication	2010
Filipe Figueiredo Correia	FEUP	Ademar Aguiar	INESC Porto/FEUP	Revising Literate Programming	2010
Hugo José Sereno Lopes Ferreira	FEUP	Ademar Aguiar João Pascoal Faria	INESC Porto/FEUP INESC Porto/FEUP	Adaptive Object Modelling: Patterns, Tools and Applications	2010
Marco Aurélio A. Oliveira	FEUP	Ademar Aguiar	INESC Porto/FEUP	Adaptiveness on Distributed Location-Based Services	2010
Nuno Honório Rodrigues Flores	FEUP	Ademar Aguiar	INESC Porto/FEUP	Patterns and Tools for improving Framework Understanding: a Collaborative Approach	2010
Pedro Miguel Correia Mendes	FEUP	João Pascoal Faria Ana Paiva	INESC Porto/FEUP FEUP	Automatic Testing of Graphical User Interfaces Based on UML Behavioral Models	2010
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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

MSC Dissertations

Author	Instit.	Supervisor	Instit.	Title or topic	Conc. Date
António José T. Gaspar	FEUP	João Pascoal Faria	INESC Porto/FEUP	A orientação aos Processos de Negócio nos Sistemas de Informação da Administração Pública.	2009
Cláudia Lopes Simões Madureira	FEUP	Ademar Aguiar	INESC Porto/FEUP	Integração e Avaliação do Impacto de uma ITIL/CMDB	2009
Joana Rodrigues Coelho de Sousa	FEUP	João Correia Lopes Almiro Amorim	INESC Porto/FEUP ESAD	Publicidade como Evento/Instalação Tecno-Artística	2009
José Carlos de Queiroz Pinto	FEUP	Ademar Aguiar	INESC Porto/FEUP	Ambiente de Trabalho Portátil	2009
Licínio Venâncio Feiteira Mano	FEUP	Ademar Aguiar	INESC Porto/FEUP	PUSL - Plataforma Unificada de Serviços de Localização para Situações de Crise ou Emergência	2009
Luís Amaral	FEUP	João Pascoal Faria	INESC Porto/FEUP	A Gap Analysis Methodology for the Team Software Process	2009
Luís Filipe Ferreira	FEUP	Ademar Aguiar	INESC Porto/FEUP	A Practical Framework for Rapid Application Development	2009
Maria Conceição Vilas Boas	FEUP	Ademar Aguiar	INESC Porto/FEUP	Método de Avaliação Ex-post de Projectos de Sistemas de Informação na Administração Pública	2009
Miguel Gomes Rodrigues	FEUP	João Correia Lopes	INESC Porto/FEUP	Arquitecturas de Integração de Mediadores com Companhias de Seguros	2009
Nelson Manuel Faria Freire	FEUP	João Correia Lopes Paulo J. Oliveira	INESC Porto/FEUP ISEP	Reutilização de Operações de Limpeza da Dados	2009
Nuno Miguel Moreira Baldaia Queiroz	FEUP	Ademar Aguiar	INESC Porto/FEUP	Extending Eclipse to Support Agile Documentation	2009
Pedro Miguel Ribeiro Veloso Gomes	FEUP	João Pascoal Faria Ademar Aguiar	INESC Porto/FEUP INESC Porto/FEUP	Integração de modelos de desenvolvimento de software mais e menos ágeis	2009
Pedro Castro Henriques	FEUP	Pascoal Faria	INESC Porto/FEUP	Strategic Planning and Acquisition Management of Information Systems	2009
Ricardo Miguel S. Leandro	FEUP	João Correia Lopes	INESC Porto/FEUP	Sage Report Description Language	2009
Rui Sanches da Costa Barros	FEUP	Ademar Aguiar	INESC Porto/FEUP	Definição de uma Framework para Municípios de Pequena Dimensão	2009
Tiago Gil B. Silva Cunha	FEUP	João Correia Lopes	INESC Porto/FEUP	iPortalDoc Light	2009
1	2	3	4	5	6

1 - Name of the post-graduation student

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

3 - Name of supervisor or supervisors

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

5 - Title of the thesis

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



INESCPORTO

INSTITUTO DE ENGENHARIA DE SISTEMAS
E COMPUTADORES DO PORTO
LABORATÓRIO ASSOCIADO

Anexo Relatório da CAC 2009

INESCPORTO
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INESC Porto Scientific Advisory Board Brief Report Period 2002-2008

The INESC-Porto Scientific Advisor Board includes:

Dr. José Principe – Coordinator (U. of Florida)
Dr. Leonardo Chiariglione (Telecom Italia Lab)
Dr. Faramarz Farahi, (U. of North Carolina)
Dr. Tomás Gomez (U. Pontificia Comillas, Madrid)
Dr. Michel Scholl (CNAM, Paris)
Dr. John O'Reilly (Cranfield University)
Dr. Volker Stich (Aachen U. of Technology)
Dr. José A. B. Fortes (U. of Florida)
Dr. Maarten van Someren (Universiteit van Amsterdam)

Disclaimer:

The role of the Scientific Advisory Board (SAB) is to evaluate institutional activities and propose modifications to help the institution achieve its goals. Its reports are written for insiders, i.e. the people that know the institution very well such as its Board of Directors, Scientific Council, Unit Heads and Investigators. As such, the reports are normally focused, detailed and concentrating more on the things that need corrections than praising what works. Therefore, if the reports are used for other goals, proper care should be exercised not to misinterpret the negative tone that sometimes permeates the evaluation.

This brief report summarizes the assessment of the SAB for the period 2002-2008, and presents also recommendations for the future.

A1 General Comments

INESC-Porto Laboratory Associado (LA) is a multifaceted Institution organized in multi-disciplinary Units associated to science and technology application areas. Therefore, in a Unit one may find already a blend of several distinct skills or scientific knowledge in distinct areas, as required for technology transfer. Currently there are 6 Units (Telecommunications and Multimedia (UTM), Manufacturing Systems Engineering (UESP), Information and Communication Systems (USIC), Power Systems (USE), Optoelectronics and Electronic Systems (UOSE) and Innovation and Technology Transfer (UITT) with a common support services infrastructure. Each Unit was born and grew independent of the others in a bottom up fashion. This evolution created Units with very different profiles, goals and perspectives, which creates a rich and diverse environment, enables each to exploit the local and short-term niches in the Portuguese markets, but is a challenge when a coherent, long-term plan for the overall Institution is delineated.

INESC-Porto defines itself as an interface Institution, transferring technology from the highly skilled University environment to a mostly traditional and technology “challenged” Industry, to the Service sector and Public Administration. Each Unit has between 3 and 30 Ph.Ds, a varying number of University Professors and graduate students with only one or two full-time staff in most units. A scientific counsel structure was created for each Unit, with a coordinator, and an external Scientific Advisory Board. Each Unit has a coordinator, who along with the scientific council coordinator reports to a Board of Directors. Academicians prevail across the whole structure.

INESC-Porto was contracted as a Laboratório Associado (LA) in 2002 by the Ministry of Science and Technology, which places it in a very selective group of Portuguese Research Institutions, and demonstrates the caliber of the research and the importance of the current areas of expertise to help modernize the Portuguese industry. The SAB considers INESC-Porto in 2008 a medium size research/technology institution with an annual budget of \$8 million Euros and 300 members (~ 70 staff).

The SAB witnessed a remarkable evolution of the INESC LA during the 2002-2008 period. We will divide our evaluation in three basic areas: Institute Management and scientific output indicators, Scientific Evaluation of the units, and will end with a SWOT analysis and a recommendation.

A1.1 Institute Management Indicators

The Scientific Advisory Board (SAB) was very impressed with the management of INESC Porto LA because of its professional and effective supporting structure with a very low overhead (8% of labor force). The Laboratório Associado status brought much needed stability in institutional funding. We were very impressed to see that in 2008 the overall budget of the Institute is **five times the structural funding from FCT** (or close to four times the combined FCT structural plus projects funding). This is rare in Portuguese institutes and attests to the entrepreneurial spirit and effectiveness of INESC researchers and its management. During this period, INESC Porto matured a very clear mission and an excellent strategy motto (From knowledge production to science base innovation) that is easy to explain and markets well the Institute. The web presence is being redesigned and the Communication Service runs a monthly news magazine (BIP) that is an excellent outreach vehicle for the Portuguese industry and high school educational system.

During this period the Institute has identified the formula to be visible internationally in academic circles, to become a player in the international

technology market, and to attract talent which the SAB considers a major landmark. Here are the indicators that corroborate this view:

- The expertise of its members is world-class (2 IEEE Fellows) and INESC Porto is being recognized as such by international grants and contracts (i.e. European Space Agency and Argonne National Lab, USA among others), international collaborations (double the number of publications with foreign co-authors since 2002) and is attracting international scholars (regular sabbaticals of IEEE Fellows) and graduate students (40% of Ph.D. are foreign nationals).
- INESC Porto was the Portuguese R&D Institution with the largest participation in the EU R&D 6th Framework Programme, both in number of projects as well as funding (it was involved in 18 European projects in 2008).
- Some of INESC Porto units transitioned into a phase of effectively integrating multiple academic disciplines with technological development, which is required to create products that solve real world problems for the Portuguese industry/services (3 fold increase in tech transfer contracts from 2002 to a current number of 45).
- Even more importantly the Institute has also found a way to transfer this technology effectively to the international technology market (2 INESC Porto startups –MOG and FiberSensing have sales of 2M Euros in 2008) and continues to spawn many high tech startups (16 startups being incubated in 2008).
- The Institute is attracting talent to jump start growth in vital future directions. Indeed, INESC Porto is in the process of integrating a large number of academicians (30 Ph.D., roughly 1/3 of the current number) from the Colleges of Science (CRACS-Center for Research in Advanced Computational Systems) and Economics (LIAAD- Laboratory of Artificial Intelligence and Decision Support), which will help create critical mass in intelligent information technologies.

A1.2 Scientific Output Indicators

INESC Porto LA made a clear progress in its international visibility. A very successful effort was undertaken to improve the journal publication of INESC Porto LA, as the statistics of the last five years clearly indicate: **while the number of researchers doubled the journal paper output increased six fold** (in 2008 the number of published journal papers is 78, and the number of refereed conference publications is 163). This is very important because the national and international success of INESC-Porto LA is predicated in the visibility of its research, for which the publication record is an important indicator. However, the ratio journal paper/senior researcher is around one, still below the international standards and a continuing effort is needed.

INESC Porto is also engaged in post-graduate education, training in its laboratories a growing number of students (in 2008 there are 78 Ph.D. students and 9 Post-doctoral fellows). The Ph.D. graduating rate averages 13 per year, which is a bit low.

Finally, INESC Porto researchers are active in the organization of international scientific events, (35 events identified in 2008, against 11 in 2002), and the institute is part of a unique technology transfer network: the University Technology Enterprise Network with UT Austin and MIT as well as of the following international educational consortia: MIT-Portugal (Sustainable Energy Systems (PhD program), Leaders for Technological Industries (PhD program), Technology Management Enterprise (MSc program), Complex Transportation Infrastructure Systems (MSc program)), CMU-Portugal (MAP-I Ph.D. program), UT Austin-Portugal (Digital Media (PhD, MSc programs and professional M. Sc.)).

The following table summarizes the evolution of INESC Porto in the period 2002-2008. The information in the 2002 column generally refers to January 1, 2002 (beginning of the period) and the end of the period is December 31, 2008. The exception is the 2002 Budget which reports to December 31, 2002 because this was the first full year with Associated Laboratory status.

INDICATOR	2008	2002	Growth factor
BUDGET (2008/2002)			
Total Budget (M€)	7.7	6.3	1.22
PERSONNEL			
No. Researchers holding a PhD degree	85	46	1.85
Total number (researchers + staff)	339	243	1.40
No. Ph.D students	112	49	2.20
PUBLICATIONS			
No. journal publications	79	13	6.07
Total no. refereed publications	253	126	2.01
Joint publications with researchers from other institutions	214	61	3.51
OTHER ACTIVITIES			
Conferences with INESC Porto in the Organization	35	11	3.18
TECHNOLOGY TRANSFER			
No. projects with transferred technology	41	18	2.28
START UP INCUBATION			
No. start up companies launched	6	1	6
No. start up companies in incubation	10	0	-

One may notice that there is a net gain in performance efficiency in every indicator. The activity output increased 2 to 6 fold with a modest 20% increase in the total budget.

A2 Units' Scientific Performance

A2.1 General Comments

The model of aggregating multidisciplinary activities in the Units is paying off in terms of technology transfer. There are excellent examples of exploitation of past R&D efforts, which is a very good sign of maturity and accomplishment. Across all the Units we observed pockets of research excellence, albeit with different degrees due to the different profiles of each Unit. Research at UOSE is top notch overall and highly visible. Research at USE is world class in an increasingly vital area (energy) which is a true unique opportunity for INESC-Porto. UESP research is still very good but perhaps losing standing in the international arena. UTM is suffering from a large number of loosely coupled areas of activity, where there are pockets of excellent work and exploitable results. The activities in USC are too heterogeneous and there is a solid scientific foundation in only a subset of the activity. This Unit will benefit from a restructure with the incoming CRACS and LIAAD groups. The service activity

of UITT is clearly justified by the INESC-Porto mission and it has already paid off its creation.

In all the Units there is good science being produced by an engaged and intellectually curious population of researchers and Ph.D. students. We saw everywhere examples of good depth and experience, but the large breadth of the Units and the limited human resources endanger consolidation of core competencies on a long-term basis. Honorable exceptions are USE and UOSE which have focused activities and strategic thinking, so best practices from these Units should be applied to the others. The ratio of post graduate students to professors is around one, which is low and the admission of new post graduate students is perhaps the best way to solidify the institution and improve some of the metrics (e.g. papers/researcher). The heavy involvement of INESC Porto in the international educational consortia is the right approach to seek new talent.

The SAB feels that the scientific atmosphere in INESC-Porto needs reinforcement thru an Institute-wide regularly scheduled seminar series. This not only invigorates the scientific enterprise but also facilitates inter Unit collaborations.

We remit to the SAB 2006 and 2008 reports for the details about the evaluation and recommendations for each Unit.

A3 SWOT Analysis

A3.1 Strengths

One of INESC-Porto strengths lies in the young and enthusiastic, highly educated, world-class group of collaborators in key areas and in the low operation costs (when compared with comparable staffed R&D centers). INESC-Porto is a Laboratório Associado in key technology areas due to its strong research accomplishments, and has already a presence in the Portuguese industrial, service and administration markets. We found clear evidence of the international visibility of the institute, not only in academic circles but also in the international marketing of R&D efforts. This is a turning point for INESC-Porto LA.

A3.2 Weaknesses

While the mission and identity of INESC-Porto is clear to its board of directors and upper research management, it is still not embraced by all the researchers in the Units. INESC Porto should revisit its structure after these years of accelerated growth because its six heterogeneous areas of activity are starting to work as silos that do not promote cross fertilization. Institutions like INESC-Porto are very peculiar because they grew bottom up. As such special attention should be given to the mentoring of a new generation of leaders. Finally, due to its size, INESC-Porto needs a better plan for sustainability from R&D exploitation.

A3.3 Opportunities

INESC-Porto should strengthen its presence in Portugal and internationally by creating highly visible and “use-oriented” flagship projects (this also will improve the silos we mentioned above). Now that INESC-Porto is a player in the technology world market, a new phase of strategic alliances should be pursued. The integration of LIAAD and CRACS is a huge opportunity to shore up competencies, and change the perspective and level of intervention in the critical IT area. Since INESC Porto has very successful Units, perhaps an analysis of best practices in these Units should be undertaken, to create guidelines for the others.

A3.4 Threats

The threats come from the excessive dispersion of activity for the available man power and current internal structure. It is necessary to have mechanisms in place to map the organization with the strategic goals of the Institute, e.g. by defining the right level of R&D theme aggregation, with criteria to create, modify and dismantle Units and promote agility.

A4 SAB Recommendation

INESC Porto is a well managed institution with a positive trajectory in all respects, and has created a set of internal evaluation protocols for checks and balances that are working. Therefore, the recommendation of the SAB is to let the Laboratorio Associado continue in its present structure to pursue its objectives under an automatic renovation of the 5 year contract.