

INSTITUTO DE TELECOMUNICAÇÕES

Relatório de Actividades

1999

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1. Introdução

O Instituto de Telecomunicações (IT) é uma instituição privada sem fins lucrativos, de utilidade pública, resultante da associação de quatro instituições com experiência e tradições de investigação e desenvolvimento na sector das Telecomunicações:

- Instituto Superior Técnico (IST),
- Universidade de Aveiro (UA),
- Faculdade de Ciências e Tecnologia da Universidade de Coimbra (FCTUC),
- Portugal Telecom, através da “Portugal Telecom Inovação” (PTI), ex “Centro de Estudos de Telecomunicações” (CET).

O IT está organizado em três Pólos: um em Aveiro, no Campus Universitário da Universidade de Aveiro (UA), outro em Coimbra, no Pólo II da Universidade de Coimbra (UC) e o terceiro em Lisboa, no IST.

A constituição do IT beneficiou do apoio do programa CIENCIA, num montante total de 1,5 milhões de contos, através de três contratos celebrados em 1991, com as instituições associadas. Este financiamento permitiu a construção de infra-estruturas nos três Pólos e a aquisição de equipamentos para os respectivos laboratórios.

A instalação do Pólo de Aveiro ficou concluída em 1993 e a dos pólos de Lisboa e de Coimbra em 1994. Nesse sentido pode-se considerar que, desde 1995, o IT desenvolve uma actividade em regime normal. Resumem-se, em seguida, algumas das actividades mais marcantes realizadas em 1999 deixando para os relatórios das linhas de investigação o seu desenvolvimento.

2. Organização interna

A gestão do IT é essencialmente descentralizada nos Pólos. A gestão de cada Pólo goza de ampla autonomia para a gestão corrente. A Comissão Executiva e os membros das Comissões de Gestão dos Pólos reúnem-se pelo menos uma vez por mês.

O Conselho Científico reúne-se duas vezes por ano, para apreciar num caso o Plano de Actividades e o Orçamento e noutro o Relatório de Actividades, bem como qualquer assunto que lhe seja proposto pela Comissão Executiva. O Plano de Actividades e o Orçamento, por um lado, e o Relatório de Actividades e Contas (depois de certificadas) por outro, são seguidamente submetidos à Assembleia Geral para aprovação.

Tanto o Plano de Actividades como o Relatório de Actividades são discutidos e comentados com a Comissão de Aconselhamento.

No ano de 1999 realizaram-se as seguintes reuniões:

- duas Assembleias Gerais, uma em Março, em Lisboa, para aprovar o Relatório de Actividades e Contas de 1998 e para eleger os membros da Assembleia Geral, do Conselho Fiscal e da Comissão Executiva, e outra em Dezembro, em Aveiro, para aprovar o “Plano de Actividades e Orçamento para 2000”;
- reuniões mensais da Comissão Executiva;
- uma reunião com a Comissão de Aconselhamento, formada por três especialistas no domínio das telecomunicações (Dr. Roland Hüber, Prof. John O’Reilly e Prof. Martin Tomlinson) actuando a título pessoal que, em Abril, assistiram à CONFTELE’99, apreciaram detalhadamente as actividades do IT em 1998 e as propostas para 1999 e formularam recomendações para actividades futuras;
- duas reuniões do Conselho Científico, uma em Março para discutir o Relatório de Actividades", preparar a avaliação trienal que teve lugar em Outubro e discutir um documento de "Planeamento Estratégico" preparado pelo presidente da Comissão Executiva, e outra em Dezembro, para preparação da proposta de “Plano de Actividades para 2000” a submeter à Assembleia Geral em Dezembro de 1999 e para continuar a discussão do documento de Planeamento Estratégico do IT com particular incidência na organização interna.

3. Projectos de âmbito nacional

A abertura do concurso de propostas de projectos pela "Fundação para a Ciência e Tecnologia" (FCT), que se esperava tivesse sido no início de 1999, teve lugar só em finais de 1999, com encerramento em 31 de Janeiro de 2000. Por outro lado as decisões relativas ao primeiro concurso de propostas de projectos do programa IST (gerido pela Comissão Europeia) foram atrasadas até finais de Novembro e algumas só serão tomadas em Março ou mesmo em Abril e 2000. Por estas razões não se iniciaram em 1999 novos projectos de grande dimensão.

Durante 1999 estiveram activos 27 projectos financiados pela FCT (no âmbito do programa PRAXIS XXI e de outros programas) dos quais 3 envolvendo mais de um Pólo.

O Pólo de Lisboa completou a "Análise técnica de aquisições" para o Instituto de Comunicações de Portugal, a pedido da Price Waterhouse e continuou a desenvolver um projecto financiado pelas Oficinas Gerais de Material Aeronáutico (OGMA).

No Pólo de Aveiro, sob contrato com a Portugal Telecom (PTI) decorreu actividade em 20 projectos nas áreas de redes (12), rádio, microondas e ondas milimétricas (4), comunicações integradas (2) e componentes ópticos e opto-electrónicos (2). O Pólo de Lisboa, também por contrato com a Portugal Telecom esteve envolvido em 1 projecto.

Como é evidente do que ficou referido a cooperação intrapolar e interpolar continua a muito baixo nível. Esta situação deverá melhorar se, como se espera, as equipas do IT foram bem sucedidas no recente concurso de projectos da FCT.

4. Projectos comunitários

A participação do IT projectos comunitários de I&D, em particular no programa ACTS (4º Programa Quadro da União Europeia), incluíram:

- FRAMES, em comunicações móveis e pessoais;
- MOMUSYS em codificação de imagem (MPEG-4);
- DICEMAN em codificação de imagem (MPEG-7);

- SAMBA em comunicações móveis de banda larga em ondas milimétricas
- DIFFERENCE, em arquitectura de redes.

A maioria destes projectos envolveram equipas de um único pólo: Lisboa, no caso do FRAMES, MOMUSYS e DICEMAN e Aveiro, no caso do DIFFERENCE. O projecto SAMBA inclui equipas dos Pólos de Aveiro e Lisboa

Outras participações do IT em projectos de I/D comunitários incluíram:

- JOE3-CT97-0049 (DG12), desenvolvimento de uma célula de combustível de baixa temperatura;
- European Neurological Network (TELEMATICS), implementação de um sistema de comunicações seguras entre centros de saúde,

Equipas do IT participaram nos projectos COST 249, 252, 255, 257, 259, 260 and 264.

Os resultados do IT no primeiro concurso do programa IST foram modestos (3 projectos novos). Este facto ficou a dever-se ao número reduzido de propostas apresentadas

Alguns dos projectos a que se faz referência neste relatório foram desenvolvidos em colaboração com as instituições associadas.

5. Produção Científica

A produção científica, foi a seguinte (entre parêntesis indicam-se os valores previstos no Plano de Actividades):

- Teses (concluídas)
 - Doutoramento 6 mais 2 submetidas (18)
 - Mestrado 17 mais 2 submetidas (30)

- Teses (em curso)
 - Doutoramento 75
 - Mestrado 61

- Publicações:
 - Livros e capítulos de livros: 10 (2)
 - Artigos em revistas 78 (60)
 - Artigos em Actas de Conferências 297 (200)

O número de teses concluídas é substancialmente inferior ao previsto no Plano de Actividades e confirma o período muito elevado necessário para a conclusão de teses de Mestrado e Doutoramento. O tempo médio para conclusão de uma tese de mestrado parece ser da ordem dos 3 anos e para uma tese de doutoramento mais de 6 anos.

O Conselho Científico discutiu demoradamente este assunto na sua reunião de 21 de Março de 2000 e apresentou razões para esta anomalia. No caso dos mestrados, a prática corrente (que irá ser alterada) contabiliza os estudantes de mestrado desde o princípio do curso embora o primeiro ano seja ocupado essencialmente com a parte escolar. Por outro lado o mercado de trabalho para jovens engenheiros de telecomunicações continua a oferecer salários muito elevados o que contribui para uma taxa de desistência elevada. No caso dos alunos de doutoramento os motivos são menos claros embora possam ser atribuídos a uma taxa de desistência elevada e ao facto da maioria do alunos já não serem docentes universitários e portanto estarem menos sujeitos a pressões para terminar.

O número de trabalhos publicados em revistas científicas e livros e o número de comunicações apresentadas em conferências excede os valores previstos no Plano de Actividades e demonstra o empenho dos colaboradores do IT em publicar.

Investigadores do Pólo de Lisboa obtiveram os seguintes prémios:

- "Jovem Engenheiro" - Primeiro prémio, da Ordem dos Engenheiros, Região Sul,
- 'Best Poster Award' - Proceedings. of GAAS'99-European Gallium Arsenide and related III-V compounds Application Symposium, Munich, Germany, Oct. 1999

6. Conferências e Seminários

O Pólo de Lisboa do IT organizou a CONFTELE'99 — II Conference on Telecommunications, realizada em Sesimbra, nos dias 15 e 16 de Abril de 1999, com mais de 300 participantes, dos quais 10 % estrangeiros. As actas da conferência (em inglês) constituem um grosso volume (742 páginas) e permitem uma visão valiosa sobre as actividades de I&D em Portugal em Telecomunicações.

A série de seminários temáticos do IT , abertos a toda a comunidade científica nacional, foi continuada com dois seminários. O primeiro sobre "Redes de Computadores" decorreu em Lisboa, em 1 de Março de 1999, e o segundo sobre "Algoritmos Genéticos", em Coimbra, em 21 de Outubro de 1999. As apresentações foram disponibilizadas no "site" do Pólo de Coimbra.

Foram organizadas diversas reuniões no âmbito dos projectos comunitários e das Acções de Cooperação COST em que as equipas do IT estão envolvidas.

7. Recursos humanos

Os recursos humanos do IT referidos a Dezembro de 1999 são os seguintes:

- IT-Aveiro
 - 24 investigadores, docentes da UA, dos quais 20 doutorados
 - 16 investigadores do Centro de Estudos de Telecomunicações da Portugal Telecom,
 - 56 estudantes de pós-graduação 22 estudantes de doutoramento, 26 estudantes de mestrado, e 8 bolseiros
 - 20 alunos finalistas de licenciatura, em Projectos de Fim de Curso,
 - 6 funcionários a tempo inteiro,
 - 1 funcionário a tempo parcial.
- IT-Coimbra
 - 11 investigadores, doutorados, 9 docentes da FCTUC e 2 docentes de outras instituições de ensino superior;

- 32 alunos de pós-graduação, dos quais 20 estudantes de doutoramento e 12 estudantes de mestrado
 - 15 alunos finalistas de licenciatura, em trabalhos finais de curso
 - 1 funcionários administrativo a tempo inteiro,
 - 1 funcionário administrativo a tempo parcial.
-
- IT-Lisboa
 - 48 investigadores, doutorados, dos quais 43 dão docentes do IST e 5 são docentes de outras instituições de ensino superior,
 - 88 estudantes pós-graduados, dos quais 47 são estudantes de doutoramento e 30 são estudantes de mestrado,
 - 96 alunos finalistas de licenciatura, em Projectos Finais de Curso,
 - 1 funcionário administrativo a tempo inteiro,
 - 1 funcionário administrativo a tempo parcial,
 - 1 técnico de laboratório a tempo parcial.

INSTITUTO DE TELECOMUNICAÇÕES

Annual Report

1999

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1. Introduction

“Instituto de Telecomunicações” (IT) is a private, not-for-profit organisation, an association of four institutions with experience and traditions in research and development in the field of Telecommunications:

- “Instituto Superior Técnico” (IST);
- “Universidade de Aveiro” (UA);
- “Faculdade de Ciências e Tecnologia da Universidade de Coimbra” (FCTUC);
- “Portugal Telecom” (PT), through its research unit "Portugal Telecom Inovação", (PTI), ex "Centro de Estudos de Telecomunicações" (CET)

IT is organised around three sites: one in Aveiro, in the University Campus, another in Coimbra, in Pole II of the University of Coimbra and the third one in Lisbon, in IST.

Setting up of IT was the result of a 1.5 billion escudos grant from Programme CIENCIA, through three contracts signed in 1991. This investment enabled new infrastructures to be built and research laboratories to be equipped in site.

Installation was concluded in Aveiro in 1993 and in Lisbon and Coimbra in 1994. Since 1995 IT activities proceed regularly. Key developments in 1999 are sketched below leaving the details for the report of individual research line.

2. Management

IT management is mostly decentralized by site. Site management enjoys ample freedom to deal with current affairs. The Executive Board and the members of the site management commissions that do not belong to the Executive Board meet at least once a month.

The Scientific Board meets twice a year to comment on the Work Plan and Budget, on the Annual Report and on any other subject put forward by the Executive Board. The Work Plan with the Budget and the Annual Report and Accounts (after legal certification) are subsequently submitted to the General Assembly for approval.

The Work Plan and the Annual Report are discussed with the Advisory Committee.

During 1999 the following meetings were held:

- two meetings of the General Assembly one in March, in Lisbon, to approve the “1998 Annual Report” and to elect the members for the General Assembly, the Audit Board and the Executive Board, and another in December, in Aveiro, to approve the “Plan and Budget for 2000”;
- monthly meetings of the Executive Board;
- one meeting with the Advisory Committee, formed by three independent experts in the field of Telecommunications (Dr. Roland Hüber, Prof. John O’Reilly and Prof. Martin Tomlinson) acting in a personal capacity who, in April, were present during CONFTELE’99, carried out a detailed survey of IT activities during 1998 and proposals for 1999, and issued recommendations for future activities;
- two meetings of the Scientific Board, one in March to discuss the 1998 Annual Report to prepare the evaluation which took place in October and to have a first discussion on the Strategic Review prepared by the Chairman of the Executive Board, and another in December, to discuss the “Plan and Budget for 2000”, to be submitted to the General Assembly, and to have a further discussion on the Strategic Review, with a particular emphasis on the internal organization.

3. National Projects

The opening of the call for proposals by "Fundação para a Ciência e Tecnologia" (FCT) which was expected in early 1999, only took place later in the year, with a closing date in the 31st of January 2000. On the other hand the decisions concerning the first call for proposals of the IST programme (run by the European Commission) were delayed until the end of November 1999 and some are still to be taken in March and possibly April 2000. Thus there were no new major projects starting in 1999.

Financed by FCT (in the scope of PRAXIS XXI and other programmes) there were 27 projects active, of which 3 involving more than one site.

IT-Lisbon carried out and completed “Technical Analysis of Acquisitions of the Instituto das Comunicações de Portugal”, by request of Price Waterhouse and continued one project financed by Oficinas Gerais de Material Aeronáutico (OGMA);

IT-Aveiro on contract with Portugal Telecom (CET), was involved in 20 projects in the areas of networks (12), radio microwave and millimetre waves (4), integrated

communications(2) and electronic and optoelectronic components (2). IT-Lisboa also on contract with Portugal Telecom (CET) was involved in one project.

As is obvious from the above inter site co-operation remains at a very low level. The situation is likely to improve if, as expected, IT teams are successful in the recent call for proposals put forward by FCT.

4. European Community Projects

IT participation in European Community research and developments projects, namely in Programme ACTS (European Union 4th Framework Programme) included:

- FRAMES, in mobile and personal communications ;
- MOMUSYS, in image coding (MPEG 4);
- DICEMAN, in image coding (MPEG 7);
- SAMBA, in wide band mobile communications in the millimetre band;
- DIFFERENCE, in network architecture.

Most of these projects involved teams from a single site: Lisbon in the case of FRAMES; MOMUSYS and DICEMAN and Aveiro in the case of DIFFERENCE. Project SAMBA was jointly carried out by teams of Aveiro and Lisbon.

Other IT participation in European Community research and developments projects included:

- JOE3-CT97-0049 (DG12), in the development of a low temperature fuel cell;
- European Neurological Network (TELEMATICS) in the implementation of secure communications infrastructures for health sites,

IT teams participated in the following COST projects: 249, 252, 255, 257, 259, 260 and 264.

IT teams scored rather modestly in the first call of the IST Programme (3 new projects). This is basically due to a very small number of proposals submitted.

Some of the European Community Projects mentioned in this report were carried out in collaboration with the associates.

5. Scientific Output

The scientific output in 1999 was as follows. In brackets in include the numbers foreseen in the 1999 Workplan and budget

- Theses (concluded)
 1. PhD 6 plus 2 submitted (18)
 - MSc 17 plus 2 submitted (30)

- Theses (ongoing)
 - PhD 75
 - MSc 61

- Publications:
 - Books and book chapters: 10 (2)
 - Papers in Journals 78 (60)
 - Papers in Conference Proceedings 297 (200)

The number of concluded theses is well below the number predicted in the 1999 Workplan and Budget confirming the very long periods required to conclude both MSc and PhD thesis. The average MSc thesis appears to take around 3 years to conclude and the average PhD thesis more than 6 years.

The Scientific discussed this situation at length in its meeting of the 21st of March 2000, and put forward the following likely reasons for this anomaly. In the case of the MSc, the current practice (which will be modified) counts the number of MSc students right from the beginning of their course, even if the first year is mostly

absorbed by course work. On the other hand the market for telecommunication engineers continue to offer young graduates very high salaries and thus the dropout rate is abnormally high. For the PhD students the reasons are less clear although they may be attributed to a high dropout rate and/or to the fact that most students are no longer part of the university staff and hence are less subject to time pressure.

In any case strong and courageous efforts must be taken to bring down the period of full time required for a MSc thesis to 12 to 18 months and for a PhD thesis to 3 or 4 years.

The number of publications compares favourably with the values foreseen in the 1999 Work plan and confirms the strong commitment of IT researchers to publish.

Researchers of IT-Lisboa were distinguished with the following awards:

- 'Jovem Engenheiro' - First Prize, from Ordem de Engenheiros - Região Sul,
- 'Best Poster Award' - Proceedings. of GAAS'99-European Gallium Arsenide and related III-V compounds Application Symposium, Munich, Germany, Oct. 1999

6. Conferences and Seminars

IT-Lisbon organized CONFTELE'99 — II Conference on Telecommunications, which was held in Sesimbra, in April 15 and 16, 1999, with an audience of more than 300, of which about 10 % were foreigners. The proceedings of the conference (in English) make up a large volume (742 pages) and provide valuable insight in the R&D activities in telecommunications in Portugal.

The series of IT thematic seminars, open to the whole scientific community, continued. Two seminars were held in 1999. The first on "Computer Networks" in Lisbon, on the 1st of March, and the second on "Genetic Algorithms", in Coimbra, on the 21 st of October. Presentations were made available on the IT-Coimbra Internet site.

A number of COST and Community Project meetings in which IT research teams participated were organised and held.

7. Human resources

IT human resources referred to December 1999 are as follows:

- IT-Aveiro:
 - 24 researchers, of which 20 hold a doctor degree, staff members from UA,
 - 16 researchers staff members from PTI,
 - 56 postgraduate students: 22 PhD students and 26 M.Sc. students at UA, and 8 research scholarship students,
 - 20 UA undergraduate students doing their final year project,
 - 6 full-time administrative staff,
 - 1 part-time administrative staff,

- IT-Coimbra:
 - 11 researchers, all holding a doctor degree, of which 9 are staff members from FCTUC and 2 are staff members from other higher education establishments,
 - 32 postgraduate students, of which 20 are PhD students and 17 are MSc students,
 - 15 FCTUC undergraduate students doing their final year project,
 - 1 fulltime administrative staff,
 - 1 part-time administrative staff,

- IT-Lisbon:
 - 48 researchers, all holding a PhD, of which 43 are staff members from IST and 5 are staff members of other higher education establishments,
 - 88 postgraduate sutudents, of which 47 are PhD students and 30 are MSc students,
 - 96 IST graduate students doing their final year project,
 - 1 full-time administrative staff,
 - 1 part-time administrative staff,
 - 1 part-time technician.

A detailed description of the activities performed by the research lines in the three sites is presented in annex.

8.ANNEX – Research Line Activities

8.1 Lisbon Site

8.1.1 Radio Microwaves and Millimeter Waves Research Line

Human Resources

Collaborators

Afonso M. Barbosa	Ph. D.	Full Professor, IST
Carlos C. Salema	Ph.D.	Full Professor, IST
João Costa Freire	Ph.D.	Associate Professor, IST
Carlos C. Fernandes	Ph. D.	Associate Professor, IST
Carlos R. Paiva	Ph. D.	Associate Professor, IST
Maria João do Rosário	Ph.D.	Assistant Professor, IST
Luís M. Correia	Ph. D.	Assistant Professor, IST
Custódio O. Peixeiro	Ph.D.	Assistant Professor, IST
António L. Topa	Ph. D.	Assistant Professor, IST
João Caldinhas Vaz	Ph.D.	Assistant Professor, IST

Other Collaborators

Fernando J. Velez	Ph. D. Student	Assistant, Univ. Beira Interior
Mário Silveirinha	Ph.D. Student	Assistant, Univ. Coimbra
Jorge Torres	Ph.D. Student	Professor, ISEL
João Gil	Ph.D. Student	Assistant, IPL
Fernando Fortes	Ph.D. Student	Assistant, ISEL
Filipe Cardoso	Ph.D. Student	Assistant, IPS
Henrique Silva	MSc. Student	Assistant, ISEL
Fernando Azevedo	MSc. Student	Assistant, ISEL
Joaquim Oliveira	MSc. Student	Assistant, IPCB
José Pereira	M. Sc. Student	Engineer, ANA
Ana Domingues	M.Sc. Student	Engineer, Optimus
Dragana Kristic	M.Sc. Student	Engineer, Optimus
José Estevez	M.Sc. Student	Engineer, ACP
Gabriela Marques	M.Sc. Student	Grant, DEEC/IST
Jorge Costa	Ph. D. Student	Grant, PRAXIS XXI
Fernando Janeiro	Ph. D. Student	Grant, PRAXIS XXI
Pedro Ramos	Ph. D. Student	Grant, PRAXIS XXI
Alexandre Moleiro	Lic. Student	IST, Final Year Project
José Rosa	Lic. Student	IST, Final Year Project
Rui Nunes	Lic. Student	IST, Final Year Project
Cristina Mota	Lic. Student	IST, Final Year Project
Vitor Silva	Lic. Student	IST, Final Year Project
Miguel Pinto	Lic. Student	IST, Final Year Project
João Eira	Lic. Student	IST, Final Year Project
Pedro António	Lic. Student	IST, Final Year Project
João Chaves	Lic. Student	IST, Final Year Project
Pedro Oliveira	Lic. Student	IST, Final Year Project
Rui Estevinho	Lic. Student	IST, Final Year Project
Pedro Assunção	Lic. Student	IST, Final Year Project

Nuno Tomás	Lic. Student	IST, Final Year Project
Pedro Sanguinho	Lic. Student	IST, Final Year Project
Ricardo Santos	Lic. Student	IST, Final Year Project
Carlos Bonito	Lic. Student	IST, Final Year Project
Duarte Semedo	Lic. Student	IST, Final Year Project
Lourenço Neto	Lic. Student	IST, Final Year Project
João Ferreira	Lic. Student	IST, Final Year Project
Luís Carvalho	Lic. Student	IST, Final Year Project
Rui Leiria	Lic. Student	IST, Final Year Project
Hugo Araújo	Lic. Student	IST, Final Year Project
José Costa	Lic. Student	IST, Final Year Project
Alexandre Martins	Lic. Student	IST, Final Year Project
João Costa	Lic. Student	IST, Final Year Project
Giulio Salvatori	B.Sc. Student	Socrates, Univ. Pisa
Jorge Marcos	B.Sc. Student	Socrates, Univ. Pol.de Valência
Nuria Higuera Ruiz	B.Sc. Student	Socrates, U. Valencia
Enrico Specos	B.Sc. Student	Socrates, U. Pisa
Zbigniew Opechowski	Lic. Student	Univ. Warsaw, Final Year Project

Projects

FCT – PRAXIS/P/EEI/12256/98 - Design and Optimisation of Shielded Solid Dielectric Horns

Development of new feeding strategies for shielded solid dielectric horns, to improve the operation bandwidth and control sidelobes. Simulation and confirmation of the results using experimental models (Carlos Fernandes, Carlos Salema, Alexandre Martins, João Costa).

FCT - PBIC/C/TIT/2501/95 - Impact of Shaped Dielectric Lens Antennas on the Millimetrewave Mobile Communications Propagation Channel

Integration of dielectric lens antennas with printed antenna arrays, in order to obtain scannable shaped beams. Design and evaluation of non-uniform index dielectric lenses for shaped beam mobile applications (Carlos Fernandes).

FCT – PRAXIS XXI – 2/2.1/TIT/1663/95 – Microwave and Optical Devices for Transmission and Switching Using Linear and Nonlinear Media

Linear media: (i) Leaky modes in three-dimensional chiral and pseudo-chiral planar waveguides; (ii) -NRD: Pseudo-chiral Non-Radiative Dielectric waveguide. Nonlinear media: (i) Amplification of WDM solitons in erbium-doped fiber amplifiers; (ii) Soliton switching in multiple-core nonlinear fiber arrays (Afonso Barbosa, António Topa, Carlos Paiva).

FCT – JNICT – PBIC/C/TIT/2531/95 – Propagation in Photonics: Complex Media in Integrated Optics; Solitons in Optical Fibers

Complex Media: Application of the theory of linear operators to planar multi-layered waveguides containing chiral and pseudo-chiral media. Solitons: (i) Dispersion management and in-line control for WDM solitons communication systems; (ii) Effect of intermodal dispersion on soliton switching in twin-core fiber couplers (Carlos Paiva, António Topa).

FCT – PPBIC/C/TIT/2507/95 – Active Printed Antennas

Characterisation of wire bonding in a broad frequency range (up to 50 GHz), (Custódio Peixeiro, Maria João Rosário).

FCT - PRAXIS XXI - 2/2.1/TIT/1641/95 - Compact Range Antenna Measurement System at Millimeterwaves Using Dielectric Lenses

Specification and update of the positioning system for the existing millimeterwave anechoic chamber. Design of collimating dielectric lens antenna. Theoretical and experimental characterisation of the resulting quiet zone. Preliminary study of phase extraction from amplitude only measurements. Preliminary study of the integration of this system with the lens system (Carlos Fernandes).

FCT - PRAXIS XXI – 3/3.1/TIT/35/94 – ITCOM (Integration of Technologies for Mobile Communications)

Design, of a base station array antenna for shaped coverage of sectorized cells. Antenna parameter optimisation using Genetic Algorithms. Development of propagation models for mobile communications in outdoors environments at the 1.8 GHz band. The models are intended for the estimation of propagation loss, considering the specific characteristics of the scenario where the mobile exists. Integration of the mobile terminal RF front end transceiver with MMICs. Test and integration of a MMIC T/R switch. Project management (Carlos Fernandes, Carlos Salema, Luís Correia, J. Costa Freire).

FCT – PRAXIS XXI – 2/2.1/TIT/1562/95 – ISAC – Implementation Aspects of a Mobile Telecommunication Satellite Payload with Dynamic Channel Allocation.

Antenna configurations for a satellite payload. Design of Monolithic active inductors and phase shifters with silicon technologies. Design, implementation and test of an active antenna array with discrete components (Custódio Peixeiro, J. Costa Freire).

FCT – Support of the Portuguese Delegates to the IST Management Committee.

To support the Portuguese delegates to the IST Management Committee (Carlos Salema).

ICP – CO-SITE – Study of the Impact of Wind Turbine Power Generators on Radio Telecommunications

Development of analytical models to characterise the obstruction and scattering produced by the wind turbine and supporting tower at VHF and UHF (Carlos Fernandes, Carlos Salema).

COST 259: Wireless Flexible Personalised Communications

Development of propagation models for outdoor environments in the UHF and millimetre wavebands: at the UHF band, models have been developed for urban scenarios and tested in the city of Lisbon for GSM with the collaboration of TELECEL; the work in the millimetre waveband has been done within the characterisation of the propagation channel, for both the average decay of power and signal fading. Also some work was done on traffic aspects, especially concerning its characterisation on the time and space domains, and on optimisation of cellular planning, namely by developing algorithms for minimising the number of base stations for given quality conditions (Luís Correia).

COST 260: Active and Phased Array Antennas

Participation in the 2nd COST 260 Workshop on Smart Antenna Design and Technology that took place in Aveiro, November 1999 (Custódio Peixeiro, Carlos Fernandes, Afonso Barbosa).

ACTS – AC 204 – SAMBA: System for Advanced Mobile Broadband Applications

Comparison of cellular deployment characteristics between the 40 and 60 GHz bands for Mobile Broadband Systems. Study of traffic aspects, considering users mobility in linear cell structures, and the influence of cell size and mobile speed on handover performance (Luís Correia).

Health safety analysis for mobile communication systems (internal project)

Some attention is being devoted to this area, by evaluating the maximum transmitted power that is possible at the mobile phone for mobile communications systems, due to limitation imposed by safety considerations. Also the case of buildings with GSM base stations on top or in the vicinity has been analysed (Luís Correia).

Cellular planning for non-uniform traffic distributions (internal project)

Optimisation of cellular planning parameters, like the ratio of division into micro- and macro-cells and cell radius for both cell types, in the real case of non-uniform distributions of traffic in city environments. Deployment cost is being considered as well. Data from a real system is being used, given by a GSM operator, TELECEL (Luís Correia).

Building penetration losses (internal project)

Development of a new model to describe building penetration loss at 5 GHz and interpretation of the results. Simulation and measurement. Final Year project of B.Sc. student, in the frame of SOCRATES program (Carlos Fernandes).

MMICs on Silicon technologies (internal project)

Design and test of microwave power amplifiers and antenna switch using standard CMOS technology. Test of the amplifiers using chip on board technology. Implementation and test of a low noise down converter for GSM (900MHz) specifications using conventional CMOS technology (M. João Rosário).

Active Patch Antenna Array (internal project)

Implementation and test of active patch arrays for X band, (Custódio Peixeiro, Maria João Rosário).

Active Filters (internal project)

Study, design and test of active filters with monolithic and hybrid technologies (J. Caldinhas Vaz , J. Costa Freire).

VHF/UHF RF front-end for satellite communications (internal project)

Design, implementation and test of a VHF emitter and UHF low noise receiver for the portuguese satellite POSAT (J. Caldinhas Vaz, J. Costa Freire).

Ph. D. Theses

Mário Gonçalo Silveirinha (supervisor: Carlos A. Cardoso Fernandes), Instituto Superior Técnico, in preparation (subject: Design of Non-Uniform Refractive Index Dielectric Lens Antennas)

Pedro Miguel Pinto Ramos (supervisor: Carlos Paiva), Instituto Superior Técnico, in preparation (subject: Soliton switching in nonlinear fiber couplers)

Jorge Manuel Lopes Leal Rodrigues da Costa (supervisor: Carlos Paiva, co-supervisor: Afonso Barbosa), Instituto Superior Técnico, in preparation (subject: Amplification of wavelength-division-multiplexed solitons in erbium-doped fiber couplers)

Fernando Manuel Tim Tim Janeiro (supervisor: Carlos Paiva, co-supervisor: António Topa), Instituto Superior Técnico, in preparation (subject: Dispersion management and inline control in WDM soliton communication systems)

Jorge Torres (supervisor: J. Costa Freire), Instituto Superior Técnico, in preparation (subject: Multifunction Monolithic Microwave Integrated Circuits)

Fernando Fortes (supervisor: M. João Rosário), Instituto Superior Técnico, in preparation (subject: Monolithic Microwave Power Amplifiers)

Fernando Velez (supervisor: Luis M. Correia), Instituto Superior Técnico, in preparation (subject: Cellular planning for mobile broadband systems in urban environments).

João Gil (supervisor: Luis M. Correia), Instituto Superior Técnico, in preparation (subject: Application of adaptive antennas to mobile broadband systems).

Filipe Cardoso (supervisor: Luis M. Correia), Instituto Superior Técnico, in preparation (subject: Characterisation of the radio channel for mobile broadband systems).

M. Sc. Theses

Luis Anunciada (supervisor: Carlos A. Cardoso Fernandes), Instituto Superior Técnico, submitted in 1999 (subject: Impact of Dielectric Lens Antennas on the mm-Wave Mobile Communications Propagation Channel).

José Leonel Pereira (supervisor: Carlos Paiva), Instituto Superior Técnico, concluded in 1999 (subject: Dispersion management in soliton communication systems).

Ana Domingues (supervisor: Luis M. Correia), Instituto Superior Técnico, concluded in 1999 (subject: Models for penetration and indoor propagation in mobile communication systems at the UHF band).

Dragana Kristic (supervisor: Luis M. Correia), Instituto Superior Técnico, concluded in 1999 (subject: Optimisation of cellular planning for non-uniform traffic distributions in mobile communication systems at the UHF band).

José Estevez (supervisor: Luis M. Correia; co-supervisor João Bento), Instituto Superior Técnico, in preparation (subject: Application of geographical information systems to cellular planning of mobile communication systems).

Gabriela Marques (supervisor: Luis M. Correia), Instituto Superior Técnico, in preparation (subject: Wideband channel modelling for wireless broadband communications).

Henrique José da Silva (supervisors: Maria João Rosário and Custódio Peixeiro), Instituto Superior Técnico, in preparation (subject: Active Printed Antennas).

Fernando Azevedo (supervisor: Maria João Rosário), Instituto Superior Técnico, in preparation (subject: CMOS Monolithic DECT RF receiver front end).

Guilherme Mascarenhas (supervisor: João Costa Freire), Instituto Superior Técnico, in preparation (subject: monolithic active phase shifters).

Joaquim Oliveira (supervisor: João Costa Freire), Instituto Superior Técnico, in preparation (subject: MMICs with BiCMOS technology).

Publications

Papers in Journals

C. A., Fernandes; V. Brankovic, S. Zimmermman; M. Filipe, L. Anunciada, "Dielectric Lens Antenna for Wireless Broadband Communications, *Wireless Personal Communications Journal*, Vol. 10, No. 1, June 1999, pp. 19-32.

C. A., Fernandes; J. Fernandes; "Performance of Lens Antennas in Wireless Indoor Millimeter-Wave Applications", *IEEE Trans. Microwaves Theory and Techniques*, Vol. 47, No. 6, Part 1, June 1999, p. 732.

C. A., Fernandes; "Shaped Dielectric Lenses for Wireless Millimeter-Wave Communications", *IEEE Antennas and Propagation Magazine*, Vol. 41, No.5, Oct 1999, pp. 141-150.

F. M. Janeiro, P. M. Ramos, and C. R. Paiva, "Hamiltonian Formulation for Dispersion-Managed WDM Soliton Communication Systems," *Microwave and Optical Technology Letters*, Vol. 21, no. 1, pp. 72-77, April 1999.

P. M. Ramos and C. R. Paiva, "All-Optical Pulse Switching in Twin-Core Fiber Couplers with Intermodal Dispersion," *IEEE Journal of Quantum Electronics*, Vol. 35, no. 6, pp. 983-989, June 1999.

A.L. Topa, C. R. Paiva, and A. M. Barbosa, "Propagation Characteristics of the Rectangular Waveguide Inhomogeneously Filled with Uniaxial Omega Media," *IEICE Transactions on Electronics*, Vol. E82-C, no. 7, pp. 1166-1171, July 1999.

C. R. Paiva, A. L. Topa, and A. M. Barbosa, "Influence of Intermodal Dispersion on the Switching of Solitons at Different Wavelengths in Twin-Core Fiber Couplers," *Journal of the Optical Society of America B*, Vol. 16, no. 10, pp. 1636-1641, October 1999.

Nuno C. Gonçalves and Luis M. Correia, "A Propagation Model for Urban Micro-cellular Systems at the UHF Band", accepted for publication, *IEEE Transactions on Vehicular Technology*.

M. Gabriela Marques, K. W. Tam, J. Caldinhas Vaz, J. Costa Freire, "MMIC Lumped and Transversal Filter with LC Tuned Amplifiers", *Microwave Engineering Europe*, pp 57, 58 and 61, November 1999.

Papers in Proceedings

C. A., Fernandes; "Design of Shaped Lenses for non-Symmetric Cells in MBS", *Proc. IEEE 1999 AP-S International Symp.*, Orlando, Florida, pp. 2440-2443, Jul 99.

C. A., Fernandes; "Lens antennas for mobile broadband systems", 2nd COST 260 Workshop on Smart Antenna Computer Aided Design & Technology, Aveiro, Portugal, Nov. 1999.

L., Anunciada; M. Filipe; C. Fernandes; "Improving the design of Dielectric Lens Antennas for Millimetre Wave Communications", in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp 68-72, Abr. 1999.

C., Salema; C. Fernandes; "Co-Siting Criteria for Wind Turbine Generators and VHF/UHF Transmitter Antennas", in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp 466-470, Abr. 1999.

M., Rodrigo; C. Fernandes; "A New Broadband Printed Antenna Element for Endfire Radiation", in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp 446-450, Abr. 1999.

C., Salema; C. Fernandes; "Similarities Between Circular and Square Dielectric Waveguides", in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp 471-475, Abr. 1999.

A.L. Topa, C. R. Paiva, and A. M. Barbosa, "Leaky Modes in Open Uniaxial Waveguides," in *Proceedings of PIERS'99 - Progress in Electromagnetics Research Symposium*, pp 940, Taipei, Taiwan, March 22-26, 1999.

F. M. Janeiro, A. L. Topa, e C. R. Paiva, "Gestão da Dispersão em Sistemas de Comunicação Óptica com Solitões," *Actas do 4.º Encontro Nacional do Colégio de Engenharia Electrotécnica*, pp. 127-132, Lisboa, 26-27 May, 1999.

J. R. Costa, C. R. Paiva, e A. M. Barbosa, "Amplificação de Solitões em Fibras Amplificadoras Dopadas com Érbio," Actas do 4.º Encontro Nacional do Colégio de Engenharia Electrotécnica, pp. 133-140, Lisboa, 26-27 May, 1999.

P. M. Ramos e C. R. Paiva, "Comutação de Solitões em Fibras Ópticas Não-Lineares de Múltiplos Núcleos," Actas do 4.º Encontro Nacional do Colégio de Engenharia Electrotécnica, pp. 144-147, Lisboa, 26-27 Maio, 1999.

A.L. Topa, C. R. Paiva, and A. M. Barbosa, "Leaky Modes in Anisotropic Planar Structures with Application to LiNbO₃ Waveguides," in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 476-480, April, 1999.

J. R. Costa, C. R. Paiva, and A. M. Barbosa, "A New Numerical Method for Multichannel Soliton Amplification in Erbium-Doped Fiber Amplifiers," in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 163-166, April, 1999.

F. M. Janeiro, A. L. Topa, and C. R. Paiva, "A New Design Procedure to Select Optimal Dispersion Maps for WDM Soliton Communication Systems," in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 167-171, April, 1999.

P. M. Ramos and C. R. Paiva, "Effect of Intermodal Dispersion on Soliton Switching in Twin-Core Nonlinear Fiber Couplers," in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 172-176, April, 1999.

A.L. Topa, C. R. Paiva, and A. M. Barbosa, "Leakage Properties of Open 3D Anisotropic Waveguides," IEEE-AP/URSI'99, URSI Digest – USNC/URSI Radio Science Meeting, p. 32, Orlando, Florida, USA, July 11-16, 1999.

A.L. Topa, C. R. Paiva, and A. M. Barbosa, "Electromagnetic Wave Propagation Characteristics of Chiral and Pseudochiral Waveguides," in Proc. of XXVIth URSI General Assembly, pp. 200, Toronto, Canada, August 13-21, 1999.

J. R. Costa, C. R. Paiva, and A. M. Barbosa, "Soliton Amplification in Erbium-Doped Fibers with Co-Propagating Noise," 7th International Symposium on Recent Advances in Microwave Technology Proceedings, pp. 49-52, Málaga, Spain, December 13-17, 1999.

P. M. Ramos and C. R. Paiva, "Optimization of All-Optical Soliton Switching in N-Core Fiber Arrays," 7th International Symposium on Recent Advances in Microwave Technology Proceedings, pp. 53-56, Málaga, Spain, December 13-17, 1999.

Luis M. Correia, "COST 259 - Wireless Flexible Personalised Communications", Proc. of COST 259/260 Joint Workshop, Vienna, Austria, April 1999.

Fernando J. Velez and Luis M. Correia, "New Calls Traffic Performance in Micro-cellular Mobile Broadband with High Mobility Handover", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April 1999.

Sandra Almeida, José Queijo and Luis M. Correia, "Spatial and Temporal Distribution Traffic Models for GSM", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April 1999.

Ana R. Claro, José M. Ferreira and Luis M. Correia, "Assessment of Propagation Models in Irregular Urban Micro-cells for GSM", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April 1999.

Ana Domingues and Luis M. Correia, "Implementation of a Propagation Model for Indoor Environments for GSM", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April 1999.

Chiara Bedini and Luis M. Correia, "Cellular Planning in Urban Regular Structures for Millimetre Wave Mobile Broadband Systems", Proc. of ACTS Mobile Communications Summit, Sorrento, Italy, June 1999.

Dragana Kristic and Luis M. Correia, "Influence from Mobility in Handover in Cellular Planning", Proc. of PIMRC'99 - IEEE 10th International Symposium on Personal, Indoor and Mobile Radio Communications, Osaka, Japan, September 1999.

Sandra Almeida, José Queijo and Luis M. Correia, "Spatial and Temporal Traffic Distribution Models for GSM", Proc. of VTC'99 Fall - IEEE 50th Vehicular Technology Conference, Amsterdam, The Netherlands, September 1999.

Ana R. Claro, José M. Ferreira and Luis M. Correia, "Assessment of a Propagation Model for Crossroads in Micro-cells", Proc. of VTC'99 Fall - IEEE 50th Vehicular Technology Conference, Amsterdam, The Netherlands, September 1999.

Ana Domingues and Luis M. Correia, "Implementation of a Propagation Model for Indoor Environments for GSM", Proc. of VTC'99 Fall - IEEE 50th Vehicular Technology Conference, Amsterdam, The Netherlands, September 1999.

Francisco Gil, Ana R. Claro, José M. Ferreira, Carlos Pardelinha and Luis M. Correia, "A 3-D Extrapolation Model for Base Station Antennas' Radiation Patterns", Proc. of VTC'99 Fall - IEEE 50th Vehicular Technology Conference, Amsterdam, The Netherlands, September 1999.

J. Barreiros, P. Cameirão and C. Peixeiro, "Microstrip Patch Antenna for GSM1800 Handsets", Proc. of the 1999 IEEE Antennas and Propagation Society International Symposium, pp. 2074-2077, Orlando, Florida, U. S. A., July 1999.

H. J. Silva, F. Fortes, M. J. Rosário and C. Peixeiro, "Modelling and Applying Wire Bond Interconnections", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 510-514, April, 1999.

C. Rodrigues, L. Garcia and C. Peixeiro, "Microstrip Patch Antenna for GSM1800", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 441-445, April, 1999.

B. Barilese and C. Peixeiro, "Microstrip Diplexer for a Mobile Communications System", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 199-203, April, 1999.

P. Correia, L. Gonçalves, H. J. da Silva, F. Fortes, C. Peixeiro, and M. J. Rosário "Array of Microstrip Patch Elements – Passive and Active – for 3 GHz", (in Portuguese) Proc. of "Jornadas de Engenharia de Telecomunicações e Computadores", JETC'99, pp. IX15-IX19, Lisboa, Portugal, October 1999.

G. Salvatori and C. Peixeiro, "Microstrip Patch Antennas for GPS", (in Portuguese) Proc. of "Jornadas de Engenharia de Telecomunicações e Computadores", JETC'99, pp. IX21-IX24, Lisboa, Portugal, October 1999.

C. Reis, H. J. da Silva, F. Fortes, C. Peixeiro, and M. J. Rosário, "Antenna Radiation Pattern Measurement System 2.3 GHz – 4 GHz", (in Portuguese) Proc. of "Jornadas de Engenharia de Telecomunicações e Computadores", JETC'99, pp. XI39-XI42, Lisboa, Portugal, October 1999.

H. J. da Silva, M. J. Rosário and C. Peixeiro, "X Band Active Microstrip Antennas", Proc. of 2nd COST 260 Workshop on Smart Antenna Design and Technology, pp. 122-128, Aveiro, Portugal, November 1999.

Kam Weng Tam, João Vinagre, Bruno Gomes, J. Costa Freire, Pedro Vitor and Rui Martins, "Modified RF lumped and transversal filter", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 507-509, April, 1999.

Fernando Azevedo, Fernando Fortes and M. J. Rosário, "A 3.3V, 1.8GHz CMOS Down Conversion Image-Rejection Mixer", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 195-198, April, 1999.

Kam Weng Tam, Pedro Vitor, J. Costa Freire and Rui Martins, "New microwave bandstop filter using lumped and transversal network", ISCAS'99 - International Symposium in Circuits and Systems, vol.VI, pp.30-32, Florida, USA, June 1999.

Jorge Torres, J. Costa Freire, "A MMIC Image Rejection Up Converter", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 485-487, April, 1999.

Jorge Torres and J. Costa Freire, "A Monolithic LSB Rejection Up Converter for PCS", IEEE MTT-S International Microwave Symposium Digest, pp. 835-838, Anaheim, USA, June 1999.

Jorge Torres and J. Costa Freire, "Monolithic Transistor SPST Switch for L Band", International Microwave and Optics Conference Digest, CD-ROM, Rio de Janeiro, Brasil, August 1999.

Jorge Torres and J. Costa Freire, "GaAs MMIC Switch for PCS", GAAS'99 - Gallium Arsenide Applications Symposium, pp.37-40, Munchen, Germany, October 1999.

M. Gabriela Marques, K. W. Tam, J. Caldinhas Vaz, J. Costa Freire, "MMIC Lumped and Transversal Filter with LC Tuned Amplifiers", GAAS'99 - Gallium Arsenide Applications Symposium, pp.109-112, Munchen, Germany, October 1999.

Fernando Fortes, Fernando Azevedo, Maria João Rosário, "Tecnologias CMOS Aplicadas às Comunicações Móveis Jornadas de Engenharia de Telecomunicações e Computadores, pp.VIII-7 - VIII-10, Lisboa, October 1999.

Fernando Azevedo, Fernando Fortes, Maria João Rosário, "Circuitos RF CMOS de Baixa Tensão para Comunicações Móveis", Jornadas de Engenharia de Telecomunicações e Computadores, pp. XI-33 - XI-36, Lisboa, October 1999.

M., Rodrigo; C. A. Fernandes; "Shaped Dielectric Lens fed by a Printed Element for WLANS at 40 GHz", Accepted for presentation at the Millennium Conference on Antennas and Propagation, AP2000, Davos, Switzerland, April 2000.

M., Silveirinha; C. A. Fernandes; "Shaped Double-Shell Dielectric Lenses for Wireless Millimeter Wave Communications", Submitted APS-URSI Conference, USA, 2000.

H. J. da Silva, M. J. Rosário and C. Peixeiro, "X Band Aperture Coupled Active Microstrip Antenna", accepted for presentation at the Millennium Conference on Antennas & Propagation, AP2000, Davos, Switzerland, April 2000.

A.Moleiro, J. Rosa, R. Nunes and C. Peixeiro, "Dual-Band Microstrip Patch Antenna Element with Parasitic for GSM", submitted for presentation at the IEEE 2000 Antennas and Propagation International Symposium, Salt Lake City, Utah, U. S. A., July 2000.

J. Rosa, R. Nunes, A. Moleiro and C. Peixeiro, "Dual Band Microstrip Patch Antenna Element with Double U Slots for GSM", submitted for presentation at the IEEE 2000 Antennas and Propagation International Symposium, Salt Lake City, Utah, U. S. A., July 2000.

R. Nunes, A. Moleiro, J. Rosa and C. Peixeiro, "Dual Band Microstrip Patch Antenna Element with Shorting Pins for GSM", submitted for presentation at the IEEE 2000 Antennas and Propagation International Symposium, Salt Lake City, Utah, U. S. A., July 2000.

Seminars

C. Fernandes, "Síntese de Lentes para Aplicação em Antenas", Escola de Verão de Matemática, FCT da Universidade Nova de Lisboa, September 1999.

C. Fernandes, "Optimização de uma Antena Utilizando Algoritmos Genéticos", Seminários do Instituto de Telecomunicações - Coimbra, October 1999.

Miscellaneous

Carlos Salema, Chairman of the Organising Committee of CONFTELE'99 – II Conference on Telecommunications, Sesimbra – Portugal, April 1999

Carlos Salema, Chairman of “Colégio de Engenharia Electrotécnica”, Ordem dos Engenheiros.

Carlos Salema, Portuguese Delegate to the IST Programme

Carlos Salema, Chairman of the Executive Board of Instituto de Telecomunicações

Carlos Salema, Chairman of the Board of Representatives of Instituto Superior Técnico

Carlos Salema, Scientific Advisor to the Pedip Programme, namely for project ATLANTIS

Afonso Barbosa, Carlos Fernandes, Luís Correia, António Topa and Custódio Peixeiro, members of the Organising Committee, CONFTELE'99, Sesimbra – Portugal, April 1999.

Afonso Barbosa, reviewer for IEEE Transactions on Antennas and Propagation and 29th European Microwave Conference, München, Germany.

Afonso Barbosa, National Delegate to Action COST 260.

Afonso Barbosa, member of the Executive Board of Instituto de Telecomunicações.

Afonso Barbosa, Conference Chairman of BIANISOTROPICS 2000 – 8th International Conference on Electromagnetics of Complex Media, to be held 27-29 September 2000, Lisbon, Portugal.

Carlos Paiva, reviewer for Journal of the Optical Society of America A and CONFTELE'99, Sesimbra, Portugal, April 1999.

Antonio Topa, reviewer for IEEE Transactions on Antennas and Propagation.

J. Costa Freire is a Member of the Management Committee of the European Microwave Conference.

J. Costa Freire was reviewer of papers presented to the 29th European Microwave Conference.

J. Costa Freire is chairman of IEEE Portugal Section joint chapter on MTT/AP/ED/SSC.

António Topa, member of the Organising Committee of BIANISOTROPICS 2000 – 8th International Conference on Electromagnetics of Complex Media, to be held 27-29 September 2000, Lisbon, Portugal).

Luis M. Correia reviewer for IEEE Transactions on Vehicular Technology, and IEEE Transactions on Antenna and Propagation, for CONFTELE'99, XVI Brazilian Symposium on Telecommunications, PIMRC'99 - IEEE 10th International Symposium on Personal, Indoor and Mobile Radio Communications, VTC'99 Fall - IEEE 50th Vehicular Technology Conference, 29th European Microwave Conference and GLOBECOM'99 - IEEE Global Communications Conference.

Luis M. Correia member of the Technical Committee of VTC'99 Fall - IEEE 50th Vehicular Technology Conference.

Luis M. Correia, National Delegate and Chairman of Action COST 259.

Luis M. Correia, evaluator of EU-IST projects in July 1999, and auditor of EU ACTS and ESPRIT projects in Nov 1999.

Carlos Fernandes, development of a precision mechanics workshop for prototype construction.

8.1.2 Integrated Circuits and Systems Research Line

Human Resources

Collaborators

José E. Franca	Ph.D	Associate Professor, IST
Carlos A. Leme	Ph.D	Assistant Professor, IST
João C. Vital	Ph.D	Assistant Professor, IST
Nuno Horta	Ph.D	Assistant Professor, IST

Other Collaborators

Rui P. Martins	Ph.D	Director FCT/Univ. Macau
Nuno Franca	Ph.D Student	Research Assistant INETI
Dra. Yan Yan Qiu	Ph.D	Grant, IST
Xu Jingnan	Researcher	Grant, IST
João Goes	Ph.D Student	UNL
João P. Carreira	Ph.D Student	Engineer ATMEL-ES2
Jorge Guilherme	Ph.D Student	Assistant, IPT
António Cavalcanti	Invited Professor	UFP (Brasil)
U Seng Pan	Ph.D Student	Grant, IST
Nuno Garrido	Ph.D Student	
Rui Neves	Ph.D Student	Grant, IST
Ricardo Reis	Ph.D Student	
Pun Pang	Ph.D Student	Grant, IST
Marco Pereira	M.Sc. Student	
Eduardo Viegas	M.Sc. Student	
Tiago Marques	Researcher	Grant, IST
Paulo Pereira	Researcher student	Grant, IST
Vitor Mendes	Research Student	Grant, IST
Paulo Jesus	Research Student	Grant, IST
Pedro Azevedo	Research Student	Grant, IST
Marco Oliveira	Research Student	Grant, IST
Vitor Silva	Research Student	Grant, IST
Paulo Assis	Research Student	Grant, IST
Gonçalo Minderico	Research Student	Grant, IST
António Leal	Research Student	Grant, IST
Nuno Morais	Research Student	Grant, IST
José Barros	Research Student	Grant, IST
Emanuel Rella	Research Student	Grant, IST
Nuno Teixeira	Research Student	Grant, IST
Álvaro Gerales	Research Student	Grant, IST
Nuno Caldeira	Research Student	Grant, IST
Alexandre Tavares	Research Student	Grant, IST
Rui Girão	Research Student	Grant, IST
Luis Cardoso	Research Student	
Miguel Bugalho	Research Student	
Renato Torres	Research Student	
José Iria	Research Student	
Ana Marcelino	Secretary	Staff member IST
Paula Silva	Secretary	Staff member IST

Projects

The main focus and strategic scientific objectives are in the field of analogue-digital integrated circuits, including analogue and digital signal processing techniques, design of components, circuits and systems in silicon technologies, as well as design-oriented testing and computer-aided design, which are vital for the development of state-of-the-art microsystems. International competitiveness is of paramount concern to the group activities.

Stimulation of final year students of electrical engineering to undertake advanced research projects, preferably leading to the completion of post-graduation programs.

Creation of modern computational and instrumentation facilities as well as easy access to advance processing technologies for integrated circuit manufacturing.

Stimulation of closer links to the national industry, both through the undertaking of joint cooperative research projects as well as through the development of continuing education and training courses of professionals.

Development of an European-wide, diversified funding-base for the continuous development of state-of-the-art research development projects.

During 1999, research activities were carried-out in the following cooperative projects:

ECOCLIMAT

Objectives: Research and development of sensorial microsystems and power line carrier modems for home system applications, notably for automatic management of energy.

Participants: The IST Centre for Microsystems is part of a national consortium led by ATECMIC.

Sponsor: Ministry of Industry through the PEDIP program.

CATALYST: HIGH-LEVEL SYNTHESIS AND MODELING OF MULTI-STEP ADCs

Objectives: Research and development of computer-aided methodologies and techniques for high-level synthesis and modeling of high-frequency multi-step analog-to-digital converters.

Sponsor: The Portuguese Agency for Scientific and Technology Research (JNICT).

MINIAN: MINIMUM ANALOG CONTENT SIGMA-DELTA MODULATORS

Objectives: Research, development and experimental demonstration of new sigma-delta modulators with minimum analog content for oversampling analog-to-digital converters.

Sponsor: The Portuguese Agency for Scientific and Technology Research (JNICT).

PAPRICA: POWER AND PART COUNT REDUCTION INNOVATIVE COMMUNICATION ARCHITECTURE

Objectives: Specify design, build and validate the DECT and DCS application Demonstration Board.

Participants: ATMEL/ES2 (France), IST (Portugal), Matra Communications (France).

ASIC4PMR: ARCHITECTURE FOR SINGLE CHIP FOR PRIVATE MOBILE RADIO COMMUNICATION

Objectives: The project will provide telecommunication equipment manufacturers the capability to integrate on a single chip a baseband and control circuitry of a digital radio terminal.

Participants: ATMEL ES2 (France), ARM (United Kingdom), THERA (Italy), IST (Portugal), Matra Communication (France), OTE (Italy).

POLICOM : POWER LINE COMMUNICATION ASIC

Objectives: The objective of this project is the design of a low-cost, easy-installation, robust system to allow communication between different equipment using the low-voltage power line. It will cover a whole range of applications from remote power reading to home-automation and remote control for industrial applications.

Participants: SAINCO (Spain), ATMEL ES2 (France), Instituto Superior Técnico (Portugal), SANTEL (Sweden).

RAPID: Retargetability for Reusability of Application-Driven Quadrature D/A Interface Block Design

Objectives: The objective of this project is to develop an advanced methodology to support the design of Quadrature D/A Interface blocks aiming at their reusability by an automatic retargeting procedure with minimal changes on their structural sub-blocks.

Participants: CM-IST Coordinator (Portugal), IMSE-CNM (Spain), Chipidea (Portugal).

MIXMODEST: Mixed Mode in Deep Submicron Technology

Objectives: The most important objective of the project is to obtain a design methodology including basic structures and circuits that will enable future state of the art analogue functions, such as front-ends, to be implemented in a basic mainstream digital 0.35 μ m and 0.25 μ m CMOS technology.

Participants: ALCATEL Microelectronics Coordinator, IMSE, IST, UNIPAV, KULeuven

Ph.D. Theses

N. Franca (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Automatic synthesis of circuit components for mixed-signal VLS integration)

A. Gano (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Design and applications of sensorial microsystems combining monolithic and thick film hybrid integrated technologies)

N. Garrido (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Design of adaptive analog filters for magnetic front-end read channels)

R. Neves (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Signal processing and conversion techniques for narrow bandwidth applications)

J. P. Oliveira (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Video frequency A/D converters using current processing techniques)

J. Goes (supervisor: J. Vital), Instituto Superior Técnico, in preparation (subject: High-resolution and high-speed analog-digital converters using linearization techniques)

J. C. Guilherme (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: Design techniques for logarithmic analog-digital conversion in CMOS technology)

R Reis (supervisor: C. Leme), Instituto Superior Técnico, in preparation (subject: Nanopower delta-sigma modulators)

P. Pang (supervisor: J. E. Franca), Instituto Superior Técnico, in preparation (subject: CMOS analog techniques for quadrature modulators in RF front-ends)

M. Sc. Theses

M. Pereira (supervisor: J. Vital), Instituto Superior Técnico, in preparation (subject: Automatic layout generation methodologies of analogue modules for CMOS integrated circuits)

Publications

Books and Book Chapters

J. E. Franca, C. A. Leme, J. C. Vital, Analog-to-Digital Conversion, Capítulo incluído na Wiley Encyclopedia of Electrical and Electronics Engineering, J. G. Webster (Editor), pp. 510-530, 1999.

Papers in Journals

U. Seng-Pan, R. P. Martins, J. E. Franca, “Offset-and Gain-Compensated and Mismatch-Free Delay Circuit with Flexible Implementation”, Electronics Letters, Vol. 35, No. 3, pp. 188-189, 4th February 1999.

K. P. Pun, J. E. Franca, C. A. Leme, “Polyphase SC IIR Hilbert Transformers”, Electronics Letters, Vol. 35, No. 9, pp. 689-690, 29th April 1999.

K. P. Pun, J. E. Franca, C. A. Leme, “Polyphase SC IIR Hilbert Transformers with Reduced Sensitivity to Finite Gain and Bandwidth”, Electronics Letters, Vol. 35, No. 19, pp. 1602-1603, 16th September 1999.

U. Seng Pan, R. P. Martins, J. E. Franca, "An Input Sample-and-Hold Rolloff Released SC Technique for Analog Interpolation", accepted for publication IEEE Transactions on Circuits and Systems - Part II: Analog Digital Signal Processing.

Papers in Conference Proceedings

A. Gano, J. E. Franca, "New Fully Differential Variable Gain Instrumentation Amplifier Based on a DDA Topology", in Proc. IEEE Instrumentation and Measurement Technology Conference, Venice (Italy), pp. 60-63, May 24-26, 1999.

U. Seng Pan, R. P. Martins, J. E. Franca, "Highly Accurate Mismatch-Free SC Delay Circuits with reduced Finite Gain and Offset Sensitivity", in Proc. IEEE International Symposium on Circuits and Systems, Orlando (FL) pp. II-57-II60, June 1999.

U. Seng Pan, R. Neves, R. P. Martins, J. E. Franca, "A 120 Mhz SC 4th order Elliptic Interpolation Filter with Accurate Gain and Offset Compensation for Direct Digital Frequency Synthesizer", in Proc. First IEEE Asia Pacific Conference on ASIC's, Seoul, Korea, pp. 1-4, August 1999.

P. Kong-Pan, J. E. Franca, C. A. Leme, "A CMOS IF Stage with Self-Tuned MOSFET-C Filters", in Proc. 8th International Symposium on Integrated Circuits, Devices and Systems, Singapore, pp. 275-278, September 8-10 1999.

A. Gano, J. E. Franca, "Fully Differential Variable Gain Instrumentation Amplifier Based on a Fully Differential DDA Topology", in Proc. IEEE International Conference on Electronics, Circuits and Systems, Cyprus, pp. 785-789, September 1999.

J. E. Franca, N. C. Horta, M. Pereira, J. C. Vital, R. Castro-Lopez, M. Delgado-Restituto, F. Fernandez, A. Rodriguez-Vazquez, J. Ramos, P. Santos, "RAPID-Retargetability for Reusability of Application-Driven Quadrature D/A Interface Block Design", in Proc. IEEE International Conference on Electronics, Circuits and Systems, Cyprus, pp. 1679-1682, September 8-10, 1999.

K. P. Pun, J. E. Franca, C. A. Leme, "Polyphase SC IIR Hilbert Transformers", in Proc. IEEE International Conference on electronics, circuits and Systems, Cyprus, pp. 1329-1332, September 8-10, 1999.

8.1.3 Signal and Image Processing Research Line

8.1.3.1 Communication Theory and Pattern Recognition Group

Human Resources

Collaborators

José Manuel Nunes Leitão	Ph. D.	Full Professor, I.S.T.
Mário Teles de Figueiredo	Ph. D.	Assistant Professor, I.S.T.
Ana Luisa Nobre Fred	Ph. D.	Assistant Professor, I.S.T.
Fernando Duarte Nunes	Ph. D.	Assistant Professor, I.S.T.
José Manuel Bioucas Dias	Ph. D.	Assistant Professor, I.S.T.
José Eduardo R. C. Sanguino	M. Sc	Assistant, I.S.T.
Francisco Alberto Sena da Silva	M. Sc.	Assistant, I.S.T.

Other Collaborators

Fernando Manuel Gomes de Sousa	Ph. D. student, IST	Adjoint Professor, I.S.E.L.
Paulo Alexandre Carapinha Marques	Ph. D. student, IST	Adjoint Professor, I.S.E.L.
José António de Oliveira Costa	Ph. D. student, IST	Grant, PRAXIS XXI
Rui Manuel Pires da Silva Castro	Ph. D. student, IST	Grant, PRAXIS XXI
Luis António Tavares Rocha Pontes	M. Sc. Student, IST	Grant, PRAXIS XXI
Tiago Araújo Marques da Silva	M. Sc. Student, IST	Grant, PRAXIS XXI

Projects

SICNAP - Integrated System for Harbour Control and Navigation. This was a multidisciplinary and multi-institutional project, co-ordinated by LNEC (National Laboratory of Civil Engineering) and financially supported by NATO through the Science for Stability program (PO-NAVIGATION project). Its goals were to develop and implement a harbour traffic control system, to be installed in Sines. It involved navigation and positioning systems (GPS - global positioning system), radar, and telecommunications aspects.

FCT – PRAXIS XXI - SARA – Sistema aéreo de reconhecimento automático (Automated Systems for Air Surveillance) (PRAXIS XXI). It is a multi-disciplinary and multi-institutional project co-ordinated by the Department of Mechanical Engineering of IST. We are dealing with the communications (data-links) and navigation (differential GPS – Global Positioning System) aspects.

ENN - European Neurological Network. Approved under the Telematics Applications Program of the European Union. It is headed by ISTEEL (Institute of Sleep and Telemedicine, of Portugal) and involves teams from 9 European countries. Goals are the creation of a multimedia telematic network in the areas of sleep and epilepsy. Our domains of participation included signal processing and artificial intelligence aspects.

FCT – PRAXIS XXI - SIN - Integrated Systems for Communication and Navigation. This project started in 1997. It deals with differential GPS navigation, in which the communication between the mobile platform and the base station plays an essential role. This project emerges from the group's participation in the SICNAP and ARMOR projects.

FCT – PRAXIS XXI - IMAPA - Integration of Stochastic and Structural Models in Image and Pattern Analysis.

Project goals are the development of image/pattern analysis techniques combining stochastic and structural models and methods. Application areas considered will include: medical imaging, remote sensing images, and financial document images.

FCT – PRAXIS XXI - HIPNOS - Automatic Sleep Classification.

This is a collaboration project involving the electroencephalography laboratory of the Centro de Estudos Egas Moniz (Egas Moniz Study Center) of Santa Maria hospital, the Centre for Sleep Medicine of the University of Parma, and the Medical Physics Institute of the University of Warsaw.

PhD. Theses

José Eduardo Charters Ribeiro Cunha Sanguino (supervisor: José M. N. Leitão), Instituto Superior Técnico. In preparation. (Subject: Positioning and navigation based on differential GPS).

Francisco Alberto Sena da Silva (supervisor: José M. N. Leitão). Instituto Superior Técnico. In preparation. (Subject: Importance sampling for communication systems simulation).

Fernando Manuel Gomes de Sousa (supervisor: José M. N. Leitão), Instituto Superior Técnico. In preparation. (Subject: Open loop structures for digital communications; DSP based implementations).

José António de Oliveira Costa (supervisor: José M. N. Leitão), Instituto Superior Técnico. In preparation. (Subject: Ambiguity Resolution as a Nonlinear Recursive Estimation and Sequential Detection Problem).

Rui Manuel Pires da Silva Castro (supervisor: José M. N. Leitão), Instituto Superior Técnico. In preparation. (Subject: Systematic Criteria for the Synthesis of Nonlinear Filters).

Paulo Alexandre Carapinha Marques (supervisor: José M. B. Dias), Instituto Superior Técnico. In preparation. (Subject: Mobile Targets Detection and Tracking in Synthetic Aperture Radar).

MSc. Theses

Tiago Araújo Marques da Silva (supervisor: José M. B. Dias), Instituto Superior Técnico. In preparation (Subject: Absolute phase estimation in interferometry).

Ana P. Falcão (supervisor: José M. B. Dias), Instituto Superior Técnico. in preparation. (Subject: Image classification in remote sensing).

Sandra V. B. Jardim (supervisor: Mário A. T. Figueiredo), Instituto Superior Técnico, in preparation (subject: Automatic analysis of fetal ultrasound images).

Artur Ferreira (supervisor: Mário A. T. Figueiredo), Instituto Superior Técnico, in preparation (subject: Dictionary-based methods for image compression and analysis).

Publications

Books and Book Chapters

M. Figueiredo, J. Leitão and A. K. Jain, Elements of Bayesian Theory and Markov Random Fields for Image Analysis. To be published by Springer Verlag (New York) in 2000.

Papers in Journals

J. Dias and J. Leitão, “Nonparametric estimation of mean Doppler and spectral width”, IEEE Transactions on Geoscience and Remote Sensing. Accepted for publication

M. Figueiredo, J. Leitão and A. Jain, “Unsupervised contour representation and estimation using B-splines and a minimum description length criterion”. IEEE Transactions on Image Processing. Accepted for publication

F. Nunes, J. Santos and M. E. Manso, “Recursive algorithm for fast evaluation of the Abel inversion integral in broadband reflectometry”, Review of Scientific Instruments, vol. 70, no. 1, pp. 1047-1050, January 1999.

F. Nunes, M. Manso, I. Nunes, A. Silva, and P. Varela, “On the application of the Wigner-Ville distribution to broadband reflectometry”, Fusion Engineering and Design, no. 43, pp. 441-449, 1999.

F.Nunes and J. Leitão, “Signal processing aspects of fusion plasma broadband reflectometry”, IEEE Transactions on Signal Processing, vol. 47, no. 2, pp. 378-388, February 1999.

J. Santos, F. Nunes, M. Manso, and I. Nunes, “Neural network evaluation of reflectometry density profiles for control purposes”, Review of Scientific Instruments, vol. 70, no. 1, pp. 521-524, January 1999.

A.Vailaya, M. Figueiredo, A. Jain, and H. J. Zhang, “Bayesian framework for hierarchical semantic classification of vacation images”, IEEE Transactions on Image Processing. Submitted.

J. Dias and J. Leitão, “Lidar inversion of backscattering and extinction coefficients: a stochastic filtering approach”, IEEE Transactions on Geoscience and Remote Sensing. Submitted.

Papers in Conference Proceedings

R. Castro and J. Leitão, “Phase estimation in mobile communications and navigation”, in Proc. of CONFTELE’99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 40-44, April, 1999.

J. Cordeiro and J. Dias, “Contour estimation on piecewise homogeneous random fields”, in Proceedings of the First International Conference on Enterprise Information Systems, vol. I, pp. 184-194, Setúbal (Portugal), 1999.

J. Costa and J. Leitão, “Satellite attitude estimation using GPS carrier phase”, in Proc. of CONFTELE’99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 35-39, April, 1999.

J. Dias, “Bayesian contour estimation: a subspace representation approach”, in Energy Minimization Methods in Computer Vision and Pattern Recognition, M. Pellilo and E. Hancock (editors), pp. 157 - 172, Springer-Verlag, 1999.

J. Dias and E. Susana, “Nonlinear stochastic filtering technique for radar/lidar inversion”, in Proceedings of the SPIE Conference on Signal and Data Processing of Small Targets, vol. SPIE 3809, pp. 51 – 62, Denver (USA), 1999.

J. Dias, E. Susana and D. Resendes, “Time and range averaging of lidar echoes using APD-based receivers”, in Proceedings of the SPIE Conference on Application of Lidar to Current Atmospheric Topics - III, vol. SPIE 3757, pp. 158 – 166, Denver (USA), 1999.

M. Figueiredo and R. Nowak, “Empirical Bayes wavelet denoising using Jeffreys’ prior”, in Proc. of CONFTELE’99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 237-241, April, 1999.

M. Figueiredo, J. Leitão and A. K. Jain, “On fitting mixture models”, in Energy Minimization Methods in Computer Vision and Pattern Recognition, M. Pellilo and E. Hancock (editors), pp. 54-69, Springer-Verlag, 1999.

M. Figueiredo and R. Nowak, “Bayesian wavelet-based image estimation using non-informative priors” in Proceedings of the SPIE Conference on Mathematical Modeling, Bayesian Estimation, and Inverse Problems, SPIE vol. 3816, pp. 97-108, Denver (USA), 1999.

J. Filipe, A. Fred, and M. Fernandes, “GDOS – A graphical diagnosis-oriented expert system development tool”, in Proceedings of the First International Conference on Enterprise Information Systems, vol. I, pp. 211 - 218, Setúbal (Portugal), 1999.

A. Fred, and J. Filipe, “GMED – A case study of a specialized graphical medical diagnosis shell application”, in Proceedings of the International Conference on Artificial Intelligence and Soft Computing, pp. 527 - 531, 1999.

P. Marques and J. Dias, "Monitoring moving targets using SAR images", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 156-160, April, 1999.

P. Marques and J. Dias, "SAR simulation of a scene containing moving targets", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 693-697, April, 1999.

Marques and J. Dias, "Efficient detection and ground mapping of selected moving targets using SAR raw data", in Proceedings of IEEE International Geoscience and Remote Sensing Symposium – IGARSS'99, pp. 542 - 546, Hamburg (Germany), 1999.

R. Nowak and M. Figueiredo, "Unsupervised progressive parsing of Poisson fields", in Proceedings of the IEEE International Conference on Image Processing– IICIP'99, vol. II, pp. 26-29, Kobe (Japan), 1999.

F. Nunes and J. Leitão, "Fast phase acquisition receiver for LEO communications in Rician channels", in Proceedings of the IEEE International Conference on Communications – ICC'99, pp. 1058-1062, Vancouver (Canada), 1999.

F. Nunes and J. Leitão, "Nonlinear channel estimation in fading OFDM systems" in Proceedings of the IEEE Global Telecommunication Conference – GLOBECOM, pp. 2157 – 2161, Rio de Janeiro (Brazil), 1999.

F. Nunes and J. Leitão, "A fast phase acquisition receiver for nongeostationary orbit satellites", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 50-54, April, 1999.

J. Sanguino, S. Marques, L. Pontes, and J. Leitão , "Architecture of a GPS-based transponder. Application to a vessel traffic system", in Proceedings of the 1999 ESA Conference on Data Systems in Aerospace – DASIA'99, pp. 503 – 508. Lisbon (Portugal), 1999.

J. Sanguino, S. Marques, L. Pontes, and J. Leitão , "Operational aspects of a DGPS-based vessel traffic system", 2000 ESA Conference on Data Systems in Aerospace – DASIA'2000, Montreal (Canada),1999. Accepted for publication.

A.Vailaya, M. Figueiredo, A. K. Jain, and H. J. Zhang, "A Bayesian framework for classification of vacation images", in Proceedings of the SPIE Conference on Storage and Retrieval for Image and Video Databases, SPIE vol. 3656, pp. 415 – 426, San Jose (USA), 1999.

A. Vailaya, M. Figueiredo, A. K. Jain, and H. J. Zhang, "Content based hierarchical classification of vacation images", in Proceedings of the IEEE International Conference on Multimedia Computing Systems – ICMCS'99, vol. I, pp. 518-523, Florence (Italy), 1999.

Miscellaneous

Invited talks:

M. Figueiredo, “Some model selection problems in image analysis”, invited talk at the Statistical Methods for Image Processing Conference (sponsored by the International Statistical Institute – ISI – and the International Association for Pattern Recognition – IAPR), Uppsala, Sweden, 1999.

A. Fred, “Structural pattern recognition: applications in automatic sleep analysis”, invited talk at the Department of Computer Science and Engineering, Michigan State University, 1999.

Editorial activity:

José M. B. Dias: Associate Editor for IEEE Transactions on Circuits and Systems.

Refereeing activity:

Mário A. T. Figueiredo: Reviewer for: IEEE Transactions on Image Processing; IEEE Transactions on Circuits and Systems; IEEE Transactions on Pattern Analysis and Machine Intelligence; IEEE Transactions on Information Theory; IEE Electronics Letters; IEEE Transactions on Neural Networks; Computer Vision and Image Understanding.

Member of the Program Committee of the 1999 International Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition.

Ana L. N. Fred: Reviewer for International Journal of Pattern Recognition and Artificial Intelligence.

Member of the Program Committee of: IAPR 2000 International Conference on Pattern Recognition – ICPR’2000; 5th International Colloquium on Grammatical Inference; First and Second International Conferences on Enterprise Information Systems.

José M. B. Dias: reviewer for: IEEE Transactions on Signal Processing; IEEE Transactions on Circuits and Systems; IEEE Transactions on Information Theory; IEEE Transactions on Biomedical Engineering; Machine Vision and Applications.

Participation in International Organizations:

José M. B. Dias: Delegate of Action COST 75 (Meteorological Radar).

José M. N. Leitão: Delegate at the TC-TIST (COST Telecommunications Technical Committee).

8.1.3.2 Image Group

Human Resources

Collaborators

Fernando Manuel Bernardo Pereira	Ph.D.	Assistant Professor, IST
Maria Paula dos Santos Queluz	Ph.D.	Assistant Professor, IST
Paulo Luis Serras Lobato Correia	M.Sc.	Assistant, IST

Other Collaborators

Paulo Jorge Lourenço Nunes	Ph.D. Student	Grant, PRAXIS XXI
Luís Ducla Soares	Ph.D. Student	Grant, PRAXIS XXI
Carla Raquel Zibreira	M.Sc. Student	Grant IST
João Manuel Valentim	M.Sc. Student	Grant IST
João Miguel Ascenso	M.Sc. Student	Grant IST
Ricardo Rosa	Engineer	Grant, IST
Wilfrid Manhente	Lic. Student	IST, Final Year Project
João Galhordas	Lic. Student	IST, Final Year Project
Fernando Fonseca	Lic. Student	IST, Final Year Project
Nuno Patricio	Lic. Student	IST, Final Year Project
Marco Oliveira	Lic. Student	IST, Final Year Project
Nuno Pinto	Lic. Student	IST, Final Year Project
Pedro Bandeira	Lic. Student	IST, Final Year Project
José Martinho	Lic. Student	IST, Final Year Project
Tiago Ribeiro	Lic. Student	IST, Final Year Project
Miguel Soares	Lic. Student	IST, Final Year Project
Nuno Correia	Lic. Student	IST, Final Year Project

Projects

MOMUSYS (ACTS 098) - Mobile Multimedia System (sponsored by the European Commission DG XIII):

Objective: European platform for the development of the MPEG4 standard including the implementation of an MPEG4 mobile audio-visual prototype providing content-based functionalities.

Partners: about 20 companies, telecoms and universities notably Bosch, Siemens and Philips. Aims at European consensus.

Duration: 4 years starting in November 1995 (finished December 1999).

Note: participation through IST.

IST participation: During 1999, the IST activity was mainly concentrated on the development of object-based video coding rate control strategies allowing to take the most benefit from the MPEG-4 video coding tools for the simple and main visual profiles. A major part of this work has been the implementation of the MPEG-4 Video Buffer Verifier to be able to produce compliant bitstreams. Alternative models have been specified and implemented.

Moreover IST developed the Graphical User Interface for a user assisted video segmentation tool, integrating automatic tools and user assistance, allowing to create natural video objects to be coded with the MPEG-4 tools.

DICEMAN (ACTS 308) - Distributed Internet Content Exchange with MPEG-7 and Agent Negotiations (sponsored by the European Commission DG XIII):

Objective: DICEMAN intends to provide a solution to what is probably the single biggest problem facing the archive content industry and its consumers today. Content holders have vast quantities of material, which they would like to sell. Content consumers have a growing need to access and purchase this content. However, today's business model is primarily based on paper, videotapes and CDs, and the postal system, making it slow, expensive and cumbersome. In this era of digital content and global digital networks, it is time a digital solution to this problem revolutionized the industry. DICEMAN aims to do this by:

Opening up valuable databases of multimedia content by making them easier to search, using advanced forms of descriptions and indexing, and advanced forms of user interfaces

Enabling the location of the best content for the purpose, both locally and globally, over electronic networks, using agent-based assistants to users and provider.

Enabling the exchange and trading of multimedia content over electronic networks using standardized interfaces to electronic databases.

Partners: 8 companies, namely IBM (D), INA (F), CSELT (I) and KPN (NL)

Duration: 2 years, starting in May 1998.

IST participation: The activity at IST in 1999 was mainly concentrated on preparation of the proposals to MPEG-7 for the description of visual content, and on the development of face detection analysis tool and the corresponding interactive editor. The face detection tool is based on colour and shape. The first stage consists in a pixel-based colour segmentation algorithm of the HSV colour space. For this purpose, a study about the skin-colour distribution of faces in natural images was first performed. The second stage recognises that an ellipse can approximate the outline of a human face shape in several positions. In this stage, an algorithm based on the Hough Transform is used to perform ellipse detection with some shape constraints. The system implemented has been tested for a wide variety of natural sequences and the experimental results show that the algorithm is robust to changes of position, size, orientation and number of faces in an image.

ISO/MPEG-4 and 7 (no sponsor):

Objective: Research and standardisation of object-based audiovisual representation and indexing methodologies.

Partners: Hundreds of universities and companies from all over the world.

IST participation: In 1999, IST mainly contributed both for the starting of the tools' development within MPEG-7 and for the continuation of the requirements' identification. Within the context of the DICEMAN project, IST submitted two proposals to the MPEG-7 Call for Proposals (Still images and video description schemes) and actively participated in the MPEG-7 Evaluation Process, chairing one of the evaluation teams. F.Pereira was also the editor of the MPEG-7 Requirements document and chaired the Ad Hoc Group on MPEG-7 Requirements for some months.

Ph.D. Theses

Paulo Luis Serras Lobato Correia (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: Video analysis for object-based representation environments)

Luis Ducla-Soares (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: Object-based error resilient video representation techniques)

Paulo Jorge Lourenço Nunes (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: Join rate control for object-based video representation schemes)

M.Sc. Theses

Carla Zibreira (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: Analysis and description of shape information).

João Valentim (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: MPEG-4 video conformance).

João Ascenso (supervisor: Fernando Pereira), Instituto Superior Técnico, in preparation (subject: Detection and tracking of human faces).

Publications

Books and Book Chapters

F.Pereira, R.Koenen, "MPEG-7: Status and directions", chapter in the book 'Advances in Multimedia: Systems, Standards and Networks' edited by Atul Puri and Tsuhan Chen, Marcel Dekker, Inc., 1999

P. Lamy, J. Martinho, T. Rosa and M.P. Queluz, "Content-based Watermarking for Image Authentication", to appear in Andreas Pfitzmann (ed.), "Information Hiding 99", Lecture Notes in Computer Science, Springer, vol. LNCS-1768, 1999

Papers in Journals

F.Pereira, "Televisão digital: a revolução já começou !", in "O mercado das telecomunicações em Portugal" published by Maxitel, 1999

G.Abrantes, F.Pereira, "MPEG-4 facial animation technology: survey, implementation and results", IEEE Transactions on Circuits and Systems for Video Technology, Special Issue on Synthetic/natural hybrid video coding, vol.9, nº 2, pp. 290 – 305, March 1999.

F. Pereira, R. Koenen, "MPEG-4: opening new frontiers to broadcasting", EBU Technical Review, n° 279, pp. 28 – 35, Spring 1999.

L. Ducla Soares, F. Pereira, "Error resilience and concealment performance for MPEG-4 frame-based video coding", Signal Processing: Image Communication, Special Issue on Error Resilience, vol. 14, n° 6-8, pp. 447-472, May 1999.

P. Nunes, F. Marques, F. Pereira, A. Gasull, "A contour-based approach to binary shape coding using a multiple grid chain code", Signal Processing: Image Communication, Special Issue on Shape Coding, to appear in May 2000.

F. Pereira, "MPEG-4: why, what, how and when ?", Tutorial Issue on MPEG-4, Signal Processing: Image Communication, to appear in 2000.

R. Koenen, F. Pereira, "MPEG-7: a standardised description of audiovisual content", Special Issue on MPEG-7 Technology, Signal Processing: Image Communication, to appear in 2000.

P. Salembier, R. Qian, N. O'Connor, P. Correia, I. Sezan, P. van Beek, "Description schemes for video programs, users and devices", Special Issue on MPEG-7 Technology, Signal Processing: Image Communication, to appear in 2000.

M. P. Queluz, "Authentication of digital images and video: generic models and a new contribution", submitted to Signal Processing: Image Communication in May 1999

Papers in Conference Proceedings

F. Pereira, "MPEG-7: a standard for describing audiovisual information", Workshop on Multimedia Databases and MPEG-7, London – UK, January 1999

M. P. Queluz, "Content-based integrity protection of digital images", IS&T/SPIE - Electronic Imaging'99 - Security and Watermarking of Multimedia Contents, San Jose - USA, January 1999

P. Fernandes, F. Pereira, "Ambiente de simulação para sistemas de comunicação de imagem", 1º Workshop Computação Gráfica Multimédia Ensino, Leiria - Portugal, February 1999

G. Abrantes, F. Pereira, "The IST MPEG-4 facial animation system", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

P. Correia, "Rejection of outliers in global motion estimation", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

N. O'Connor, P. Salembier, P. Correia, L. Ward, "The DICEMAN description schemes for still images and video sequences", WIAMIS'99 - Workshop on Image Analysis for Multimedia Interactive Services, Berlin - Germany, May 1999

B. Marcotegui, P. Correia, F. Marquès, R. Mech, R. Rosa, M. Wollborn, F. Zanoguera; "VOGUE: the MoMuSys video object generator with user environment", WIAMIS'99 - Workshop on Image Analysis for Multimedia Interactive Services, Berlin - Germany, May 1999

J.Ascenso, J.Valentim, F.Pereira, "Reconhecimento automático de faces usando informação de textura e de geometria 3D", 4º Encontro Nacional do Colégio de Engenharia Electrotécnica, Lisboa - Portugal, May 1999

F.Pereira, "Televisão digital: tecnologias e serviços", 4º Encontro Nacional do Colégio de Engenharia Electrotécnica, Ordem dos Engenheiros, Lisboa - Portugal, May 1999

P.Nunes, F.Pereira, "Object-based rate control for the MPEG-4 visual simple profile", Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS'99), Berlin - Germany, May 1999

F.Pereira, "MPEG-4 and MPEG-7: technologies and functionalities", plenary speech at VIII Simposium Nacional de Reconocimiento de Formas y Analisis de Imagenes, Bilbao - Spain, May 1999

P. Salembier, N. O'Connor, P. Correia, F. Pereira, "Hierarchical visual description schemes for still images and video sequences", Int. Conference on Image Processing (ICIP'99), Kobe - Japan, October 1999

F.Pereira, "The new MPEG standards for coding and description of audiovisual content", Jornadas de Engenharia de Telecomunicações e Computadores (JETC'99), Lisboa - Portugal, October 1999

F.Pereira, "The MPEG-7 standard: a challenge to describe multimedia information", invited speech at European Workshop on Content-Based Multimedia Indexing (CBMI'99), Toulouse - France, October 1999

B. Marcotegui, P. Correia, F. Marques, R. Mech, R. Rosa, M. Wollborn and F. Zanoguera, "A video object generation tool allowing friendly user interaction", ICIP'99, Kobe - Japan, October 1999

M.P. Queluz and P. Lamy, "Spatial watermark for image verification", accepted for IST/SPIE - Electronic Imaging' 2000 - Security and Watermarking of Multimedia Contents II, San Jose - USA, January 2000

F. Pereira, "Visual data representation: recent achievements and future developments", submitted to the European Conference on Signal Processing (EUSIPCO'2000), Tampere - Finland, September 2000

P. Correia, F. Pereira, "Estimation of video object's relevance", submitted to the European Conference on Signal Processing (EUSIPCO'2000), Tampere - Finland, September 2000

Deliverables

F.Pereira et al, "Final report on standardisation activities", Doc. AC098\IST\WP1.2\DS\P\029\B, Projecto ACTS MOMUSYS, January 1999

P. Salembier, N. O'Connor, P. Correia, F. Pereira, J. Ramon Casas, L. Garrido, J. Ruiz, "Still image description scheme", MPEG-7 proposal P185, Lancaster - UK, February 1999

P. Salembier, N. O'Connor, P. Correia, F. Pereira, J. Ramon Casas, L. Garrido, J. Ruiz, "Video description scheme", MPEG-7 proposal P186, Lancaster - UK, February 1999

B. Marcotegui, P. Correia, F. Marquès, R. Mech, R. Rosa, M. Wollborn, F. Zanoguera, Francisca; "VOGUE: the MoMuSys video object generator with user environment", COST 211quat AG(99)/11, Tampere, Finland, March 1999

P.Nunes, F.Pereira, "Implementing the MPEG-4 natural visual profiles and levels", Documento MPEG99/4878, Vancouver – Canada, July 1999

F. Zanoguera, P. Correia, F. Marquès, R. Ferran, "Software library and user manual for the video object generation tool", ACTS MoMuSys deliverable, AC098\CMM\WP5.2\DS\L\046\A1, August 1999

F. Marquès, P. Correia, B. Marcotegui, R. Mech, M. Wollborn, F. Zanoguera, "Algorithmic description of the video object generation tool", ACTS MoMuSys deliverable, AC098\CMM\WP5.2\DS\L\047\A1, September 1999

P.Nunes, F.Pereira, "Implementing the MPEG-4 video buffering verifier for the core profile- some results", Documento MPEG99/5168, Melbourne – Australia, October 1999

P. Correia, R. Mech, B. Marcotegui, F. Marquès, T. Schmidt, "Report on collaboration activities with other related European research projects", ACTS MoMuSys Deliverable AC098\IST\WP5\DS\L\051\A1, December 1999

P. Lamy, J. Martinho and T. Rosa, "Assinatura de imagens digitais (Watermarking)", (in Portuguese), Degree Project, IST, July 1999

Miscellaneous

Fernando Pereira

IEEE Senior Member since April 1999.

Expert in Telecommunications by Ordem dos Engenheiros in November 1999.

Member of the Executive Committee of the Specialisation on Telecommunications at Ordem dos Engenheiros since October 1999.

Member of the Committee for the M.Sc. Thesis “Suporte à descrição e pesquisa de imagem digital” by Eng. Artur Miguel Pereira Alves Caetano, at Instituto Superior Técnico, Universidade Técnica de Lisboa.

Member of the Committee for the M.Sc. Thesis “Meta-informação no armazenamento e recuperação de documentos multimédia”, by Susana Maria Silva Santos Gaio, at Faculdade de Engenharia, Universidade do Porto.

Member of the Committee for the Ph.D. Thesis “Codificação fonética: codificação de fala baseada em segmentos classificados foneticamente” by Eng. Carlos Eduardo de Meneses Ribeiro, at Instituto Superior Técnico, Universidade Técnica de Lisboa.

Member of the Committee for the Ph.D. Thesis “Error resilience for video coding services over packet-based networks” by Jian Zhang, at University of New South Wales, Canberra - Australia.

Supervisor of the Final Year Project “Simulador de comunicações móveis de vídeo” by João Miguel Ribeiro Galhordas e Wilfrid Salvador Manhente.

Project evaluator for the Hong Kong Research Grants Council.

Project evaluator for the IST European Programme (Action 6) by invitation of the European Commission, in July 1999.

Auditor for the ACTS and ESPRIT European Programmes by invitation of the European Commission.

Chairman of the ACTS MPEG Forum in the context of the ACTS European Programme from the European Commission.

Team leader in the MPEG-7 Evaluation Process held in February 1999 in Lancaster – UK.

Chairman of the Ad Hoc Group on MPEG-7 Requirements, between March and October 1999.

Editor of the “MPEG-7 Requirements” document since March 1999.

Member of the Program Committee for Visual Communications and Image Processing (VCIP’99) held in San Jose (CA) - USA, in January 1999.

Member of the Organising Committee for CONFTELE’99 held in Sesimbra - Portugal, in April 1999.

Member of the Program Committee for 2º Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS’99) held in Berlin - Germany, in May 1999.

Chairman of the session on “Telecomunicações” at the 4º Encontro Nacional do Colégio de Engenharia Electrotécnica, held in Lisboa – Portugal, in May 1999.

Member of the Program Committee for the Third International Conference on Visual Information Systems (VISUAL'99) held in Amsterdam – The Netherlands, in June 1999.

Member of the Program Committee for the IEEE International Conference on Multimedia Computing and Systems (ICMCS'99) held in Florence - Italy, in June 1999.

Chairman of the special session “Multimedia standards” at IEEE International Conference on Multimedia Computing and Systems (ICMCS'99), held in Florence – Italy, in June 1999.

Chairman of the MPEG-4 Seminar held in Vancouver – Canada, in July 1999.

Member of the Program Committee for the Workshop on Content-Based Multimedia Indexing (CBMI'99) held in Toulouse – France, in October 1999.

Member of the Scientific Committee for the International Workshop on Very Low Bitrate Video Coding (VLBV'99) held in Kyoto – Japan, in October 1999.

Member of the Program Committee for the Visual Communications and Image Processing (VCIP'2000) to be held in Perth - Australia, in June 2000.

Member of the Scientific Committee for the International Symposium on Image/Video Communication over Fixed and Mobile Network to be held in Rabat - Morocco, in April 2000.

Member of the Technical Committee for the 10th International Packet Video Workshop to be held in Cagliari – Italy, in May 2000.

Member of the Organizing Committee for the Workshop and Exhibition on MPEG-4 to be held in the context of ISCAS'2000 in Geneva – Switzerland, in May 2000.

Tutorials Chairman in the proposal to held the International Conference on Image Processing (ICIP) in Barcelona – Spain, in 2003.

Member of the Editorial Board of the Signal Processing: Image Communication Journal, published by EURASIP

Associate Editor of IEEE Transactions of Circuits and Systems for Video Technology
Guest editor of the Special Issue on Object-based Video Coding and Description of IEEE Transactions on Circuits and Systems for Video Technology, December 1999

Guest editor of Tutorial Issue on MPEG-4 of Signal Processing: Image Communication Journal, 1999

Guest editor of Tutorial Issue on MPEG-7 Technology of Signal Processing: Image Communication Journal, to appear in 2000

Reviewer for Signal Processing (EURASIP), Image Communication Journal (EURASIP), IEEE Transactions on Circuits and Systems for Video Technology, Proceedings of IEEE, Journal of Real-Time Imaging, IEEE Journal on Selected Areas in Communications, IEEE Transactions on Pattern Analysis & Machine Intelligence, ETRI Journal, IEEE Transactions on Multimedia and several international conferences.

Paula Queluz

Reviewer for IEEE Transactions on Circuits and Systems for Video Technology

Session Chair at the Electronic Imaging 2000 Conference, San Jose - USA, January 2000

Auditor for the ACTS European Programme from the European Commission

Member of the Committee for the Ph.D. Thesis “Analysis and coding of visual objects: new concepts and new tools”, by Eng. Manuel Menezes de Sequeira, at Instituto Superior Técnico, Universidade Técnica de Lisboa.

Supervisor of the Msc. Thesis “Automatic classification of urban areas using satellite images and non-spectral information “, by Jorge Rocha.

Supervisor of the Final Year Project “Extracção de objectos de uma sequência vídeo a partir da análise do movimento”, by Luís Faustino

Supervisor of the Final Year Project “Assinatura Digital de Imagens (Watermarking)” by P. Lamy, J. Martinho and T. Rosa.

Supervisor of the Final Year Project “Modelos 3D para planeamento de redes de comunicações móveis” , by M. Soares and N. Correia

Supervisor of the Final Year Project “Assinatura Digital de Imagens - II”, by F. Fonseca and N. Patrício

Supervisor of the Final Year Project “Modelos 3D para planeamento de redes de comunicações móveis - II” , by M. Oliveira e N. Pinto

8.1.3.3 Radio Communications Systems Group

Human Resources

Collaborators

Francisco António Bucho Cercas	Ph.D.	Assistant Professor, IST
Jorge Manuel Nunes Pereira	Ph.D.	Assistant Professor, IST
Antonio Castelo Branco Rodrigues	Ph.D.	Assistant Professor, IST
Augusto Afonso de Albuquerque	Ph.D.	Full Professor, ISCTE
Américo Manuel Carapeto Correia	Ph.D.	Assistant Professor, ISCTE
Carlos Gutierrez Sá da Costa	Ph.D.	Assistant Professor, ISCTE
Rosa Maria da Fonseca Monteiro	Lic.	Assistant, IST
Francisco António Monteiro	Lic.	Assistant, IST

Other Collaborators

Mário Pedro G. Marques da Silva	Ph.D. Student	M.Sc., Student, Marinha
Luis Filipe Carvalho Antunes	M.Sc. Student	Portugal Telecom
Pedro Joaquim Amaro Sebastião	M.Sc. Student	IEFP
Pedro Manuel G. Borda de Água	M.Sc. Student	Marinha
Luis Miguel Ribeiro Coimbra	Lic. Student	IST, Final Year Project
Jorge Marques Santana	Lic Student	IST, Final Year Project
João Filipe Santos Belchior	Lic. Student	IST, Final Year Project
José Manuel Pinto Pinela	Lic. Student	IST, Final Year Project
Bruno Ruben N. Sales Gomes	Lic. Student	IST, Final Year Project
Carlos Manuel G. Cotrim	Lic. Student	IST, Final Year Project
João Tiago Fonseca	Lic. Student	IST, Final Year Project
Tomás Gomes da Silva Brandão	Lic. Student	IST, Final Year Project
Pedro Luís Ruivo Dias	Lic. Student	IST, Final Year Project
Nuno Ricardo da Silva Sarmento	Lic. Student	IST, Final Year Project
Nuno Alexandre Vigário	Lic. Student	IST, Final Year Project
Hugo Miguel da Cruz Louro	Lic. Student	IST, Final Year Project
João Miguel Gaspar da Silva	Lic. Student	IST, Final Year Project
Hugo Ricardo Santos Pinto	Lic. Student	IST, Final Year Project
Jorge Filipe Ribeiro Fernandes	Lic. Student	IST, Final Year Project
Paula Alexandra Matos Cunha	Lic. Student	IST, Final Year Project
Patrícia Alexandra Freixial	Lic. Student	IST, Final Year Project
Luciano Manuel Oliveira	Lic. Student	IST, Final Year Project
Diogo Diogo	Lic. Student	IST, Final Year Project
Pedro Aço	Lic. Student	IST, Final Year Project
Ravindra Queluz Gaunencar	Lic. Student	IST, Final Year Project
Nuno Alexandre Monteiro	Lic. Student	IST, Final Year Project
Pedro Miguel Raio	Lic. Student	IST, Final Year Project
João Ricardo Lino	Lic. Student	IST, Final Year Project
Eva Vieira	Lic. Student	IST, Final Year Project
Diogo Nunes Sampaio Beja	Lic. Student	IST, Final Year Project
António Carlos N. R. Pacheco	Lic. Student	IST, Final Year Project
Gonçalo Crispim	Lic. Student	IST, Final Year Project
Luis Silva	Lic. Student	IST, Final Year Project
Pedro Marques	Lic. Student	IST, Final Year Project
Pedro Teixeira	Lic. Student	IST, Final Year Project

Projects

FRAMES (ACTS 090) – Future Radio Wideband Multiple Access System (sponsored by the European Commission DG XIII):

Objective 1 : To define, develop and evaluate a wideband and efficient multiple radio access scheme which fulfils the UMTS / IMT-2000 requirements.

Objective 2: To demonstrate and validate the resulting FRAMES system

Objective 3: To contribute to the UMTS / IMT-2000 standardisation process in international standardisation bodies as ETSI SMG.

Partners: Siemens (G), Ericsson (Sweden), Nokia (Fin.), T.U. Delft (NL), U. Oulu (Fin.), CNET (F), CSEM (Switzerland), U. Kaiserslautern (G), Chalmers U. (Sweden), The Royal Institute of Technology (Sweden), Instituto Superior Técnico (P), ISM (Spain).

Duration: 4 years starting in September 1995 (finished August 1999).

Note: participation through IST.

IST participation: During the beginning of 1999, the IST activity was mainly concentrated on the writing of the Final CTSYS Deliverable and on the writing of the FRAMES Book to be published by Artech House Pub., on March 2000.

ID SMRF-OGMA – Radio Frequency Modular System (Sistema Modular de Rádio Frequência SMRF) (sponsored by Oficinas Gerais de Material Aeronáutico OGMA):

Objective: To design and build a prototype of a satellite receiver for the Portuguese satellite POSAT-1 of reduced size and power consumption so as to be carried out in vehicles.

Partners: IST and OGMA.

Duration: 2 years starting 1998.

IST participation: IST was responsible for the design and implementation of the RF circuitry as well as the modem itself, while OGMA was responsible for implementing all network protocols. In particular, the Radio Group was responsible for the design of the modem and also for its implementation using digital signal processing (DSP) techniques. This task was successfully achieved with the co-operation of the University of Plymouth represented by Prof. Martin Tomlinson.

COST 252 – Evolution of Satellite Personal Communications from 2nd to Future Generation Systems (no sponsor):

Objective: Research and standardisation of satellite personal communications and its integration with terrestrial systems for future generations.

Partners: Around 30 universities, operators and companies from all over Europe.

IST participation: In 1999 some final contributions were presented at the Joint International Workshop of COST Actions 252, 253 and 255 at Supaero, Toulouse, in May. F. Cercas was responsible for the preparation and edition of Session “Simulation Tools” with contributions from the 3 actions. He is also the leader of Working Group 3 of this Action (to end in 2000) and was also responsible for the edition and organization of the corresponding part of the final report.

COST 255 – Radiowave Propagation Modeling for New SatCom Services at Ku-Band and Above (no sponsor):

Objective: Research and standardisation of propagation models for new satellite services at higher frequency bands.

Partners: Around 50 universities, operators and companies from all over Europe.
IST participation: The main contribution of IST was presented at the Joint International Workshop of COST Actions 252, 253 and 255 at Supaero, Toulouse, in May, together with the preparation and presentation of one Session “Simulation Tools”. This corresponds to the work of working group 3 related to the air interface. IST also contributed to the final report through the specification of a test case for a VSAT system operating at Ka band and using WB CDMA. This Action is due to end at 2000.

COST 259 – Wireless Flexible Personalised Communications (no sponsor):

Objective: Research and standardisation of mobile, personal and wireless systems and networks.

Partners: Around 80 universities, operators and companies from all over Europe.

IST participation: In 1999, contributions were presented to WG1 dealing with technical aspects on the combination of multicarrier and CDMA techniques for optimization of the capacity of future mobile networks. A. Rodrigues acted as a rapporteur from COST 252 and 255.

Ph.D. Theses

Mário Pedro Guerreiro Marques da Silva (supervisor: Prof. Américo Correia), Instituto Superior Técnico, in preparation (subject: Interference Cancellation in WCDMA Networks)

M.Sc. Theses

Pedro Joaquim Amaro Sebastião (supervisor: Prof. Francisco António Bucho Cercas), Instituto Superior Técnico, concluded in 1999 (subject: Efficient Performance Evaluation of TCH Codes using Stochastic Models)

Mário Pedro Guerreiro Marques da Silva (supervisor: Prof. Américo Manuel Carapeto Correia), Instituto Superior Técnico, concluded in 1999 (subject: Multiple User Detection of CDMA Systems)

Luís Filipe Carvalho Antunes (supervisor: Prof. Francisco António Bucho Cercas), Instituto Superior Técnico, in preparation (subject: Performance Evaluation of TCH Sequences in CDMA Systems)

Francisco António T. B. Nunes Monteiro (supervisor: Prof. António José Castelo Branco Rodrigues), Instituto Superior Técnico, in preparation (subject: Multi-h Coded Modulation in Multipath Fading Channels)

Pedro Manuel Geada Borda de Água (supervisor: Prof. Francisco António Bucho Cercas), Instituto Superior Técnico, in preparation (subject: Spread Spectrum Communication in Power Lines using TCH Codes)

Rosa Maria da Fonseca Monteiro (supervisor: Prof. Francisco António Bucho Cercas), Instituto Superior Técnico, in preparation (subject: Efficient control of CDMA Systems for Satellite Communications)

Pedro Teles Lageira (supervisor: Prof. Augusto Casaca, co-supervisor: Prof. Carlos Sá da Costa), Instituto Superior Técnico, in preparation (subject: "Management of an Optical Network Access System")

Publications

Books and Book Chapters

A. Rodrigues et al., "Advanced Radio Interface Techniques and Performance", chapter in the book 'Digital Mobile Radio Towards Future Generation Systems' edited by Eraldo Damosso and Luís Correia, EC Publication EUR 18957, 1999.

F. Cercas, A. Correia et al., "Modulation and Coding for UMTS", chapter in the book "Third Generation Mobile Communication Systems", edited by R. Prasad, W. Konhauser and W. Mohr, to be published by Artech House in March 2000.

Papers in Journals

A. Correia, A. Rodrigues, F. Cercas, "Frequency-Hopping versus Interference Cancellation for TD-CDMA", IEEE Journal on Selected Areas in Communications, Special Issue on Spread Spectrum for Global Communications, to appear in January 2000.

Papers in Conference Proceedings

M. Nunes, J. Santos, A. Rodrigues, J. Punt, H. Nikokaar, R. Prasad, "Forward Link MC-CDMA System Performance with Intercell Interference", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 221-225, April, 1999.

A. Correia, F. Cercas, A. Rodrigues, "Wideband CDMA with Blind Interference Cancellation", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 229-233, April, 1999.

A. Correia, F. Cercas, A. Rodrigues, "CDMA with Blind Interference Cancellation", Proceedings of the 2nd FRAMES Workshop, Delft, Netherlands, January 1999.

A. Correia, A. Hottinen, R. Wichman, "Effects of Channel Estimation Errors in Space-Time Transmit Diversity for WCDMA", Proceedings of the 2nd FRAMES Workshop, Delft, Netherlands, January 1999.

A. Correia, A. Hottinen, R. Wichman, "Optimised Constellations for Transmitter Diversity", Proceedings of IEEE VTC1999-Fall, Amsterdam, The Netherlands, pp. 1785-1789.

F. Cercas, "Efficient receiver DS CDMA with TCH codes", contribution 2.3 (pp. 67-68) of Session 3 "Mobile system tradeoffs with emphasis on radio interface & propagation" (pp. 65-74), edited by Andreas Polydoros e George Tombras, Joint International Workshop, Supaero, Toulouse, France, 19-20 May 1999.

F. Cercas, P. Sebastião and A. Cartaxo, "Use of the Interval Simulation Technique for Obtaining the Performance of TCH codes", contribution 2.6 (pp. 132-133) of Session 5 "Simulation Tools" (pp. 121-135), edited by Francisco Cercas, Joint International Workshop, Supaero, Toulouse, France, 19-20 May 1999.

F. Cercas, A. Cartaxo and P. Sebastião, "Performance of TCH Codes with Independent and Burst Errors Using Efficient Techniques", IEEE VTC 1999-Fall, Amsterdam RAI International Exhibition and Congress Centre, Amsterdam, Holland, 19-22 September 1999, pp. 2536-2540.

L. Antunes and F. Cercas, "Code Spreading CDMA with TCH Codes for Simplified Radio Interface", IEEE VTC 1999-Fall, Amsterdam RAI International Exhibition and Congress Centre, Amsterdam, Holland, 19-22 September 1999, pp. 2899-2902.

P. Sebastião, F. Cercas and A. Cartaxo, "Performance Estimation of TCH Codes in Burst Channels" (in Portuguese), XVII Simpósio Brasileiro de Telecomunicações, Parthenon, Pasárgada Residence, Praia da Rocha, Vila Velha, ES, Brazil, 7-10 September 1999, pp. 605-610.

L. Antunes and F. Cercas, "Simplified Radio Interface for CDMA with TCH Codes", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 226-228, April, 1999.

P. Sebastião, F. Cercas and A. Cartaxo, "Performance Results for TCH Codes Using Efficient Simulation", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 337-341, April, 1999.

J. Inácio, F. Cercas, J. Gerald and M. Ortigueira, "Performance Analysis of TCH Codes and other New PN Even Balanced (PN-EB) Codes Suitable for High Processing Gain DS-SS Systems", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 342-346, April, 1999.

P. Sebastião, F. Cercas and A. Cartaxo, "Performance of TCH Codes with Independent and Burst Errors" (in Portuguese), 4º Encontro Nacional do Colégio de Engenharia Electrotécnica da Ordem dos Engenheiros, FIL - Parque das Nações, Lisboa, 27-28 May 1999, pp. 170-177.

F. Monteiro and F. Cercas, "Digital Communications Simulator" (in Portuguese), JETC'99 Jornadas de Engenharia de Telecomunicações e Computadores, Instituto Superior de Engenharia de Lisboa, Lisboa, Portugal, October 1999, pp. XI-43, XI-47.

Carlos Sá da Costa, Tiago Silva and Hitoshi Sato, "An Optical Digital Loop Carrier System", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 583-587, April, 1999.

Deliverables

M. Nunes, J. Santos, A. Rodrigues, J. Punt, H. Nikokaar, R. Prasad, "Effects of Downlink Intercell Interference on MC-CDMA System Performance", COST 259 TD(99) 68, Vienna, Austria, 22-23 April 1999

A. Correia et al, "Results of Physical Transport Studies", FRAMES Deliverable DEL050, January 1999.

Miscellaneous

António Rodrigues

Member of the Committee for the M.Sc. Thesis "Optimization of Cellular Planning for Non-uniform Distributions" (in Portuguese) by Eng. Dragana Kistic, at Instituto Superior Técnico, Universidade Técnica de Lisboa, April 1999.

Member of the Committee for the M.Sc. Thesis "Multi-user Decoding for DS-CDMA Systems" (in Portuguese) by Eng. Mário Guerreiro Marques da Silva, at Instituto Superior Técnico, Universidade Técnica de Lisboa, September 1999.

Project evaluator for the IST European Programme (Action 4 – Mobile Communications) by invitation of the European Commission, in July 1999.

Auditor for the ACTS European Programme by invitation of the European Commission, in December 1999.

Co-Chairman of the session on "Performance of CDMA Systems" at the II Conferência de Telecomunicações 1999 (CONFTELE'99) held in Sesimbra, Portugal, in April 1999.

Member of the Technical Committee for the IEEE 50th Vehicular Technology Conference (VTC'99 – Fall) held in Amsterdam, The Netherlands, in September 1999.

Chairman of the session "Wireless LAN II" at the IEEE 50th Vehicular Technology Conference (VTC'99 – Fall) held in Amsterdam, The Netherlands, in September 1999.

Reviewer for IEEE Transactions on Communications, VTC'99 – Fall and II Conferência de Telecomunicações.

Américo Correia

First author of Nokia International Patent NC18264, "Diversity Transmission Method and System", June 1999.

Member (M.Sc. Supervisor) of the Committee for the M.Sc. Thesis "Multi-user Decoding for DS-CDMA Systems" (in Portuguese) by Eng. Mário Silva, at Instituto Superior Técnico, Universidade Técnica de Lisboa, April 1999.

Member of the Committee for the M.Sc. Thesis “Application of TCH Codes for CDMA Mobile Communications” (in Portuguese) by Eng. Luís Carvalho Antunes, at Instituto Superior Técnico, Lisboa, November 1999.

Member of the International Advisory Committee of the IEEE 50th Vehicular Technology Conference (VTC’99 – Fall) held in Amsterdam, The Netherlands, in September 1999.

Reviewer of Wireless Personal Communications of Kluwer Publ. in 1999.

Francisco Cercas

Member of the International Advisory Committee for the IEEE 50th Vehicular Technology Conference (VTC’99 – Fall) held in Amsterdam, The Netherlands, in September 1999.

Reviewer for IEEE VTC’99 – Fall and CONFTELE’99

Chairman of session “Hybrid Systems / Advanced Techniques”, at the IEEE 50th Vehicular Technology Conference (VTC’99 – Fall) held in Amsterdam, The Netherlands, in September 1999.

Co-Chairman of the session on “Channel Coding” at the II Conferência de Telecomunicações 1999 (CONFTELE’99) held in Sesimbra, Portugal, in April 1999.

Organiser of the Joint International Workshop, Supaero, Toulouse, France, 19-20 May 1999 with the participation of COST 252, COST 253 and COST 255. He was also the editor, coordinator and chairman of Session 5 “Simulation Tools” at that conference.

Member of the Scientific Committee for the evaluation of the recent Engineering Degree of Instituto Superior Técnico designated as “Licenciatura em Engenharia e Gestão Industrial (LEGI) so as to be officially recognised and approved by the Portuguese Institute of Electrical Engineers (Ordem dos Engenheiros).

Member of the Committee for the M.Sc. Thesis “Processing Gain of a Communication System with DS Spread Spectrum and Manchester Code” (in Portuguese) by Eng. João Manuel Lopes de Carvalho Dias, at Instituto Superior Técnico, Lisboa, July 1999.

Member (M.Sc. Supervisor) of the Committee and President of Jury for the M.Sc. Thesis “Application of TCH Codes for CDMA Mobile Communications” (in Portuguese) by Eng. Luís Carvalho Antunes, at Instituto Superior Técnico, Lisboa, November 1999.

Carlos Sá da Costa

IT responsible for the protocol between IT, IST and Siemens signed in 1999 with five years duration.

8.1.4 Optical Communications Research Line

Human Resources

Collaborators

António A. Moreira	Ph. D.	Associate Professor, IST
Adolfo V. T. Cartaxo	Ph. D.	Assistant Professor, IST
João J. O. Pires	Ph. D.	Assistant Professor, IST

Other Collaborators

José A. P. Morgado	Ph. D. Student	Grant, AFA
Luís G. C. Cancela	Ph. D. Student	Assistant, ISCTE
João L. Rebola	Ph. D. Students	Grant FCT
João M. G. Oliveira	Lic. Student	IST, Final Year Project
Clara A. A. A. Lourenço	Lic. Student	IST, Final Year Project
Daniel D. Fonseca	Lic. Student	IST, Final Year Project
Ruben S. Luís	Lic. Student	IST, Final Year Project
Eduardo M. da Silva	Lic. Student	IST, Final Year Project
Joao P. Veiga	Lic. Student	IST, Final Year Project

Projects

IT-L02 -Optical Protection (internal project)

A reconfigurable optical add-drop multiplexer has been developed. This includes, namely, a supervisory system appropriate for detecting failures, a control system for reconfiguration and a PC interface and visualisation software. A detailed analyses of the impact of the crosstalk generated by AWGs in the size of WDM rings using a logical full mesh topology has also been performed.

Ph. D. Theses

José A. P. Morgado (supervisor: Adolfo Cartaxo), Instituto Superior Técnico, in preparation (subject: Limitations imposed by active devices in optical fibre communication systems).

Luis G. C. Cancela (supervisor: João Pires), Instituto Superior Técnico, in preparation (subject: Multichannel optical networks based on hierarchical ring topologies).

João L. Rebola (supervisor: Adolfo Cartaxo), Instituto Superior Técnico, in preparation (subject: Wavelength division multiplexing communication systems and networks).

Publications

Papers in Journals

A. Cartaxo, B. Wedding, W. Idler, "Influence of fiber nonlinearity on the fiber transfer function: theoretical and experimental analysis", *IEEE/OSA Journal of Lightwave Technology*, vol. 17, n°10, Oct. 1999, pp. 1806-1813.

A. Cartaxo, "Small-signal analysis for nonlinear and dispersive optical fibres, and its application to design of dispersion supported transmission systems with optical dispersion compensation", *Proceedings IEE, Part J - Optoelectronics*, vol. 146, n°5, Oct. 1999, pp. 213-222.

A. Cartaxo, "Cross-phase modulation in intensity modulation - direct detection WDM systems with multiple optical amplifiers and dispersion compensators", *IEEE/OSA Journal of Lightwave Technology*, vol. 17, n°2, Feb. 1999, pp. 178-190.

A. Cartaxo, J. Morgado, "Rigorous assessment of small-signal analysis for linear and dispersive optical communication systems operating near zero-dispersion wavelength", *IEEE/OSA Journal of Lightwave Technology*, vol. 17, n°1, Jan. 1999, pp.86-94.

J. J. O. Pires, M. O'Mahony, N. Parnis, and E. Jones, "Scaling limitations in full-mesh WDM ring networks using arrayed-waveguide grating OADMs," *Electronic Letters*, vol.35, n°1, pp. 73-75, January1999.

Papers in Conference Proceedings

J. Morgado, A. Cartaxo, "Nonlinear transmission of noise along singlemode fiber at zero-dispersion wavelength", *12th IEEE Lasers and Electro-Optics Society Annual Meeting, LEOS'99, S. Francisco, U.S.A., 8-11 Nov. 1999, paper WZ1, pp. 607-608, ISBN: 0-7803-5634-9.*

A. Cartaxo, J. Morgado, "On the dynamic stability of external-cavity semiconductor lasers operating at the strong feedback regime", *12th IEEE Lasers and Electro-Optics Society Annual Meeting, LEOS'99, S. Francisco, U.S.A., 8-11 Nov. 1999, paper ThA6, pp. 667-668, ISBN: 0-7803-5634-9.*

P. Sebastião, F. Cercas, A. Cartaxo, "Estimação do desempenho dos códigos TCH em canais com erros em burst", *Anais do XVII Simpósio Brasileiro de Telecomunicações, Espírito Santo, Brasil, 7-10 Sep. 1999, pp. 605-610.*

J. Morgado, A. Cartaxo, "Impact of laser and booster noises in repeaterless IM/DD systems with optical post- and pre-amplifiers", *1999 Pacific Rim Conference on Lasers and Electro-Optics, vol. II, Seul, South Korea, 30 Aug. - 3 Sep. 1999, paper P1.89, pp. 497-498, ISBN: 0-7803-5661-6.*

A. Cartaxo, J. Morgado, "Accurate simulation of laser diode noise with arbitrary levels of optical feedback", 1999 Pacific Rim Conference on Lasers and Electro-Optics, vol. III, Seoul, South Korea, 30 Aug. - 3 Sep. 1999, paper P2.41, pp. 912-913, ISBN: 0-7803-5661-6.

F. Cercas, A. Cartaxo, P. Sebastião, "Performance of TCH codes with independent and burst errors using efficient simulation techniques", 50th Vehicular Technology Conference, vol. 5, Amsterdam, Netherlands, 19-22 Sep. 1999, paper 4.8.3., pp. 2536-2540, ISBN: 0-7803-5435-4.

L. G. C. Cancela and J. J. O. Pires, "Influence of channel frequency spacing in multisource crosstalk in a Benes optical switch," Proc. Internatinal Conference on Transparent Optical Networks, pp. 107-110, Kielce, Polónia, June 1999.

P. Sebastião, F. Cercas, A. Cartaxo, "Desempenho dos códigos TCH para erros independentes e em rajada", Actas do 4º Encontro Nacional do Colégio de Engenharia Electrotécnica, Lisboa, 27-28 May 1999, pp. 170-177, ISSN: 0873-4747.

L. G. C. Cancela e J. J. O. Pires, "Rigorous analysis of the impact of multisource crosstalk in a NxN Benes optical switch," in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 285-266, April, 1999.

J. Morgado, A. Cartaxo, "Influence of fibre nonlinearity on noise transmission in IM/DD repeaterless system with optical post- and pre-amplifiers", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 269-273, April, 1999.

P. Sebastião, F. Cercas, A. Cartaxo, "Performance results for TCH codes using efficient simulation", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.337-341, April, 1999.

A. Cartaxo, "Cross-phase modulation in intensity modulation - direct detection WDM systems with multiple fibre spans", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.357-361, April, 1999.

J. Morgado, A. Cartaxo, "Frequency noise transmission over nonlinear dispersive singlemode fibres at zero-dispersion wavelength", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.535-539, April, 1999.

J. Morgado, A. Cartaxo, "Relative intensity noise induced by fibre dispersion at zero-dispersion wavelength in nonlinear dispersive singlemode fibres", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 540-544, April, 1999.

A. Cartaxo, J. Nunes, "First results on dispersion supported transmission performance improvement achieved by using transversal filters", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 545-549, April, 1999.

J. J. O. Pires, M.O´Mahony, N. Parnis, and E. Jones, "Size limitations of a WDM ring network based on arrayed-waveguide grating OADMs," Proc. Third Working Conference on Optical Network Design and Modeling (ONDM´99), pp. 71-79, Paris, France, February 1999.

Deliverables

Luis Cancela and João Pires "Final report on optical signal monitoring in optical transparent networks," Project L02 (Optical Protection), October 1999.

“Projecto e simulação de um sistema de comunicação óptica de muito alta velocidade”, João Rebola, João Oliveira, Clara Lourenço, Report of Final Year Project at IST (supervisor: A. Cartaxo).

Miscellaneous

A. Cartaxo was reviewer for IEEE/OSA Journal of Lightwave Technology, IEEE Photonics Technology Letters, Electronics Letters. He was also reviewer for 2ª Conferência Nacional de Telecomunicações. A. Cartaxo was technical evaluator of European projects for the Information Society Technologies program by invitation of Comission of European Communities.

João Pires has been reviewer for the Computer Networks and ISDN Journal and for the conference Networking 2000, to be held in Paris, France, May 2000.

8.1.5 Electronic and Optoelectronic Components Research Line

Human Resources

Collaborators

Jorge Manuel Torres Pereira	Ph. D.	Associate Professor, IST
Carlos Alberto Ferreira Fernandes	Ph. D.	Assistant Professor, IST
Artur Fernando Delgado Lopes Ribeiro	Ph. D.	Assistant Professor, IST

Other Collaborators

Paulo Jorge dos Santos Almeida	M. Sc. Student	Grant, PRAXIS XXI
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Projects

FCT – PRAXIS XXI - TIT/1591/95 – SCCEO - Simulation and Characterisation of Electrical and Optoelectronic Components

Development of a Transfer Matrix method to model the laser structures with several discontinuities in the longitudinal direction in the high-level injection regime.

Development of modelling tools to analyse the multi-mode waveguide structures to be used in the MMI devices.

Development of the modelling tool previously used to study the time-domain behaviour of DFB lasers to preview the bandwidth correlation with structure and working parameters.

M. Sc. Theses

Paulo Jorge dos Santos Almeida (supervisor: Artur Fernando Delgado Lopes Ribeiro.), Instituto Superior Técnico, submitted in 1999 (subject: Modelling and Characterisation of Multimode Interference Devices.)

Publications

Papers in Conference Proceedings

Jorge Manuel Torres Pereira, “The Effect of Temperature on the Light-Current Characteristics of InGaAsP Quantum Well Lasers”, in Proc. of CONFTELE’99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 565-568, April, 1999.

Jorge Manuel Torres Pereira, “Modulation Response of InGaAsP Quantum Well Lasers”, Proceed. 6^{as} Jornadas Luso-Espanholas de Engenharia Electrotécnica, Lisboa-Portugal, Julho 1999, vol. 4, pp. 251-258.

Jorge Manuel Torres Pereira, “Self-Heating Effects at CW Operation of MQW Long-Wavelength Lasers”, LDSD’99 – The Third International Conference on Low Dimensional Structures and Devices, Antalya-Turkey, September 1999, p.111.

C.F. Fernandes, "The Effect of Phase-Shift Position on the Characteristics of InGaAsP QWS Distributed Feedback Laser Diodes", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 95-98, April, 1999.

C. Ferreira Fernandes, "Hole-Burning Corrections in the Stationary Analysis of DFB Laser Diodes", LDSD'99 – The Third International Conference on Low Dimensional Structures and Devices, Antalya-Turkey, September 1999, p.OS19.

A. Lopes Ribeiro, "Comparison Between n+-InP and Semi-Insulating Substrates in Reducing the Crosstalk in Integrated Optical Transceivers", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 261-263, April, 1999.

P. Santos Almeida, A. Lopes Ribeiro, "Modelling Multimode Interference Devices", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.574-577, April, 1999.

8.1.6 Power Systems Research Line

Human Resources

Collaborators

Mário Lança	Ph. D.	Full Professor, IST
Maria Inês Simas	Ph. D.	Associate Professor, IST
Maria Beatriz Borges	Ph. D.	Assistant Professor, IST
A. Victor Anunciada	Ph. D.	Assistant Professor, IST

Other Collaborators

Pedro Santos	Ph. D. Student	Prof. Pupilos do Exército
António Casimiro	Ph. D. Student	Grant, PRAXIS XXI
Floriberto Lima	M. Sc. Student	Assistant IST
Raul Monteiro	M. Sc. Student	Assistant, IPT
João Beirante	M. Sc. Student	Assistant, IPT
Paulo Tavares	Lic	BIC - PRAXIS XXI
João F. Dias	Lic.	Grant, IT
Rui Santos	Lic. Student	IST
Pedro Cunha	Lic. Student	IST
Luis Barata	Lic. Student	IST
Luis Cunha	Lic. Student	IST
Fernando Rodrigues	Lic. Student	IST
Joint venture IT/FCTI(Brazil), granted by ICCTI/CNPq:		
Frank Behrens.	Ph.D	Assistant Professor, PUCC
Saulo Finco.	Ph.D. Student	Assistant, FCTI

Projects

FCT - PRAXIS XXI - 2/2.1/TIT/1655/95 - Smart Power - CIIP - Intelligent Power Integrated Circuits

“Integrated Circuits for High Efficiency Power Conversion, Using CMOS Technologies, Based on NMOS Devices”.

High performance power conversion solutions were studied and new solutions were developed, namely:

Optimization, development and fabrication of new power switching structures in a standard CMOS technology, paying attention to cells geometry and using 2-dimensional simulation (SPICES) and electrical simulation (PSPICE), regarding ON-resistance and breakdown voltages.

Novel cell architecture for basic power switching cells considering IPICs Electromagnetic Compatibility and fast smart power prototyping.

Development of new power control functions based on a unique NMOS cell type, aimed at very low cost semicustom smart power design, by means of convenient top metal layers interconnections using a programmable NMOS structures based matrix.

These results are extremely suitable to decrease low series production cost, to reduce turn-around production cycle and to enable the reuse of functional blocks.

A related Patent is pending.

SWITCH (internal project)

Development of new circuit topologies for soft switching converters and active power filters. Two new topologies were developed and tested during 1999: a single phase power factor correction circuit and the switched input circuit for zero voltage switching in bridge converters (1-phase and 3-phase).

ADAFO - Supply system for optical links

High voltage DC (400V) ring for energy supply of add-drops in a optic fiber telecom link. A computer program for cost minimization and aided design of the energy supply link, has been developed.

Project sponsored by Portugal Telecom

CEM Continuing education for Electromagnetic Compatibility (internal project)

Efforts are being carried out to create the skills to solve CEM problems, which are arising in industry, services and research institutes.

Ph. D. Theses

Saulo Finco (supervisor: Inês Simas), Universidade Estadual de Campinas, in preparation (subject: Cost Effective Smart Power ICs Using Standard CMOS Technologies and NMOS based blocks)

António Casimiro (supervisor: Inês Simas), Instituto Superior Técnico in preparation (subject: Cost Effective Smart Power ICs Using Standard CMOS Technologies and Programmable Arrays).

Pedro Santos (supervisor: Inês Simas), Instituto Superior Técnico in preparation (subject: Characterization and Optimization of Power Switching Cells Towards Smart Power ICs Using Standard CMOS Technologies)

M. Sc. Theses

Raul Monteiro (supervisor: Victor Anunciada), Instituto Superior Técnico, submitted in 1999 (subject: Switched input circuits for soft switching of bridge converters)

João Beirante (supervisor: M. Beatriz Borges), Instituto Superior Técnico, in preparation (subject: Development of soft switching phase modulation DC/DC converters)

Floriberto Lima (supervisor: Victor Anunciada), Instituto Superior Técnico, in preparation (subject: Soft switching active power filters)

Publications

Papers in Conference Proceedings

S. Finco, A. P. Casimiro, F. Behrens, P. Tavares, M. I. Castro Simas and C. Mammana, "Smart Power: A Perspective for Semicustom Approach, IBERCHIP'98, pp. 342-349, Lima, Peru, March 1999.

P. Santos, A. P. Casimiro, M. I. Castro Simas and M. Lança, "New NMOS Device for Low Cost Smart Power Integration", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 287-291, April, 1999.

A.P. Casimiro, S. Finco, P. Tavares, F. Behrens, C. I. Z. Mammana and M. I. Castro Simas, "Smart Power ICs Fast Prototyping for Portable Telecommunications", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 281-286, April, 1999.

P. Tavares, S. Finco, F. Behrens, L. E. Seixas, A. P. Casimiro and M. I. Castro Simas, "Microsystem for a Biomedical Application Using Cost Effective Smart Power Strategies, in Proceedings of the International Conference on Microelectronics and Packaging (ICMP'99), pp.145-150, Campinas, Brasil, August 1999.

P. Santos, A. P. Casimiro, M. I. Castro Simas and M. Lança, "The Gate-Shifted LDD-NMOS", European Power Electronics Conference, EPE'99 CDROM – DS 1.2, Lausanne, Switzerland, September 1999.

F. Lima, A. Anunciada, "Novel Active Power Filter Topology", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 292-296, April, 1999.

J. Dias, L. Barata, B. Borges, A. Anunciada, "Single-Phase Factor Correction Converter", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 292-296, April, 1999.

Deliverables

Patent Request nr. 102297 in Portugal "Circuitos Integrados Inteligentes de Potência Configuráveis sua Aplicação e Dispositivos" (in Portuguese)

Patent Request via PCT "Mask-Configurable Smart Power Circuits – Applications and Devices"

A. P. Casimiro, P. Santos "Circuito Integrado PIC_1_99 (Run # 325 Mietec20 2 μ m)".

A. P. Casimiro, P. Santos "Circuito Integrado PIC_2_99 (Run # 380 Mietec20 2 μ m)".

P. Santos "Considerações sobre a resistência específica", September 1999.

A. P. Casimiro "Missão à FCTI-Campinas, Dezembro de 1999" .

Miscellaneous

M. I. Castro Simas, responsible for the protocol between IT/IST and FCTI-Brazil, a Joint venture granted by ICCTI/CNPq.

M. I. Castro Simas, responsible for the organisation and chairperson of the 10th annual meeting of the IAS EWG: “New Semiconductor Materials, New Power Devices, Intelligent Power Devices”.

M. I. Castro Simas, reviewer for IEEE Transactions on Power Electronics and for IEEE Transactions on Industrial Applications.

M. I. Castro Simas, chairperson of IEEE Portugal Section joint chapter on PEL/IA/IE.

Victor Anunciada, reviewer for IEEE Transactions on Industrial Electronics.

Victor Anunciada, organising committee of the CONFTELE'99

8.1.7 Networks Research Line

Human Resources

Collaborators

José Manuel R. L. Brázio	Ph. D.	Associate Professor, IST
João Luís C. C. G. Sobrinho	Ph. D.	Assistant Professor, IST

Other Collaborators

Nuno Miguel V. Ribeiro	MSc Student	Assistant, I.P. Setúbal
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Projects

COST 257 “Impact of New Services on the Architecture and Performance of Broadband Networks”

Work on traffic models which are a generalization of the finite population single resource model (Engset model) to the case of a finite population with multiservice multirate demands.

QUALITY OF SERVICE OVER PACKET NETWORKS

Extension of the black burst contention scheme for operation in an ad hoc wireless environment. The black burst contention scheme overlays any carrier sense multiple access mechanism and provides QoS guarantees to real-time traffic.

Development of an algebraic framework for QoS path computation and packet forwarding. This framework characterizes the QoS paths that are compatible with Internet's OSPF routing protocol and hop-by-hop destination-based forwarding.

MULTIMEDIA COMMUNICATIONS OVER LARGE SCALE NETWORKS WITH QUALITY OF SERVICE GUARANTEES

The inclusion of this project in the 1999 Workplan was based on the assumption that it would be carried out by a full-time Research Assistant to be hired at the beginning of 1999. The search process in the meanwhile undertaken did not identify a suitable candidate, and thus the corresponding work was not undertaken. The hiring of a senior Research Associate for doing work in this area remains as an objective for this research line, and the search effort will be continued in 2000.

PLATFORM FOR UNIVERSAL ACCESS TO APPLICATIONS IN A UNIVERSITY CAMPUS ENVIRONMENT

Completion of the work on the architectural definition of the system (Logical Model and Functional Architecture). Definition of the computation and middleware platforms for its support and of the object structure for an object-oriented implementation. Start of the implementation of key modules.

M. Sc. Theses

Nuno Miguel V. Ribeiro (supervisor: José Manuel R. L. Brázio), Instituto Superior Técnico, in preparation (subject: Platform for Universal Access to Applications in a University Campus Environment)

Publications

Papers in Journals

J. Sobrinho, A.S. Krishnakumar, "Quality of service in ad hoc carrier sense multiple access wireless networks," IEEE Journal on Selected Areas on Communications, August 1999, pp. 1353–1368

Patents

A.S. Krishnakumar, J.L. Sobrinho, "Priority access for real-time traffic in contention based networks", U.S. Patent nº 5982779, filed on Sept. 1997, issued on Nov. 1999.

Miscellaneous

This research line and the Integrated Communications and Multimedia Research Line were the local organisers for the COST 257 Mid-Term Seminar, held in January of 1999 in Vilamoura, Portugal

João Luís Sobrinho was member of the organising committee of CONFTELE'99

8.1.8 Integrated Communications and Multimedia Research Line

Human Resources

Collaborators

Carlos Alberto de Carvalho Belo	Ph. D.	Associate Professor, IST
António Carlos Matias Almeida	M. Sc.	Assistant, IST

Other Collaborators

Daniel Zaragoza	Ph. D. Student	Assistant, EST
Kindoki Kimanima	M. Sc. Student	Grant, (Bartolomeu Dias)
Sérgio Filipe Alves	M. Sc. Student	Assistant, ISCTE
António Ramos	M. Sc. Student	IST
Ricardo Rodrigues	B. Sc. Student	Grant, (ENN project)
João Neves	B. Sc. Student	Grant, (ENN project)
João Silva	B. Sc. Student	Grant, (ENN project)

Projects

TELEMATICS, HC1014 - ENN - European Neurological Network

This project involves neurological laboratories spread over Europe from Finland to Portugal. Within the project this group dealt with the communications infrastructure. A network based on ISDN has been built and tested. In particular, inverse multiplexing techniques were used to support applications with bandwidth requirements above the 64kbps. Also, firewall mechanisms have been implemented to guarantee security in the communications among Health Care Centres. To reduce the need for long distance calls a proxy/cache server was implemented to provide for data in local environments. During 1999 the system has been used in a regular basis between Health Care Centres and a specialised neurological laboratory. The project ended in December 1999.

COST 257 “Impact of New Services on the Architecture and Performance of Broadband Networks”

The project centers on traffic modeling and performance evaluation in communication networks. This group contributed to the development and test of mechanisms on congestion control in ATM and TCP/IP networks.

COST 264 “Enabling Networked Multimedia Group Communication”.

Participation on the activities of the technical committee for this action. The activities include the definition and structuring of the work to be done in the dissemination of group communication (european-wide), and also research in multicast networking.

Ph. D. Theses

António Carlos Matias Almeida. (supervisor: Carlos A. Carvalho Belo), Instituto Superior Técnico, in preparation (subject: Congestion control in packet-switching networks)

Daniel Zaragoza (supervisor: Carlos A. Carvalho Belo), Instituto Superior Técnico, in preparation (subject: Traffic models in Multimedia Communications)

M. Sc. Theses

Kindoki Kimanima (supervisor: Carlos A. Carvalho Belo), Instituto Superior Técnico, in preparation (subject: Dynamic Multilink Connections for Point-to-Point Communications)

Sérgio Filipe Alves (supervisor: Carlos A. Carvalho Belo), Instituto Superior Técnico, in preparation (subject: Multicast Communications)

António Ramos (supervisor: Carlos A. Carvalho Belo), Instituto Superior Técnico, in preparation (subject: Local Area Multimedia Networks)

Publications

Papers in Conference Proceedings

António C. M. Almeida and Carlos Belo, “Congestion Control: Evaluation of Binary Schemes”, in Proc. of CONFTELE’99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

António C. M. Almeida and Carlos Belo, “Explicit congestion control based on 1-bit encoded channels”, MC Meeting COST 257, Varsaw, May 1999. (Extended version)

António C. M. Almeida e Carlos Belo, “On resource allocation using 1-bit encoded channels”, 7th IFIP Workshop on Performance Modelling and Evaluation of ATM Networks (IFIP ATM’99), June 1999, Antwerp, Belgium.

Yuhua Luo, Ricardo Galli, António C. M. Almeida, Miguel Dias, “A Prototype System for Cooperative Architecture Design”, IEEE International Conference on Information Visualisation (IV’99), London, July 1999

António C. M. Almeida and Carlos Belo, “Explicit Rate Congestion Control with Binary Notifications”, 10th IEEE Workshop on Local and Metropolitan Area Networks (LANMAN’99), Sydney, Australia, November 21-24, 1999.

António C. M. Almeida and Carlos Belo, “Explicit congestion control based on 1-bit encoded channels”, 11th IASTED International Conference on Parallel and Distributed Computing and Systems (PDCS’99), Cambridge, MA, USA, November 3-6, 1999.

Deliverables

ENN Deliverable D5.2, "Report on the Implemented Network", A. Almeida, C. Belo, 1999.

Miscellaneous

Carlos A. C. Belo, reviewer for CONFTELE'99.

Carlos A. C. Belo, reviewer and member of the Program Committee of ICEIS'99 – First International Conference on Enterprise Information Systems held in Setúbal, Portugal, March 1999.

This research line and the Networks Research Line were the local organisers for the COST 257 Mid-Term Seminar, held in January of 1999 in Vilamoura, Portugal

8.1.9 Technology and Materials Research Line

Human Resources

Collaborators

L. Alcácer	Ph.D.	Full Professor, IST
R. T. Henriques	Ph.D.	Associate Professor IST
J. M. F. Morgado	Ph.D.	Assistant Professor IST

Other Collaborators

Nunzio Barbagallo	Ph.D. Student	Grant, UNIV. BOLOGNA
A. C. Ribeiro	Ph.D. Student	Grant, PRAXIS XXI
Ana Charas	Ph.D. Student	Grant, PRAXIS XXI

Projects

PRAXIS/3/3.1/MMA/1792/95— POLYMER LED ACTIVE MATRIX

Polymer LEDs of the ITO/PPV/M (M=Al) type were deposited on glass substrates and their characteristics were measured. An amorphous silicon thin film transistor array was fabricated to be used as the active element of a polymer LED active matrix.

PRAXIS/3/3.1b. SENSION— DEVELOPMENT OF A REFERENCE MICROELECTRODE.

Polymer electrolytes based on polymethylmethacrilate gels with lithium perchlorate were developed for the reference system of pH sensors for medical applications.

PRAXIS/PCEX/C/QUI/82/96, “THIN FILM P-N JUNCTIONS BASED ON ELECTROACTIVE POLYMERS”:

Thin film p-n junctions were prepared from blends of PPV (poly(p-phenylene-vinylene) and poly(ethylene-oxide) doped with lithium salts and their physical characteristics were studied.

PRAXIS XXI — CMOS Multivariable Environmental Monitoring Sensor

The project involves investigation of humidity sensing materials and the design and fabrication of a novel, low-cost, compact, wide-range humidity and temperature sensing device for house, building and industrial climate control.

Contract Ministry of Industry (PEDIP) — ECOCLIMAT

The goal is to develop a capacitive humidity sensor and a temperature sensor together with signal conditioning and interface circuitry to be manufactured by CMOS (Complementary Metal-Oxide-Semiconductor) technology.

PRAXIS XXI nº 2/2.1/QUI/203/94 — CHARGE TRANSFER SOLIDS. FROM TRANSITION METAL DICHALCOGENATES TO SYNTHETIC METALS.

The work done under this project consisted on the detailed study of the electric and magnetic properties of charge transfer complexes containing transition metal bis-dithio(seleno)lenes.

CONTRACT JOE3-CT97-0049(DG12-WSMN) — DEVELOPMENT ON LOW TEMPERATURE FUELL CELL WITH METHANOL AS A FUELL OPTION

Our activities in this project, during 1998 consisted on the synthesis of new polymers for the proton exchange membranes of fuell cell prototypes.

Ph.D. Theses

Antonieta Caneco Ribeiro (supervisor: L. Alcacer); Instituto Superior Tecnico. in preparation ; (subject: Development of Reference Microelectrodes for Microsensors).

Ana Maria Matos Charas (supervisor: L. Alcacer; co-supervisor: J. Morgado); Instituto Superior Tecnico. in preparation; (subject: Synthesis and Characterization of new Soluble Conjugated Polymers for LEDs).

Nunzio Barbagallo (supervisor: L. Alcacer; co-supervisor: J. Morgado); Instituto Superior Tecnico.in preparation; (subject: Polymer LED active matrices)

M. Sc. Theses

Antonieta Caneco Ribeiro (Supervisor: L. Alcacer); Instituto Superior Tecnico, concluded in 1999.(subject: Ionic Conducting Polymers for Microsistems).

Ana Maria Matos Charas (Supervisor: J. Morgado); Instituto Superior Tecnico, concluded in 1999;(subject: Synthesis and Characterization of Soluble Conjugated Polymers for Applications in Electronic Devices).

Publications

Books and Book Chapters

- “Polímeros Condutores” (Conducting Polymers), in portuguese, Jorge Morgado and Luís Alcácer, in “Os Materiais nos Anos 2000”, P. J. Ferreira and M. Amaral Fortes, eds.; IST Press; in press.

Papers in Journals

“Luminescence Properties of Poly(*p*-phenylenevinylene): Role of the Conversion Temperature on the Photoluminescence and Electroluminescence Efficiencies.”, J. Morgado, F. Cacialli, J. Grüner, N. C. Greenham and R. H. Friend, *Journal of Applied Physics* 85, 1784 (1999).

“Ability of Substituted Perylenes to Form Organic Conductors”, L. F. Veiros and J. Morgado, *Mol. Cryst. and Liq. Cryst.* 333, 259 (1999).

“The (DT-TTF)₂M(mnt)₂ Family of Radical Ion Salts: From a Spin Ladder to Delocalised Conduction Electrons that Interact With Localised Magnetic Moments”, E. Ribera, C. Rovira, J. Veciana, J. Tarrés, E. Canadell, R. Rousseau, E. Molins, M.

Mas, J.-P. Schoeffel, J.-P. Pouget, J. Morgado, R. T. Henriques and M. Almeida, *Chemistry - A European Journal*. 5, 2025 (1999).

“Synthesis of Porphyrin-PPV copolymers for Application in LEDs.”, R. Iqbal, G. Yahioğlu, L. R. Milgrom, S. C. Moratti, A. B. Holmes, F. Cacialli, J. Morgado and R. H. Friend, *Journal Materials Science.: Materials in Electronics*, 11, 97 (2000)

”Light-emitting devices based on a novel poly(*p*-phenylene vinylene) derivative with ion-coordinating side groups.”, J. Morgado, R. H. Friend, F. Cacialli, B. S. Chuah, S. C. Moratti and A. B. Holmes, *J. Appl. Phys.* 86, 6392 (1999).

”Electrochemical and electroluminescent properties of random copolymers of fluorine- and alkoxy-substituted poly (*p*-phenylene vinylene)s”, R. Riehn, J. Morgado, R. Iqbal, S. C. Moratti, A. B. Holmes, S. Volta and F. Cacialli, *Macromolecules*, in press.

“The Fuel-Cell Car at Last?”, V. de Zea Bermudez and L. Alcacer, *Ionics* 5 (1999) 122.

“Synthesis and characterization of novel urethane cross-linked ormolytes for solid-state lithium batteries”; V. de Zea Bermudez, L. Alcacer, J.L.Acosta, E. Morales; *Solid State Ionics*, 116, 197-209 (1999).

“Sol-gel Derived urea Cross-linked organically Modified Silicates. 1. room Temperature Mid-Infrared Spectra”, *Chem. Mater.* Vol. 11, nº 3, 569 (1999)

Papers in Conference Proceedings

“Novel Luminescent Polymers”, H. Rost, B. S. Chuah, D.-H. Hwang, S. C. Moratti, A. B. Holmes, J. Wilson, J. Morgado, J. J. M. Halls, J. C. De Mello and R. H. Friend, International Conference on Science and Technology of Synthetic Metals, Montpellier, França, 12-18 Julho 1998, *Synth. Met.* 102 (1999) p937-938.

” Synthesis of Porphyrin-PPV Copolymers for Applications in LEDs”, R. Iqbal, G. Yahioğlu, L. Milgrom, S. C. Moratti, A. B. Holmes, F. Cacialli, J. Morgado and R. H. Friend, International Conference on Science and Technology of Synthetic Metals, Montpellier, França, 12-18 Julho 1998, *Synth. Met.* 102, 1024 (1999).

“The DT-TTF M(mnt)₂ Family of Compounds”, E. Ribera, C. Rovira, J. Veciana, J. Tarrés, E. Cannadell, R. Rousseau, E. Molins, M. Mas, J. P. Schoeffel, J.-P. Pouget, J. Morgado, R. T. Henriques and M. Almeida, International Conference on Science and Technology of Synthetic Metals, Montpellier, França, 12-18 Julho 1998, *Synth. Met.* 102, 1743 (1999).

“Synthesis and Characterisation of Charge Transfer Salts Based on Au(dcdmp)₂ and TTF Type Donors”, D. Belo, J. Morgado, E. B. Lopes, I. C. Santos, S. Rabaça, M. T. Duarte, V. Gama, R. T. Henriques and M. Almeida, International Conference on Science and Technology of Synthetic Metals, Montpellier, França, 12-18 Julho 1998, *Synth. Met.* 102, 1751 (1999).

“ Role of Indium Chloride on the Luminescence Properties of PPV”, J. Morgado, F. Cacialli, D. S. Thomas and R. H. Friend, 2nd International Conference on Electroluminescence of Molecular Materials and Related Phenomena (ICEL2), Sheffield (UK), 13-15 May, 1999, *Synth. Met.* , in press.

“Luminescence Properties of PPV-Based Copolymers with Crown Ether Substituents”; J. Morgado, F. Cacialli, R. Friend, B. S. Chuah, S. C. Moratti and A. B. Holmes, 2nd International Conference on Electroluminescence of Molecular Materials and Related Phenomena (ICEL2), Sheffield (UK), 13-15 May, 1999, *Synth. Met.* , in press.

“Design and Synthesis of Conjugated Materials for Efficient Optoelectronic Devices”, A. B. Holmes, B. S. Chuah, F. Geneste, R. E. Martin, F. Cacialli, R. H. Friend and J. Morgado, SPIE’s 44th Annual Meeting and Exhibition - Conference 3797, Denver, Colorado, USA, 19-21 July, 1999, submitted to SPIE Proceedings, Vol. 3797, paper 3797_05.

”Surface and Bulk Phenomena in Conjugated Polymers Devices”, F. Cacialli, J.S. Kim, T.M. Brown, J. Morgado, M. Granström, R.H. Friend, G. Gigli, R.Cingolani, L. Favaretto, G. Barbarella, R. Daik, W.J. Feast, Electrical and Related Properties of Organic Solids (ERPOS) 8, Polónia, 1999, *Synth. Met.* , in press.

“Photo and Electroluminescence Properties of a Porphyrin-Poly(*p*-phenylene vinylene) Derivative Copolymer”; J. Morgado, R. Iqbal, G. Yahioğlu, L. R. Milgrom, S. C. Moratti, A. B. Holmes, R. H. Friend and F. Cacialli , MRS-Fall Meeting, Boston, USA, November 29-December 3, 1999, *Materials Research Society Symposium Proceedings Series, Vol. 598*, in press.

“Versatile Syntheses of Various Homo- and Copolymers of Poly(1,4-arylene vinylene)s”; R. E. Martin, B. S. Chuah, R. H. Riehn, F. Geneste, F. Cacialli, R. H. Friend, A. B. Holmes, and J. Morgado, MRS-Fall Meeting, Boston, USA, November 29-December 3, 1999, *Materials Research Society Symposium Proceedings Series, Vol. 598*, in press

8.1.10 Instrumentation and Measurement Research Line

Human Resources

Collaborators

Pedro Manuel Brito da Silva Girão	Ph.D.	Associate Professor, IST
António Manuel da Cruz Serra	Ph.D.	Assistant Professor, IST
Helena Santos Geirinhas Ramos	Ph.D.	Assistant Professor, IST
Francisco André Corrêa Alegria	MSc.	Assistant, IST
Maria da Conceição. C. Macedo	MSc.	Assistant, IST
Raul Daniel Carneiro Martins	MSc.	Assistant, IST
Manuel José Fonseca da Silva	Lic.	Assistant, IST

Other Collaborators

José Miguel Costa Dias Pereira	Ph. D.	Professor, IP Setubal
Mouhaydine Tlemçani	Ph. D. Student	Assistant, U. Évora
Paulo Jorge Maia dos Santos	M. Sc. Student	Assistant, U. Algarve
José Fernando Lopes Mariano	M. Sc. Student	Assistant, U. Algarve
Joaquim Rodrigues Caseiro	M. Sc. Student	Grant, IT
Manuel Joaquim de Castro Lopes	Lic.	Grant, IT
Pedro Miguel Pinelo Cruz	Lic. Student	IST, Final Year Project
Daniela M. S. Campos	Lic. Student	IST, Final Year Project
Telmo Edgar da Costa Cabrita	Lic. Student	IST, Final Year Project
Pedro Miguel do Carmo Russo	Lic. Student	IST, Final Year Project
Vitor Hugo Cardoso	Lic. Student	IST, Final Year Project
Nuno Filipe Fontes Morgadinho	Lic. Student	IST, Final Year Project
Pedro Miguel A. Fernandes da Silva	Lic. Student	IST, Final Year Project
Vitor Manuel Pires Brás	Lic. Student	IST, Final Year Project
Felice Macaro	Lic. Student	SOCRATES, U. Sannio

Projects

FCT - PRAXIS XXI - P/EEI/13170/1998, - Analog to Digital Converters Testing
New testing methods for the static and dynamic characterisation of Analog to Digital Converters (ADC) were developed. Time domain (sine-fitting), frequency domain (FFT) and statistical domain (histogram test) were considered. Experimental test beds for ADC testing were designed and fabricated.

The usage of dithering in time interleaved ADC systems in order to increase the resolution with minimal loss of input signal bandwidth was investigated. Simulation tools and prototypes were developed in order to compare theoretical and experimental results for interleaved ADC systems.

FCT - PRAXIS XXI - 2/2.1/TIT/1591/95 – SCCEO: Simulation and Characterisation of Electronic and Optoelectronic Devices

The nature of the bit pathologies in a ADC converter and its influence in the INL vector were studied. Expressions were derived that not only quantify the true individual bit binary weights deviations but also their induced modulation. An

automated procedure, based in the recognition of bit-pathologic patterns, for the reading of these coefficients was implemented and both simulated and experimental results were obtained.

EUPAS - “EUropean Project for ADC-based devices Standardization”

During 1999, the work was focused in the improvement of the European rules concerning the test methods for analog-to-digital converters and sample-and-hold circuits, with emphasis on their dynamic behaviour. The effect of EMI in ADC testing was studied.

“Calibration and Test” - Contract with the Lab. of Metrology CET-TELECOM Lisboa.

Automatic HF calibration systems based on PC and calibrators were implemented.

Ph. D. Theses

José Miguel Costa Dias Pereira (supervisors: Pedro M.B. S. Girão and António M. C. Serra), Instituto Superior Técnico, concluded in 1999 (subject: New techniques for performance improvement in digitising systems).

Manuel José Freire Fonseca da Silva (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: Impedance measurement system based in self-adjusted bridges).

Francisco André Corrêa Alegria (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: High resolution measurements in non-stationary or very noisy signals).

Mouhaydine Tlemçani (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: Simulation characterisation and error correction in Analog to Digital Converters).

Maria da Conceição Falcão Líbano Monteiro Costa Macedo (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: Comparison of existing ADC standards and development of new testing techniques).

Raul Daniel Lavado Carneiro Martins (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: Dynamic characterisation of ADCs by using gaussian noise as the stimulus signal).

M. Sc. Theses

Maria da Conceição Falcão Líbano Monteiro Costa Macedo (supervisor: António M. C. Serra), Instituto Superior Técnico, concluded in 1999 (subject: Real time transcription of sung melodies).

Raul Daniel Lavado Carneiro Martins (supervisor: António M. C. Serra), Instituto Superior Técnico, concluded in 1999 (subject: Dynamic characterisation methods of Analog to Digital Converters).

Paulo Jorge Maia dos Santos (supervisor: Pedro M.S. Girão), Instituto Superior Técnico, in preparation (subject: Monitorisation of water quality: measuring transducers, data acquisition and telemetry).

José Fernando Morais Lopes Mariano (supervisor: Helena M. G. Ramos), Instituto Superior Técnico, in preparation (subject: Modelling of analog to digital converters).

Joaquim Rodrigues Caseiro (supervisor: António M. C. Serra), Instituto Superior Técnico, in preparation (subject: Calibration of HF measuring instruments).

Publications

Books and Book Chapters

P. M. Silva Girão, A. Cruz Serra and H. Geirinhas Ramos, "Electric Distortion Measurement", in "Wiley Encyclopedia of Electrical and Electronics Engineering", Vol. 6, pp. 286-293, John Wiley and Sons, Inc. Nova York, USA, 1999.

P. M. Silva Girão, A. Cruz Serra and H. Geirinhas Ramos, "Volt-Ampere meters", in "Wiley Encyclopedia of Electrical and Electronics Engineering", Vol. 6, pp. 286-293, John Wiley and Sons, Inc. Nova York, USA, 1999.

Papers in Journals

R. Martins, A. Cruz Serra, "Automated ADC characterization using the histogram test stimulated by Gaussian noise", IEEE Transaction on Instrumentation and Measurement, vol. 48, n. 2, pp. 471-474, Abril, 1999.

F. Alegria, A. Cruz Serra, " Automatic Calibration of Analog and Digital Measuring Instruments Using Computer Vision ", accepted for publication in IEEE Transactions on Instrumentation and Measurement, February, 2000.

A. Cruz Serra, "New measurement methods in ADC characterisation standards", accepted for publication in Journal of Computer Standards & Interfaces, Elsevier Science B. V., 1999.

R. Martins, A. Cruz Serra, " ADC characterization by using the histogram test stimulated by Gaussian noise, Theory and experimental results ", accepted for publication in Measurements, Elsevier Science B. V., 1999.

F. Alegria, A. Cruz Serra, " Computer vision applied to the automatic calibration of measuring instruments", accepted for publication in Measurement, Elsevier Science B. V., 1999.

R. Martins, A. Cruz Serra, " ADC interbit modulation: description, detection and quantification ", accepted for publication in Journal of Computer Standards & Interfaces, 1999.

Papers in Conference Proceedings

O. A. Postolache, J. M. Dias Pereira, P. Silva Girão, M. Cretu, "Application of RBF Neural Network in ADC Resolution Enhancement", Proceedings of IMEKO XV World Congress, Volume IV TC-4, pp. 89-92, Osaka, Japan, June 1999.

O. Postolache, P. Silva Girão, J. M. Dias Pereira, "ADC Resolution Enhancement Based on RBF Neural Network", Proceedings of the 4th International Workshop on ADC Modelling and Testing (IWADC'99), vol. 1, pp. 232-235, Bordeaux, France, September 1999.

R. Martins, A. Cruz Serra, "ADC characterization by using the histogram test stimulated by Gaussian noise, Theory and experimental results", 4th International Workshop on ADC modelling and testing, pp.201-206, Bordeaux, France, September 1999.

A. Cruz Serra, "Uncertainties in the estimation of the code transition levels in the static test of ADCs", 4th International Workshop on ADC modelling and testing, pp.221-226, Bordeaux, France, September 1999.

J. Dias Pereira, A. Cruz Serra, P. Girão, "Dithering in interleaved ADC systems", XV IMEKO World Congress Proceedings, Vol. IV, pp. 81-84, Osaka, Japan, June 1999.

J. Dias Pereira, A. Cruz Serra, P. Girão, "Dithered ADC systems in the presence of hysteresis errors", IEEE Instrumentation and Measurement Technology Conference, IMTC/99 Proceedings, vol. 3, pp. 1648-1652, Venice, Italy, May 1999.

O. Postolache, P. Girão, Helena Ramos, M. Cretu, C. Fosalau, "Sistem Multifibra Optica Bidirectionala cu Aplicatii in Masurarea Deplasarilor". 2nd International Conference of Electromechanical Systems (SIELMEL), Chisinau, Moldavia. October, 1999

O. Postolache, P. Girão, Helena Ramos, M. Cretu, C. Fosalau, "O Aplicatie a Microcontrolerului PIC12C509 in Masurarea Deplasarilor". 2nd International Conference of Electromechanical Systems (SIELMEL), Chisinau, Moldavia. October, 1999.

Paulo Maia Santos and Pedro Silva Girão, "Telemetry Using Cellular Mobile Communications", Buletinul Institutului Politehnic din Iasi, Tomul XLV (IL) Fasc. 5A, pp. 285-290, Iasi, Romania, November 1999.

O. Postolache, Helena Ramos, P. Silva Girão, M. Cretu, "The Multisensor ANN Fusion Method for Accurate Displacement Measurement", Buletinul Institutului Politehnic din Iasi, Tomul XLV (IL) Fasc. 5A, pp. 363-369, Iasi, Romania, November 1999.

Helena Ramos, O. Postolache, J. M. Dias Pereira, P. Silva Girão, "A LVDT-Based Vibration Meter", Buletinul Institutului Politehnic din Iasi, Tomul XLV (IL) Fasc. 5A, pp. 370-376, Iasi, Romania, November 1999.

J. Dias Pereira, A. Cruz Serra, P. Girão, "Dithering in A/D converters: a compromise between resolution and bandwidth", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 85-89, April, 1999.

R. Martins, A. Cruz Serra, "Dynamic characterisation of analog to digital converters", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 90-94, April, 1999.

C. Monteiro, A. Cruz Serra, "Real time transcription of sung melodies", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 670-674, April, 1999.

M. F. Silva, A. Cruz Serra, "Automatic capacitance measurement system", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 481-484, April, 1999.

Miscellaneous

Prof. Pedro M. B. Silva Girão and Prof. António M. Cruz Serra were reviewers for IEEE Transactions on Instrumentation and Measurement .

Prof. Pedro M. B. Silva Girão and Prof. António M. Cruz Serra were reviewers for the new "IEEE 1241 – Standard for terminology and test methods for analog-to-digital converters".

Prof. António M. Cruz Serra is member of the editorial board of the International Journal of Computer Standards & Interfaces, Elsevier Science B. V..

Prof. António M. Cruz Serra is member and Scientific Secretary of the Technical Committee on Measurement of Electrical Quantities (TC-4) of the Instrumentation and Measurement Confederation (IMEKO).

Prof. Pedro M. B. Silva Girão is member of the Scientific Committee of "Caderno do CEFAT" from the Faculty of Engineering of Oporto University.

Prof. Pedro M. B. Silva Girão is Consultant and Auditor of the Portuguese Institute for Quality (IPQ).

Prof. António M. Cruz Serra was reviewer and member of the Technical Program Committee of the IEEE Instrumentation and Measurement Technology Conference (IMTC 99) held in Venice, Italy, May 1999.

Prof. António M. Cruz Serra was reviewer and Secretary of the International Program Committee of the 4th Workshop on ADC Modeling and Testing", held in Bordeaux, France, September 1999. He was also chairman of the technical session F2 "ADC Testing II".

Prof. António M. Cruz Serra was member of the Organising Committee of the 2nd Conference on Telecommunications, held in Sesimbra, Portugal, April 1999. He was also co-chairman of the technical session TM3 "Instrumentation and Electronics for Telecommunications".

Prof. António M. Cruz Serra is referee and member of Technical Program Committee of the 5th Workshop on ADC modeling and testing to be held in Vienna, Austria, September, 2000.

Prof. António M. Cruz Serra is the person in charge of the collaboration within the European Programme SOCRATES Programme: Higher Education (ERASMUS) between the DEEC, Instituto Superior Técnico and the Dip. dell'Informazione ed Ingegneria Elettrica, University of Salerno, Italy and the Dip. di Ingegneria dell'Informazione ed Ingegneria Elettrica, University of Sanio-Benevento, Italy.

Prof. H. Geirinhas Ramos is the person in charge of the collaboration within the European Programme SOCRATES Programme: Higher Education (ERASMUS) between the DEEC, Instituto Superior Técnico and the Dep. of Electrical Engineering of the University of Iasi, Romania.

During 1999 plug&play boards for personal computers were designed and fabricated. IST Lic. Students developed these within the Final Year Project. The boards are used to implement automatic measurement systems. Six students had a PRODEP grant (work done by A. Cruz Serra and R. Martins).

A measurement and control system for the protection of a cable TV optical ring network was developed. This work was done in collaboration with the Optical Communications Research Line of the Instituto de Telecomunicações (work done by A. Cruz Serra and P. Cruz).

Modelling and testing of interleaved ADCs systems was performed. The use of dither techniques to linearise ADCs transfer functions was studied (work done by J. M. Costa Pereira, P. M. Silva Girão and A. Cruz Serra).

The development of an impedance measurement system based on self-adjusted measurement bridges continued. Sine fitting algorithms to increase the accuracy of the system were developed. (work done by A. Cruz Serra and M. F. Silva).

8.2 Coimbra Site

8.2.1 Signal and Image Processing Research Line

Human Resources

Collaborators

Luis Vieira de Sá	Ph. D.	Associate Professor, FCTUC
Vitor Mendes Silva	Ph. D.	Assistant Professor, FCTUC
Fernando Perdigão	Ph. D.	Assistant Professor, FCTUC
Eduardo Sá Marta	M.Sc.	Assistant, FCTUC
Luís Alberto Cruz	M. Sc.	Assistant, FCTUC
Paulo Monteiro	M. Sc.	Assistant, FCTUC
Emanuel Martins	M. Sc.	Assistant, FCTUC

Other Collaborators

Sérgio Maciel de Faria	Ph. D.	Coordinator Professor, IPL
Pedro Amado Assunção	Ph. D.	Coordinator Professor, IPL
João Carlos Silvestre	M. Sc.	Assistant, ISEC
Fernando Lopes	M. Sc.	Assistant, ISEC
Nuno Rodrigues	Lic.	Assistant, IPL
Carlos Manuel Ribeiro	Lic.	Assistant, IPL
Mário Gonçalo Silveirinha	Lic.	Assistant, FCTUC
Carla Lopes	M. Sc. Student	Assistant, IPL
Artur Gaspar	Lic. Student	FCTUC, Final year project
Elisabete Cordeiro	Lic. Student	FCTUC, Final year project
João Duque	Lic. Student	FCTUC, Final year project
Jorge Rato	Lic. Student	FCTUC, Final year project
Pedro Santos	Lic. Student	FCTUC, Final year project
Nuno Sucena	Lic. Student	FCTUC, Final year project
José Veríssimo	Lic. Student	FCTUC, Final year project
Raquel Marques	Lic. Student	FCTUC, Final year project
Paulo Pereira	Lic. Student	FCTUC, Final year project
Gonçalo Pereira	Lic. Student	FCTUC, Final year project
Mário Baptista	Lic. Student	FCTUC, Final year project
Rui Francisco	Lic. Student	FCTUC, Final year project
Pedro Antunes	Lic. Student	FCTUC, Final year project
Marco Gomes	Lic. Student	FCTUC, Final year project
João Filipe	Lic. Student	FCTUC, IT grant

Projects

FCT - PRAXIS XXI - P/EEI/10140/1998 – VISEF – Video Coding and Transmission in Wireless Networks

This project started in September 1999 in partnership with IT Aveiro Pole. The main objective of this project is to study and to develop video coding algorithms and

transmission techniques which allow high performance video services and applications over future mobile networks based on CDMA systems.

COST249 – “Continuous Speech Recognition over the Telephone Line”

The Signal and Image Research Line of IT-Coimbra has participated in the fifth year of this COST 249 action together with 21 other research labs from Universities and Telecommunications Operators.

FCT - PRAXIS XII – REC - Speech Recognition Applied to Telecommunications

During the year of 1999 the work of the Signal and Image Processing Research Line in this project has concentrated in the main two topics: Robust Speech Recognition and Speaker Independent Phoneme Recognition. In the first topic a noise suppression technique was investigated and integrated in a previously developed auditory model. A digit recognizer based on syllables and derived triphones was built. Also a recognizer for command words was trained with the TIMIT speech database.

In the area of speaker independent phoneme recognition the task of stop-consonant discrimination was further investigated in order to obtain native-language independence. The ISOLET speech database was used in this task.

Five final year students was involved in this project.

FCT - CAPES “Video Coding and Processing Based on the Analysis of Image Contents”

This project started in 1998 and involves the cooperation of IT and the Federal University of Rio de Janeiro (FURJ). 5 researchers of IT and FURJ partipated in the project.

Ph. D. Theses

Emanuel Gustavo Bebiano Castro Martins (supervisor: Sérgio Manuel Maciel de Faria and Vitor Manuel Mendes da Silva), University of Coimbra, in preparation (subject: visual quality enhancement of video transmission over wireless channels)

Eduardo Sá Marta (supervisor: Luís Vieira de Sá), University of Coimbra, in preparation (subject: Speaker independent phoneme transmission)

João Carlos Silvestre (supervisor: Luís Vieira de Sá), University of Coimbra, in preparation, (subject: Processing of finite size signals in multiresolution analysis)

Paulo Paiva Monteiro (supervisor: Luís Vieira de Sá and Joaquim Júdice), University of Coimbra, in preparation, (subject: IIR digital filter design and signal modelling)

M. Sc. Theses

Nuno Rodrigues Morais Rodrigues (supervisor: Sérgio Manuel Maciel de Faria and Vitor Manuel Mendes da Silva), University of Coimbra, in preparation (subject: Low bit rate video coding using geometric transforms)

Carlos Miguel Ribeiro (supervisor: Sérgio Manuel Maciel de Faria and Pedro António Amado de Assunção), University of Coimbra, in preparation (subject: Flexible administration of multimedia services over networks with ADSL access)

Carla Alexandra Calado Lopes (supervisor: Fernando S. Perdigão), University of Coimbra, in preparation (subject: Noise Suppression for Speech Recognition)

Publications

Papers in Journals

Vitor Silva and Luís de Sá, "General method for perfect reconstruction subband processing of finite length signals using linear extensions", IEEE Transactions on Signal Processing, vol. 47, n.º. 9, pp. 2572-2575, September 1999.

M. Ghanbari and P. Assunção, "Transmission of pre-encoded MPEG video over ATM Networks and VoD Applications", Scientia Iranica - International Journal of Science & Technology, Vol. 6, No 1, Winter 1999.

Papers in Conference Proceedings

Nuno Rodrigues, Vitor Silva and Sérgio Faria, "General geometric transform for video compression", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 708-711, April, 1999.

Mário Silveirinha, José Simões, Manuel Veríssimo, Emanuel Martins and Luís de Sá, "PCI Bus Interface Card for Communication at 2Mbps", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Fernando Perdigão and Luís de Sá, "A Noise Suppression Technique using an Auditory Model", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Pedro Assunção, "QoS Filters for Flexible Digital TV Services", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Eduardo Marta and Luis Sá, "Auditory features for human communication of stop consonants under full-band and low-pass conditions", in Proc. 6th European Conference on Speech Communication and Technology (EuroSpeech '99), Vol.4, pp.1691-1694, Budapest, Hungary, September 5-9, 1999.

Mário Silveirinha, José Simões, Manuel Veríssimo, Emanuel Martins and Luís Sá, "Sistema de comunicação de dados a 2Mbit/s através da rede ISDN", XVII Simpósio Brasileiro de Telecomunicações, paper n.º 84, Vitória, Espírito Santo, Brasil, 7-10, September 1999.

Eduardo Marta and Luis Sá, "Auditory Features Underlying Cross-Language Human Capabilities in Stop Consonant Discrimination", in Proc. ESCA-NATO Workshop

"Multi-lingual Interoperability in Speech Technology", pp.45-50, Leusden, The Netherlands, 13-14, September 1999.

Nuno Rodrigues, Vitor Silva and Sérgio Faria, "Low bit rate video coding with geometric transformation", IASTED conference on Signal and Image Processing (SIP'99), pp. 251-255, October 1999.

Miscellaneous

Luís de Sá

Member of the Executive Board of Instituto de Telecomunicações.

Reviewer for Eurasip Conference, ECMCS'99 "DSP for Multimedia Communications and Services", Poland, 1999.

Reviewer for CONFETELE'99 – held in Sesimbra, Portugal, Abril 1999.

Vitor Silva

Reviewer for IEEE Transactions on Circuits and Systems for Video Technology and IEEE Transactions on Signal Processing.

Reviewer for EUSIPCO 2000 – European Signal Processing Conference, Tampere, Finland, September 2000.

Pedro Assunção

Reviewer for IEEE Transactions on Multimedia and IEEE Transactions on Circuits and Systems for Video Technology.

Fernando S. Perdigão

Reviewer for CONFETELE'99 – II Conference on Telecommunications held in Sesimbra, Portugal, Abril 1999.

Reviewer for PROPOR IV, IV Encontro para o Processamento Computacional da Língua Portuguesa Escrita e Falada, Évora, 20-21 Évora, Portugal, September 1999.

8.2.2 Optical Communications Research Line

Human Resources

Collaborators

Henrique J. A. da Silva	Ph. D.	Associate Professor, FCTUC
Álvaro M. F. de Carvalho	Lic.	Assistant, FCTUC

Other Collaborators

Mário M. Freire	M. Sc.	Assistant, UBI
Paulo M. Mendes	M. Sc.	Assistant, U. Minho
João G. P. T. dos Reis	M. Sc.	Engineer, ONI
Mário M. C. A. dos Reis	Lic.	Engineer, CENEL
Luís M. M. Mendes	Lic.	Assistant, IPL
Telmo R. C. Fernandes	Lic.	Assistant, IPL
Gabriel F. Guerra	Lic. Student	FCTUC, Final Year Project
Mónica C. Figueiredo	Lic. Student	FCTUC, Final Year Project
Raquel M. Carreira	Lic. Student	FCTUC, Final Year Project
Romero F. Silva	Lic. Student	FCTUC, Final Year Project
Vítor M. Martins	Lic. Student	FCTUC, Final Year Project

Projects

FCT - PRAXIS XXI – 3/3.1/TIT/35/94 – ITCOM – Integration of Technologies for Mobile Communications

2 GHz optical transmitter and optical tuned receiver for the link between the central node and the base station of the ITCOM demonstrator.

INA-net

Design of a WAN for "Instituto Nacional de Administração" (INA).

Ph. D. Theses

Mário M. Freire (supervisor: Henrique J. A. da Silva), Universidade da Beira Interior, in preparation (subject: Non Linear Applications of Semiconductor Optical Amplifiers in Multichannel Optical Communication Systems)

M. Sc. Theses

Paulo M. Mendes (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, concluded in 1999 (subject: Performance Assessment of Optical Networks with CDMA)

João G. P. T. dos Reis (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, concluded in 1999 (subject: Analysis and Simulation of Passive Photonic Devices)

Álvaro M. F. de Carvalho (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Soliton Transmission in Strongly Perturbed Systems)

Luís M. M. Mendes (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Transmission Interfaces for Optical Communication Systems with SCM)

Telmo R. C. C. Fernandes (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Dynamic Channel Assignment in Cellular Mobile Communication Systems)

Mário M. C. A. dos Reis (supervisor: Henrique J. A. da Silva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Measurement Techniques for Characterization of Semiconductor Lasers)

Publications

Papers in Journals

Mário M. Freire and Henrique J. A. da Silva, "Estimation of Multiple-Quantum Well Laser Parameters for Simulation of Dispersion Supported Transmission Systems at 20 Gbit", IEE Proceedings - Optoelectronics, Vol. 146, No. 2, pp. 93-98, April 1999.

Mário M. Freire e Henrique J. A. da Silva, "Avaliação do Desempenho de Bloqueio em Redes WDM com Anel Unidireccional ou Bidireccional", Anais da Engenharia e Tecnologia Electrotécnica, Ordem dos Engenheiros, Ano IV, No. 7.

Papers in Conference Proceedings

Mário M. Freire, Álvaro M. F. de Carvalho, and Henrique J. A. da Silva, "Assessment of Blocking Performance in Wavelength Division Multiplexed Ring Networks with Bidirectional Links", Proceedings of the 3rd Working Conference on Optical Network Design and Modeling (ONDM'99), Paris, France, February 8-9, 1999, pp. 41-50.

Mário M. Freire and Henrique J. A. da Silva, "Assessment of Blocking Performance in WDM Networks with Wavelength Interchange", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 617-621, April, 1999.

Mário M. Freire and Henrique J. A. da Silva, "Assessment of Blocking Performance in Bidirectional WDM Ring Networks with Node-to-Node and Full-Mesh Connectivity", Networks and Optical Communications 1999 (NOC'99), Vol. II, D. W. Faulkner and A. L. Harmer (Eds.), IOS Press, Amsterdam, 1999, pp. 82-89.

Mário M. Freire and Henrique J. A. da Silva, "Performance Assessment of 40-Gbit/s Optical Transmission Systems at 1310 nm Using Semiconductor Optical Amplifiers", Networks and Optical Communications 1999 (NOC'99), Vol. II, D. W. Faulkner and A. L. Harmer (Eds.), IOS Press, Amsterdam, 1999, pp. 147-152.

Paulo M. Mendes and Henrique J. A. da Silva, "Influence of Fibre Dispersion on the Performance of Optical Fibre Code Division Multiple Access Systems", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

João G. P. T. dos Reis and Henrique J. A. da Silva, "Modeling and Simulation of Passive Optical Devices", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Álvaro M.F. de Carvalho and Henrique J. A. da Silva, "Design and Optimization of Strongly Perturbed Soliton Communication Systems", Annual Meeting of the Optical Society of America, Santa Clara, CA, USA, September 26-30, 1999, pp. 121, paper WLL75.

Mário M. Freire and Henrique J. A. da Silva, "Estratégias para Resolução da Contenção em Comutadores Ópticos de Pacotes", Proceedings (CD-ROM) of the 2nd. Conference on Computer Networks (CRC'99), FCCN / Universidade de Évora, October 18-19, 1999.

Deliverables

Luís M. M. Mendes and Henrique J. A. da Silva, "2GHz SCM Optical Transmitter and Optical Tuned Receiver", deliverable related to WP5100, project ITCOM (PRAXIS XXI – 3/3.1/TIT/35/94), June 1999.

Miscellaneous

Henrique J. A. da Silva, reviewer for CONFTELE'99 – held in Sesimbra, Portugal, Abril 15-16, 1999.

Henrique J. A. da Silva, Member of Programme Committee for CRC'99 – II Conference on Computer Networks, held in Évora, Portugal, October 18-19, 1999.

8.2.3 Applied Mathematics Research Line

Human Resources

Collaborators

Joaquim João Júdice	PhD	Full Professor, FCTUC
Madalena Gomes Martins	PhD	Associate Professor, FCTUC
Maria Celeste Gouveia	PhD	Associate Professor, FCTUC
Cristina Requejo Agra	MSc	Assistant, FCTUC

Other collaborators

Maria Leonor Alves	MSc	Assistant Professor, ISEC
Luis Merca Fernandes	MSc	Assistant Professor, IPT
João Manuel Patrício	MSc	Assistant Professor, IPT

Projects

FCT – PRAXIS XXI - 2/2.1/MAT/346/94 - Solution of Numerical Linear Algebra and Optimization Problems and Applications to Structural Engineering, Genetics and (Joaquim João Júdice, M. M. Martins, M. C. Gouveia, J. M. Patrício, L. M. Fernandes, M. L. Alves, C. Requejo Agra)

FCT – PRAXIS XXI - PCEX/MAT/38/96 Variational Models and Optimization (I. Figueiredo, J. J. Júdice, L. M. Fernandes, J. M. Patrício)

Optimization in Physics
(Orlando Oliveira, J. J. Júdice)

PhD Theses

Cristina Requejo Agra (supervisor: Luís Gouveia) Universidade de Coimbra, in preparation, (subject: Combinatorial Optimization algorithms with application to topological network design)

Luís Merca Fernandes (supervisor: Joaquim João Júdice), Universidade de Coimbra, in preparation (subject: Complementarity Problems and Applications)

Pedro Tavares (supervisor: Joaquim João Júdice), Universidade de Coimbra, in preparation, (subject: Optimization Models for Mud Management)

Isabel Ribeiro (supervisor: Joaquim João Júdice), Universidade de Coimbra, in preparation, (subject: Optimization Models in Structural Engineering)

Paulo Monteiro (supervisor: Luis Sá, co-supervisor: Joaquim João Júdice), Universidade de Coimbra, in preparation, (subject: Optimization Models for Filtering in Telecommunications)

Publications

Books and Book Chapters

M. C. Gouveia, J. J. Júdice, eds., *Matemática em Telecomunicações: Que Problemas?*, Instituto de Telecomunicações, 1999.

Papers in Journals

M. M. Martins, W. Xinmin, Further results on regular splittings and their applications to some iterative methods, *Int. Jour. Comp. Math.* 72(1999)167-180.

Deliverables

J. Júdice, Algorithms for Nonlinear Programming Problems with Complementarity Constraints, “2nd Conference on Operations and Quantitative Management”, Ahmedabad, India, January 1999.

A. Costa, I. Figueiredo, J. Júdice, J. Martins, A Complementarity Eigenproblem in the Stability Analysis of Finite Dimensional Elastic Systems with Frictional Contact, “International Conference on Complementarity Problems”, Madison, USA, June 1999.

J. Júdice, Path-Following Algorithms for Complementarity Problems: Convergence Analysis and Solution of some Structured Models, “Workshop on Nonlinear Programming”, Rio de Janeiro, Brazil, July 1999.

C. Gouveia, Von Neuman Regularity of Bezoutians and Resultants over Rings, “8th Conference of the International Linear Algebra Society”, Barcelona, Spain, July 1999.

L. Gouveia, C. Requejo Agra, A New Lagrangian Relaxation Approach for the Hop-Constrained Minimum Spanning Tree Problem, “INFORMS”, Philadelphia, USA; November 1999

8.2.4 Power Systems Research Line

8.2.4.1 Electrical Machines and Power Electronics Research Group

Human Resources

Collaborators

Eduardo de Sousa Saraiva	Ph. D.	Full Professor, FCTUC
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Other Collaborators

Maria Teresa Barroca Delgado	Lic.	Assistant, IPViseu
António Lopes de Campos	M. Sc.	Assistant, IPCoimbra

Ph. D. Theses

António Lopes de Campos (supervisor: Eduardo de Sousa Saraiva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Resonant Converters)

M. Sc. Theses

Maria Teresa Barroca Delgado (supervisor: Eduardo de Sousa Saraiva), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Cascata hipo-síncrona não convencional)

Miscellaneous

Eduardo de Sousa Saraiva: Organizing Committee and reviewer for ELECTRIMACS'99 – 6th International Conference on Modelling and Simulation of Electrical Machines, Converters and Systems Lisbon, Portugal, September 1999.

Eduardo de Sousa Saraiva: participation in European Conference on Power Electronics and Applications, Lausanne, Switzerland 1999.

8.2.4.2 Electromechatronics Research Group

Human Resources

Collaborators

António João Marques Cardoso	Ph.D.	Assistant Professor, FCTUC
André Manuel dos Santos Mendes	M.Sc.	Assistant, FCTUC
Sérgio Manuel Ângelo da Cruz	M.Sc.	Assistant, FCTUC

Other Collaborators

Luís Manuel Ramos de Oliveira	M.Sc. Student	Assistant, U. Algarve
Manuel António Marques Esteves	M.Sc. Student	Assistant, IPL
Natália dos Santos Gameiro	M.Sc. Student	Assistant, IPL
Nuno de Abreu e Sousa Cabete Gil	M.Sc. Student	Assistant, IPL
Ana Carla Vicente Vieira	M.Sc. Student	Assistant, IPT
Acácio Manuel Raposo Amaral	M.Sc. Student	Assistant, ISEC
João Pedro Fernandes Trovão	Lic.	Grant, PRODEP

Projects

FCT – PRAXIS XXI - P/EEI/14151/1998 - DSP-Based Winding Fault Diagnosis in Operating Three-Phase Power Transformers

The major aim of this project basically comprises the development of a prototype, able to provide a complete and reliable diagnosis of the operating condition of three-phase power transformers, particularly regarding the occurrence of winding faults.

For that purpose, a modelling and simulation study has been conducted, concerning either the normal operating or the failure mode behaviour of three-phase power transformers. Based on the number of signals to be analysed, as well as on the predictable complexity of the diagnostics algorithms to be implemented, Digital Signal Processors are required for the prototype development. Therefore, the tasks related to the DSP technology acquaintance and the data acquisition and processing system design were already performed.

TELEMAINTENANCE

Funded by PEGOP Energia Eléctrica S.A., this project is related to the development and implementation of a remote maintenance system of electromechatronics equipment.

Started in the last quarter of 1999, the tasks already undertaken are related to the system basic-specifications definition, choice of protocol communications, data format to be utilized, user interface, and also the implementation of some separate modules of the global system.

PEGO

Funded by PEGOP Energia Eléctrica S. A., this project is related to the condition monitoring and diagnostics of electromechatronics equipment at Pego Power Plant. Several tests were conducted on-site and the corresponding Technical Reports were prepared.

CIMPOR

Funded by CIMPOR - Indústria de Cimentos S. A. (Centro de Produção de Souselas), this project is related to the condition monitoring and diagnostics of electromechatronics equipment at Souselas Cement Mill. Several tests were conducted on-site and the corresponding Technical Reports were prepared.

INAPA

Funded by Papéis INAPA S. A., this project is related to the on-condition maintenance of AC machines at Setúbal Paper Mill. Several tests were conducted on-site, during a one-day visit, and the corresponding Technical Report was prepared.

TELECOMMAINTENANCE

This is an internal project which is intended to explore adequate strategies for diagnosing the occurrence of faults in telecommunications power supply systems. The ultimate purpose is to include the diagnostic routines into the control module, therefore allowing for the introduction of remedial control strategies soon after failure occurrence and thereby improving reliability and maintainability. In other words, it is envisaged the development of fault tolerant telecommunications energy systems.

Following the previous successful work conducted on three-phase thyristor-controlled rectifiers, traditionally used in central power supplies, the research programme is now focused on the switch-mode power supplies.

WIND

This is another internal project, recently started, devoted to the fault analysis and diagnostics of wind power generators (aerogenerators), which are ideally suited for low power requirements at remote locations. In almost all of these types of systems the location is unmaned; so reliability, fault tolerance, repairability and monitoring are very important issues.

The work developed so far basically comprises a state-of-the-art report and some preliminary simulation studies.

Ph.D. Theses

Adérito Neto Alcaso (supervisor: António João Marques Cardoso), Univesidade de Coimbra, in preparation (subject: Fault Tolerance in CSI-Fed Synchronous Motor Drives).

André Manuel dos Santos Mendes (supervisor: António João Marques Cardoso), Universidade de Coimbra, in preparation (subject: Self Diagnostic Techniques for Variable Speed Induction Motor Drives).

Sérgio Manuel Ângelo da Cruz (supervisor: António João Marques Cardoso), Universidade de Coimbra, in preparation (subject: Stator-Side Asymmetries of Three-Phase Inverter-Fed Induction Machines).

M.Sc. Theses

Sérgio Manuel Ângelo da Cruz (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, concluded in 1999 (subject: Rotor Cage Fault Diagnosis in Three-Phase Induction Machines).

Luís Manuel Ramos de Oliveira (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Fault Analysis and Diagnostics of Three-Phase Power Transformers).

Manuel António Marques Esteves (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Prototype Development for a DSP-Based Winding Fault Diagnosis in Operating Three-Phase Power Transformers).

Natália dos Santos Gameiro (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Switched Reluctance Motors Fault Diagnosis).

Nuno José de Abreu e Sousa Cabete Gil (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Fault Analysis and Diagnostics of Asynchronous Generators).

Luís Carlos Costa Maria (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Fault Diagnosis of Permanent Magnet Synchronous Machines).

Ana Carla Vicente Vieira (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Organization and Maintenance in an Educational Establishment).

Pedro Miguel Martins de Pina Ribeiro (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Power Plants Maintenance).

Pedro Manuel Meco Girão Veloso (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Fault Analysis and Diagnostics in Three-Phase Synchronous Machines).

Acácio Manuel Raposo Amaral (supervisor: António João Marques Cardoso), Faculdade de Ciências e Tecnologia da Universidade de Coimbra, in preparation (subject: Telecommunications Power Supply Systems Maintenance).

Publications

Papers in Journals

A. J. M. Cardoso and L. M. R. Oliveira, "Condition Monitoring and Diagnostics of Power Transformers", International Journal of COMADEM, Vol. 2, Nº 3, pp. 5-11, July 1999.

A. J. M. Cardoso, S. M. A. Cruz and D. S. B. Fonseca, "Inter-Turn Stator Winding Fault Diagnosis in Three-Phase Induction Motors, by Park's Vector Approach", IEEE Transactions on Energy Conversion, Vol. 14, N° 3, pp. 595-598, September 1999.

S. M. A. Cruz and A. J. M. Cardoso, "Rotor Cage Fault Diagnosis in Three-Phase Induction Motors by Extended Park's Vector Approach", accepted for publication Electric Machines and Power Systems, Vol. 28, N° 4, pp. 289-299, April 2000.

Papers in Conference Proceedings

A. M. S. Mendes and A. J. M. Cardoso, "Voltage Source Inverter Fault Diagnosis in Variable Speed AC Drives, by the Average Current Park's Vector Approach", Proceedings of the 1999 IEEE International Electric Machines and Drives Conference, pp. 704-706, Seattle Washington, USA, May 1999.

A. M. S. Mendes and A. J. M. Cardoso, "On-Line Diagnostics of Three-Phase Thyristor-Controlled Rectifiers, in Telecommunications Power Supply Systems, by the Average Current Park's Vector Approach", Proceedings of the 21st International Telecommunications Energy Conference, CD-ROM, 4 pp., Copenhagen, Denmark, June 1999.

S. M. A. Cruz and A. J. M. Cardoso, "Diagnostics of the Simultaneous Occurrence of Multiple Induction Motor Faults, by the Extended Park's Vector Approach", Proceedings of the 12th International Congress on Condition Monitoring and Diagnostic Engineering Management, pp. 17-24, Sunderland, England, July 1999.

A. J. M. Cardoso, A. M. S. Mendes and S. M. A. Cruz, "The Park's Vector Approach: New Developments in On-Line Fault Diagnosis of Electrical Machines, Power Electronics and Adjustable Speed Drives", Record of the 1999 IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, pp. 89-97, Gijón, Spain, September 1999.

A. M. S. Mendes and A. J. M. Cardoso, "Fault Diagnosis in a Rectifier- Inverter System Used in Variable Speed AC Drives, by Park's Vector Approach", Record of the 1999 IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, pp. 99-103, Gijón, Spain, September 1999.

S. M. A. Cruz and A. J. M. Cardoso, "Rotor Cage Fault Diagnosis in Voltage Source Inverter-Fed Induction Motors, by the Extended Park's Vector Approach", Record of the 1999 IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, pp. 105-110, Gijón, Spain, September 1999.

A. M. S. Mendes and A. J. M. Cardoso, "Fault Diagnosis in a Rectifier-Inverter System Used in Variable Speed AC Drives, by the Average Current Park's Vector Approach", Proceedings of the 8th European Conference on Power Electronics and Applications, CD-ROM, 9 pp., Lausanne, Switzerland, September 1999.

L. M. R. Oliveira and A. J. M. Cardoso, "Modelling and Simulation of Three-Phase Power Transformers", Proceedings of the 6th International Conference ELECTRIMACS 99, Vol. 2/3, pp. 257-262, Lisbon, Portugal, September 1999.

S. M. A. Cruz and A. J. M. Cardoso, "Rotor Cage Fault Diagnosis in Three-Phase Induction Motors by the Total Instantaneous Power Spectral Analysis", Conference Record of the 1999 IEEE Industry Applications Society Annual Meeting, CD-ROM, 6 pp., Phoenix, Arizona, USA, October 1999.

Project Deliverables and Reports

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "PEGOP - Central Termoelétrica do Pego", Technical Report DIANA-PEGOP 03/98, Coimbra, Portugal, February 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "PEGOP - Central Termoelétrica do Pego", Technical Report DIANA-PEGOP 01/99, Coimbra, Portugal, March 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "CIMPOR - Centro de Produção de Souselas", Technical Report DIANA-CIMPOR 01/99, Coimbra, Portugal, April 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "CIMPOR - Centro de Produção de Souselas", Technical Report DIANA-CIMPOR 02/99, Coimbra, Portugal, May 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "PEGOP - Central Termoelétrica do Pego", Technical Report DIANA-PEGOP 02/99, Coimbra, Portugal, October 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "CIMPOR - Centro de Produção de Souselas", Technical Report DIANA-CIMPOR 03/99, Coimbra, Portugal, November 1999.

A. J. M. Cardoso, S. M. A. Cruz, A. M. S. Mendes and J. P. F. Trovão, "PEGOP - Central Termoelétrica do Pego", Technical Report DIANA-PEGOP 03/99, Coimbra, Portugal, December 1999.

Miscellaneous

António João Marques Cardoso:

Supervisor of the Provas de Aptidão Pedagógica e Capacidade Científica, Davide Sérgio Baptista da Fonseca, Universidade da Beira Interior, in preparation (subject: Fault Tolerance in Electromechatronic Systems).

Supervisor of Estágio Formal (ORDEM DOS ENGENHEIROS), António Jorge Sousa Mendes, Santos Barosa - Vidros S.A., in preparation (subject: Organization and Maintenance Management of I. S. Machines).

Supervisor of PRODEP II - Estágio Profissional, João Pedro Fernandes Trovão, Instituto de Telecomunicações - Pólo de Coimbra, concluded in 1999 (subject: Mechanical Load Emulation Test Facility to Assist the Development of Adequate Machinery Diagnostic Strategies).

Supervisor/co-supervisor of two final year projects at the Departamento de Engenharia Electrotécnica da Faculdade de Ciências e Tecnologia da Universidade de Coimbra.

Presenter of a seminar "Diagnóstico de Avarias em Sistemas Electromecatrónicos, Através da Aplicação da Transformada Complexa Espacial (Vector de Park)", Escola Superior de Tecnologia e Gestão do Instituto Politécnico da Guarda, Guarda, Portugal, January 1999.

Presenter of a seminar " Diagnóstico de Avarias em Transformadores Trifásicos", Faculdade de Engenharia da Universidade do Porto, Porto, Portugal, April 1999.

Reviewer for IEEE Transactions on Industry Applications and IEEE Transactions on Power Electronics.

Honorary Member of the International Biographical Centre Advisory Council, Cambridge, England.

Member of the International Editorial Board of the International Journal of Condition Monitoring and Diagnostic Engineering Management, published by COMADEM International, Birmingham, UK.

Member of the Electrical Machines Committee and of the Industrial Drives Committee of the Industry Applications Society of the Institute of Electrical and Electronics Engineers (IEEE).

Actively involved, as an expert, in the field of standardisation on condition monitoring and diagnostics, both at a national and international level, where he has been acting as a convenor of ISO/TC 108/SC 5 Advisory Group C (Condition monitoring of electrical motors and generators, for the purposes of diagnostics), Advisory Group D (Condition monitoring and diagnostics of power transformers) and Working Group 10 (Condition Monitoring and Diagnostics of Electrical Equipment), and also member of several Working Groups of ISO, IEC and CEN.

Session Chairman, session organiser and member of the Scientific Committee of the IEEE International Symposium on Diagnostics for Electrical Machines, Power Electronics and Drives, SDEMPED'99 (Gijón, Spain, 1-3 September 1999).

8.3 Aveiro Site

8.3.1 Radio, Microwaves and Millimetre waves Research Line

Human Resources

Collaborators

José Carlos S. Neves	PhD	Full Professor, UA
José Fernando da R. Pereira	PhD	Associate Professor, UA
José Carlos Pedro	PhD	Associate Professor, UA
João Nuno Matos	PhD	Assistant Professor, UA
Armando Carlos Rocha	PhD	Assistant Professor, UA
José Fernandes	PhD	Assistant Professor, UA
António Navarro	PhD	Assistant Professor, UA
Nuno Borges Carvalho	PhD	Assistant Professor, UA
Manuel Dinis	Eng.	Engineer, PT

Other Collaborators

Joana Catarina Madaleno	PhD Student	Grant, PRAXIS XXI
António Morgado	PhD Student	Grant, PRAXIS XXI
Victor Santos	PhD Student	Grant, PRAXIS XXI
João Paulo Madaleno	MSc Student	Grant, PRAXIS XXI
Pedro Tavares de Pinho	MSc Student	Grant, FCT
Ruben Leote Mendes	MSc Student	ERASMUS, U. Kiel
João Tavares	MSc. Student	Grant, PRAXIS XXI
Paulo José H. Jesus	MSc Student	UA, First Year
José Emanuel Garcia	MSc Student	UA, First Year
Mario Rui Santos	MSc Student	UA, First Year
Eliseu Macedo	MSc Student	UA, First Year
Adão Paulo Soares Silva	MSc Student	UA, First Year
Susana de Jesus Mota	MSc Student	UA, First Year
Paulo Silva	Lic. Student	UA, Final Year Project
Henrique Manuel de O. Ribeiro	Lic. Student	UA, Final Year Project
Filipe Rodrigues Alves	Lic. Student	UA, Final Year Project
Nelson Oliveira	Lic. Student	UA, Final Year Project
Duarte Fernando A. Alves	Lic. Student	UA, Final Year Project
Eugénio Manuel C. Aguiar	Lic. Student	UA, Final Year Project
João Paulo Almeida	Lic. Student	UA, Final Year Project
José Pedro Cardoso	Lic. Student	UA, Final Year Project
Rui Manuel Cardoso	Lic. Student	UA, Final Year Project
Vitor Luis Marcos	Lic. Student	UA, Final Year Project
Duarte Nuno Silva	Lic. Student	UA, Final Year Project
João Carlos Gaspar	Lic. Student	UA, Final Year Project
João Carlos Simões	Lic. Student	UA, Final Year Project
António Soares Soares	Lic. Student	UA, Final Year Project
Rui Fabrício Correia Cabral	Lic. Student	UA, Final Year Project
César Miguel C. B. Pimentel	Lic. Student	UA, Final Year Project

Luis Filipe Alves Morgado	Lic. Student	UA, Final Year Project
Álvaro H. da Conceição Gomes	Lic. Student	UA, Final Year Project
Marco Paulo M. Mendes Vieira	Lic. Student	UA, Final Year Project
António João L. Silva	Lic. Student	UA, Final Year Project
Nuno Cardoso	Lic. Student	UA, Final Year Project
Adriano Santos	Lic. Student	UA, Final Year Project

Projects

FCT - PRAXIS XXI - 3/3.1/TIT/35/94 - ITCOM - Integration of Technologies for Mobile Communications

Conclusion of BS-CS Optical Link. Integration with forward optical link. Preliminary tasks for ITCOM integration and demonstrator testing.

A new prototype of a low cost fast switching frequency synthesizer, to be used in a third generation mobile system, was developed. This prototype should also work autonomously in other frequencies.

LIRA - PBIC/TIT/2496/95 – RF Power Amplifier Linearity and Efficiency

Modelling and interpretation of the so-called Large Signal IMD Sweet-spots. Development a design strategy for power amplifiers with a prescribed IMD versus Pin pattern. Validation with a medium power prototype. Conclusion of LIRA Project.

ISAC – 2/2.1/TIT/1562/95 – Implementation Aspects of a Mobile Communications Satellite Payload with Dynamic Channel Allocation

Design, implementation and test of linear microwave power amplifier for the ISAC demonstrator.

First tests and performance evaluation of a physical device simulator.

Theoretical distortion studies in multi-tone microwave power amplifiers. Derivation of relations between two-tone and multi-tone IMD figures-of-merit. Behavioural nonlinear distortion modelling using bi-dimensional Volterra series techniques.

FCT – PRAXIS XXI - LinMix – C/EEI/14160/1998 - LinMix

Project start-up.

LAMBADA

Support to the activities developed in the framework of the SAMBA (System for Advanced Mobile Broadband Applications) European project, namely: planning and realisation of first Aveiro field trials and contribution to various deliverables of the project. Realisation of demonstrations in the ACTS Mobile Communication Summit '99 in Sorrento, Italy and Telecom '99 in Geneva, Switzerland.

BOLERO

Support to the activities developed in the framework of the ACCORD (ACTS Broadband Communication Joint Trials and Demonstrations) European project, namely: definition of the ACCORD joint trials; identification of the modifications needed to the SAMBA Trial Platform to enable the interconnection with the other demonstrators involved; realisation of field trials in Rome, Italy and contribution to several deliverables.

SAMBA: System for Advanced Mobile Broadband Applications

Radio propagation simulations using measured antennas radiation patterns designed and fabricated for the SAMBA Trial Platform in the scenarios chosen for the field trials. These results are being compared with measured data gathered during the field trials already performed. The objective is to further assess the simulation tool validation as well to study the propagation phenomena faced in MBS deployment.

Planning and realisation of first Aveiro field trials and contribution to some deliverables of the project. Realisation of demonstrations in the ACTS Mobile Communication Summit '99 in Sorrento, Italy and Telecom '99 in Geneva, Switzerland and support the public demonstration in ATM'99 event held in Rennes, France.

FCT - PRAXIS/2/2.1/TIT/1640/95 - RADICAL - High Data Rate Cellular Digital Mobile Radio

Characterisation of the radio propagation channel taking into account antenna configuration to evaluate single-carrier and multi-carrier transmission techniques for mobile broadband systems.

The cell coverage problem for MBS type systems was studied by resorting to simulations. Multiple coverage using multiple transceiver antennas at the same frequency and at the different frequencies was proposed.

FCT - PRAXIS XXI /P/EEI/10140/1998 – Video Coding and Transmission in Wireless Networks

In the framework of the video coding and transmission project a solution for the problem of the joint source-channel coding of PCM images to be transmitted through a binary symmetric channel (BSC) has been studied. Source samples are quantified and protected by BCH (Bose-Chaudhuri-Hocquenghem) codes of different rates according to the channel noise. The bandwidth is maintained constant and equal to that required transmitting the images without any channel coding. Peak signal-to-noise ratio (PSNR) improvement as high as 20 dB has been achieved.

COST 260 Action: SMART ANTENNAS: CAD and Technology

Some technical documents were presented in this Action in field of smart antennas, namely related with field trials performance evaluation of a demonstrator developed by us.

COST 259 Action: Wireless Flexible Personalised Communications

Some contributions have been submitted to this Action in the field of radio propagation for mobile communications and also on transmission performance evaluation as well as cell coverage issues.

PhD Theses

Nuno Borges Carvalho (supervisor: José Carlos Pedro), Universidade de Aveiro, concluded in 1999 (subject: Nonlinear Distortion Optimization in Multi-tone Microwave Power Amplifiers)

Joana Catarina Madaleno (supervisor: José Carlos Pedro), Universidade de Aveiro, in preparation (subject: Design of Linear RF and Microwave Power Amplifiers)

Manuel Dinis (supervisor: José Neves), Universidade de Aveiro, in preparation, (subject: Broadband Mobile Communications).

Victor Santos (supervisor: José Neves), Universidade de Aveiro, in preparation (subject: Satellite Mobile Communications).

António Morgado (Supervisor: José Fernandes), Universidade de Aveiro, in preparation, (subject: Adaptive antennas for mobile broadband communications).

M.Sc. Theses

Ilídio Chaves (supervisor: José Carlos Neves), Universidade de Aveiro, concluded in 1999 (subject: Satellite Mobile Communications)

João Paulo Madaleno (supervisor: José Carlos Pedro), Universidade de Aveiro, in preparation (subject: Design of Linear Microwave Mixers)

Pedro Renato Tavares Pinho (supervisor: José Fernando da Rocha Pereira), Universidade de Aveiro, in preparation (subject: Antenna for a mobile terminal for the 1.91 to 2.2 GHz)

Ruben Leote Mendes (supervisor: João Nuno Matos), Universidade de Aveiro, in preparation (subject: Digital Modulator/Demodulator).

João Tavares (supervisor: António Navarro), Universidade de Aveiro, in preparation (subject: Video Signal Transmission over Wireless Channels)

Eliseu Macedo (supervisor: António Navarro), Universidade de Aveiro, in preparation (subject: Multi-program Digital TV Receiver)

Paulo José Jesus (supervisor: José Rocha Pereira, co-supervisor: José Fernandes), Universidade de Aveiro, in preparation (subject: Smart Antenna)

Mário Santos (supervisor: José Neves) Universidade de Aveiro, in preparation (subject: TV Distribution System)

Publications

Papers in Journals

P. J. Silva, P. Mendes, J. Ferreira da Rocha, J. C. Pedro, P. Tavares, P. S. André and N. B. Carvalho, “Automatização de Laboratórios de Medida de Componentes Ópticos e Electrónicos Através de LabVIEW”, Revista do DETUA, vol. 2, Nº 2, pp.449-458, Jan. 1999.

J. C. Pedro, N. Carvalho and R. Madureira, “Nonlinear Distortion Model for VCO-PLL FM Transmission Systems”, IEEE Trans. on Circuits and Systems II: Analog and Digital Signal Processing, vol. CAS-46, nº 3, pp.348-352, Mar. 1999.

J. A. Garcia, A. Tazón, A. Mediavilla, I. Santamaria, M. Lázaro, C. J. Pantaleón and J. C. Pedro, "Modeling MESFET's and HEMT's Intermodulation Distortion Behavior Using a Generalized Radial Basis Function Network", Intern. Journal of RF and Microwave Computer-Aided Engineering, Vol. 9, No. 3, pp.261-276, May 1999.

J. A. Garcia, M. L. de La Fuente, J. C. Pedro, A. Mediavilla, A. Tazón and J. L. Garcia, "Intermodulation distortion reduction with drain bias in parallel MESFET Switch", Electronics Letters, Vol. 35, No. 11, pp.907-909, May 1999.

N. B. Carvalho and J. C. Pedro, "Large and Small Signal IMD Behavior of Microwave Power Amplifiers", IEEE Trans. on Microwave Theory and Techniques, vol. MTT-47, n° 12, pp.2364-2374, Dec. 1999.

J. C. Pedro and N. B. Carvalho, "On the Use of Multi-Tone Techniques for Assessing RF Components' Intermodulation Distortion", IEEE Trans. on Microwave Theory and Techniques, vol. MTT-47, n° 12, pp.2393-2402, Dec. 1999.

J. A. Garcia, J. C. Pedro, M. L. de La Fuente, N. B. Carvalho, A. Mediavilla and A. Tazón, "Resistive FET Mixer Conversion Loss and IMD Optimization By Selective Drain Bias", IEEE Trans. on Microwave Theory and Techniques, MTT-47, n° 12, pp.2382-2392, Dec. 1999.

T. Fernández, J. A. García, A. Tazón, A. Mediavilla, J. C. Pedro, and J. L. García, "Accurately Modelling the Drain to Source Current in Recessed Gate P-HEMT Devices", IEEE Electron Device Letters, vol. EDL-20, n° 11, pp.557-559, Nov. 1999.

N. B. Carvalho and J. C. Pedro, "Compact Formulas to Relate ACPR and NPR to Two-Tone IMR and IP3", Microwave Journal, vol. 42, No.12, pp.70,77-78,80,82,84, Dec. 1999.

L. Pires, E. Gomes and A. Rocha, "Sistema para Apontamento Programado de uma Antena", Revista do DETUA, Setembro 1999.

J. Fernandes, "Mobile Broadband Radio Communications: Physical Aspects", Revista do DETUA. Vol. 2, No 4, pp. 413-424, Jan. 1999.

C. Fernandes and J. Fernandes, "Performance of Lens Antennas in Wireless Indoor Millimeter Wave Applications", IEEE Trans. on Microwave Theory and Techniques, Vol. 47, No. 6, pp. 732-737, Jun 1999.

Papers in Conference Proceedings

N. B. Carvalho and J. C. Pedro, "Gain Compression or Expansion, Distortion and Other Large Signal Power Amplifier Related Phenomena", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 515-518, April, 1999.

L. R. Gomes, J. C. Pedro and N. B. Carvalho, "Highly Efficient MMIC Class-F Power Amplifier", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 191-194, April, 1999.

J. C. Pedro and N. B. Carvalho, "A Very Fast and Efficient Computation Method for Nonlinear Distortion on Uniformly Discretized Spectra", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 519-522, April, 1999.

N. B. Carvalho and J. C. Pedro, "A New Active Device Model Approximation Suitable for a Nonlinear Frequency Domain Simulator", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 187-190, April, 1999.

J. A. Garcia, R. Garcia, J. C. Pedro, N. B. Carvalho, A. Mediavilla and A. Tazón, "Intermodulation Distortion Prediction in MESFET Switches and Attenuators", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 523-526, April, 1999.

J. A. García, V. Eguía, J. C. González, A. Mediavilla , A. Tazón, and J. C. Pedro, "Caracterización en Distorsión de Intermodulación y Modelado No Lineal de la Fuente de Corriente Ids para MESFETs Polarizados en Zona Lineal", XIV Symposium Nacional de URSI, Stgo. de Compostela, SPAIN, Sept. 1999.

R. García, J. A. García, A. Mediavilla , A. Tazón and J. C. Pedro, "Contribución de los Coeficientes Cruzados a la Distorsión de Intermodulación en Transistores MESFETs en Funciones de Control", XIV Symposium Nacional URSI, Stgo. de Compostela, SPAIN, Sept. 1999.

N. B. Carvalho and J. C. Pedro, "Multi-Tone Intermodulation Distortion Performance of 3rd Order Microwave Circuits", 1999 IEEE Intern. Microwave Theory and Tech. Symposium, pp.763-766, Anaheim, Jun. 1999.

N. B. Carvalho and J. C. Pedro, "Large Signal IMD Sweet Spots in Microwave Power Amplifiers", 1999 IEEE Intern. Microwave Theory and Tech. Symposium, pp.517-520, Anaheim, Jun. 1999.

J. L. Garcia, J. C. Pedro, N. B. Carvalho, A. Mediavilla and A. Tazón, "Resistive FET Mixer Conversion Loss and IMD Optimization by Selective Drain Bias", 1999 IEEE Intern. Microwave Theory and Tech. Symposium, pp.803-806, Anaheim, Jun. 1999.

L. R. Gomes and J. C. Pedro, "Design Rules for Highly Efficient Power Amplifiers Driven By Low Voltage Supplies", 29th European Microwave Conference Proc., vol. II, pp.267-270, Munchen, Oct. 1999.

J. C. Pedro and N. B. Carvalho, "Efficient Harmonic Balance Computation of Microwave Circuits' Response to Multi-Tone Spectra", 29th European Microwave Conference Proc., vol. I, pp.103-106, Munchen, Oct. 1999.

J. C. Pedro and J. C. Madaleno, "An Efficient Technique for the Analysis of Large Mild Nonlinear Microwave Circuits", 7th Intern. Symposium on Recent Advances in Microwave Technology Proc. pp.240-243, Malaga, Dec. 1999.

N. B. Carvalho, J. A. Garcia and J. C. Pedro, "State-of-the-Art Simulation of Microwave Amplifier's Nonlinear Distortion", 7th Intern. Symposium on Recent Advances in Microwave Technology Proc., pp.559-562, Malaga, Dec. 1999.

J. C. Pedro, "Design Methods for Multi-Carrier Microwave Power Amplifiers", Artigo Convidado, 7th Intern. Symposium on Recent Advances in Microwave Technology Proc., pp.547-550, Malaga, Dec. 1999.

J. A. García, J. C. Pedro, N. B. Carvalho, J. M. Zamanillo, A. Mediavilla, and A. Tazón, "Characterizing the MESFET's Intermodulation Distortion Behavior in the Linear Region", 7th Intern. Symposium on Recent Advances in Microwave Technology Proc., pp.244-247, Malaga, Dec. 1999.

M. Santos, G. Andrade, R. Madureira, A. Rocha, et al, "Design and Implementation of a Satellite TV Channels Distribution System Based on Selective IF", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 733-737, April, 1999.

M. Santos, G. Andrade, R. Madureira, J. Pedro, J. Neves, "Design and Implementation of a Satellite TV Channels Allocation Unit", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.728-732, April, 1999.

M. Santos, G. Andrade, J. Carlos, J. Neves, "CATV and Satellite Television Optical Fibre Link", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.377-381, April, 1999.

A.Rocha, J. Neves, "Radiometer Data Pre-processing Software For Propagation Studies", Accepted paper at the Millennium Conference on Antennas and Propagation AP2000, April 2000, Davos, Switzerland.

P. Pinho and J. Pereira, "Antenna for mobile terminal for the 1.91 to 2.2 GHz band", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 437-440, April, 1999.

J. Fernandes, J. Pereira, P. Jesus and J. Ferreira, "Adaptive array antenna with electronically steerable beam", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 63-67, April, 1999.

P. Pinho and J. Pereira, "Antenna for mobile terminal for the 1.91 to 2.2 GHz band", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 437-440, April, 1999.

P. Pinho and J. Pereira, "Design of a PIFA antenna using FDTD" Proceedings of the COST 260 Workshop on Smart Antenna Design and Technology, pp. 62-66, November 1999.

A. Gameiro, J. N. Matos, P. Pereira, P. Silva, D. Rodrigues, E. Gomes, "Spread Spectrum Transceiver for Basic Rate ISDN Signals", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 104-107, April, 1999.

V. Santos, M. Dinis, J. Neves, "Dynamic Channel Allocation Techniques: a Comparative Study", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

P. Conforto, G. Losquadro, G. Ferrari, L. M. oretti, M. Dinis, "ACCORD Network solutions for the Global Mobile Broadband System: complementing the Satellite with Terrestrial Components", ACTS Mobile Communications Summit '99, 8th – 11th of June 1999, Sorrento, Italy.

M. Dinis and J. Fernandes, The SAMBA project, Magazine COMUNICAÇÕES, Year 13, N° 96, August of 1999.

V. Santos, M. Conceição, V. Pereira, M. Dinis, J. Neves, "Simplified Maximum Packing a New Dynamic Channel Allocation Technique", 5th ECSC, Toulouse, France, 3rd – 5th November 1999.

J. Fernandes, A. Marques, J. Garcia, "Antenna Configuration for Broadband Cellular Coverage", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 451-455, April, 1999.

P. Marques, J. Fernandes, J. Neves, "Wideband Channel Modeling for Picocellular Mobile Communications", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 130-134, April, 1999.

J. Fernandes, J. R. Pereira, P. Jesus, J. Ferreira, "Adaptive Array Antenna with Electronically Steerable Beam", Proceedings of COST259/260 Joint Workshop on Spatial Channel Models and Adaptive Antennas, Vienna, Austria, pp. 89-95, April 1999.

J. Fernandes, A. Marques, J. Garcia, "Cellular Coverage for MBS Using the Millimetre-Wave Band", ACTS Mobile Communications Summit '99, Sorrento, Italy, pp. 125-130, June 1999.

M. Dinis, J. Fernandes, M. Prögler and W. Herzig, "The SAMBA Trial Platform in the Field", ACTS Mobile Communications Summit '99, Sorrento, Italy, pp. 1013-1018, June 1999.

J. Fernandes, J. R. Pereira, P. Jesus, J. Ferreira, "Adaptive Antenna with Beamforming Made at RF Level", Proceedings of 2nd COST260 Workshop on Smart Antenna Design and Technology, Aveiro, Portugal, pp. 89-96, November 1999.

A. Navarro and J. Tavares, "Joint Source-Channel PCM Image Coding for Binary Symmetric Channels", Int. Conference on Signal Processing Applications and Technology, Orlando – USA, 1999.

P. Ribau, A. Gameiro, A. Navarro, "Flexible Framing Circuit for Wide-band Radio System, in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

P. Silva, A. Gameiro, A. Navarro, "Precoder Circuit for Channels with Multipath Dispersion", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Project Deliverables and Reports

J. Garcia, A. Rocha, J. Fernandes, "Climatical effects on electromagnetic wave propagation", Report Radical_01;

Manuel Dinis et al., "Dissemination of SAMBA Results", CEC Deliverable Number: A0204/PTIN/SRM/DS/P/017/b1, 30/11/1999, Submitted to the European Commission in the framework of the SAMBA project.

J. Fernandes and C. Fernandes, "Impact of Shaped Lens Antennas on MBS Systems", COST 259 TD(99) 017, Thessaloniki, Greece, January 1999.

C. Fernandes and J. Fernandes, "Performance of Lens Antennas in Wireless Indoor Millimeter Wave Applications", COST 259 TD(99) 016, Thessaloniki, Greece, January 1999.

J. Fernandes, M. Dinis, M. Prögler, W. Herzig and J. Zubrzycki, "The SAMBA Trial Platform: Initial Results", COST 259 TD(99) 015, Thessaloniki, Greece, January 1999.

J. Fernandes, and J. Garcia, "Cell Coverage for MBS Environments", COST 259 TD(99) 099, Leidschendam, The Netherlands, September 1999.

M. Dinis, J. Fernandes, M. Prögler and W. Herzig, "The SAMBA Trial Platform in the Field", COST 259 TD(99) 106, Leidschendam, The Netherlands, September 1999.

J. Garcia, A. Rocha e J. Fernandes, "Efeitos climatéricos na propagação de ondas electromagnéticas", RADICAL project Deliverable, Radical_01, January 1999.

J. Fernandes, A. Marques e J. Garcia, "Antenas e arquiteturas celulares", RADICAL project Deliverable, Radical_02, January 1999.

A. Marques, A. Rocha e J. Fernandes, "Efeitos climatéricos na propagação de ondas electromagnéticas", RADICAL project Deliverable, Radical_03, January 1999.

Miscellaneous

A.Rocha, reviewer for CONFETELE'99, held in Sesimbra, Portugal, Abril 1999.

J. Rocha Pereira, organised the COST 260 Workshop on Smart Antenna Design and Technology, held in Aveiro on 3-5 November 1999.

J. Fernandes, reviewer for CONFETELE'99, held in Sesimbra, Portugal, Abril 1999.

José Carlos Pedro, reviewer CONFETELE'99, held in Sesimbra, Portugal, Abril 1999.

José Carlos Pedro, Session Chairman for CONFETELE'99, held in Sesimbra, Portugal, Abril 1999.

José Carlos Pedro, Session Chairman for ISRAMT'99 – Int. Symp. On Recent Advances on Microwave Tech. held in Malaga, Spain, Dec. 1999.

Manuel Dinis, reviewer for the ACTS Mobile Communication Summit 99 Conference, Sorrento, Italy.

António Navarro, reviewer for CONFETELE'99, held in Sesimbra, Portugal, Abril 1999.

8.3.2 Networks Research Line

Human Resources

Collaborators

Luis Miguel Silva	MSc	BU Director, PT Inovação
Rui T. Valadas	PhD	Assistant Professor, UA
Amaro F. de Sousa	MSc	Assistant, UA
António Duarte Nogueira	MSc	Invited Assistant, UA
Telma Mota	MSc	Enginner, PT Inovação
José Pedro Fernandes	MSc	Enginner, PT Inovação
Jorge Gonçalves	MSc	Enginner, PT Inovação
Nuno Silva	Lic.	Enginner, PT Inovação
Fernando Bastos	Lic.	Enginner, PT Inovação
Luís Cortesão	Lic.	Engineer, PT Inovação

Other Collaborators

Paula Cristina Couto	PhD student	Grant, PRAXIS XXI
Susana Isabel Sargento	PhD student	Grant, PRAXIS XXI
Paulo Salvador Ferreira	PhD student	Grant, PRAXIS XXI
Luís António Pinheiro	MSc student	Engineer, PT
Alberto J. Nascimento	MSc student	Engineer, Siemens
Luís Pedro Cardoso	Researcher	Engineer, PT Inovação
Elizabeth Fernandez	Researcher	Grant, IT
Carlos Lopes Borges	Researcher	Grant, IT
Carlos Santiago	Researcher	Grant, IT
Nuno Filipe Santos	Researcher	Grant, IT
Sebastian Gonçalves	Researcher	Grant, IT
Pedro Nuno Lúcio	Reseracher	Grant, IT
Filipe Joel Ferreira	Researcher	Grant, IT
Cristina Maria Noversa	Researcher	Grant, IT
Célia Maria Pinho	Researcher	Grant, IT
José António Parente	Researcher	Grant, IT
Carla Pinto de Paiva	Researcher	Grant, IT
Nicolau Matilde Ramos	Researcher	Grant, IT
José Lino Teixeira	Researcher	Grant, IT
Miguel Cunha Queirós	Researcher	Grant, IT
Carlos Manuel Cravo	Researcher	Grant, IT

Projects

CESTA: Statistical characterisation and simulation of ATM traffic

The project started in 1997. The main objective of the project is the development of dimensioning tool for ATM networks that integrates traffic model fitting and selection procedures with optimisation routines for cost-effective dimensioning and resource management. The main results were: (i) developments of two software packages, one for traffic analysis and the other for network design, (ii) development of methods for parameter estimation of ATM traffic models, (iii) development of methods for rare

event simulation, (iv) formulation and development of optimisation models for several network design problems, (v) study and development of meta-heuristics based on genetic algorithms for solving optimisation problems.

BBTráfego: Traffic Engineering for Broadband Access Networks

The project was concluded in 1999. Defined a set of methods for dimensioning and resource management of access networks based on ATM technology and developed a planning tool for these networks.

GISA: Integrated Management of Transport Networks

A first version of a business support system (ARCO v1.0) for the automation of the SDH circuit provisioning process, within the Portugal Telecom transport network, was developed.

In a first phase, special focus was devoted to the understanding of the provisioning business process, in order to capture the requirements to develop a system to support and enhance the current manual process. This analysis was based on the TMForum Telecommunications Operation Map (TOM). On a second phase, and based on the requirements capture and analysis carried out, it was designed and implemented the ARCO v1.0 system.

The system allows to build an high level view of the transport network capacity, describing the connectivity of nodes, routes, links and capacity. On top of this logical connectivity, network provisioning is performed to fulfil specific service requests, in an optimal and effective way. The development process was based on the UML notation, and the Rational Unified Process (RUP) was followed. The system follows a two-tier client-server architecture, with JAVA based clients and Oracle8i as a persistent store.

GesAcesso: Management of broadband access networks

Research on understanding the radio access technologies. The following reports were produced: “Radio Technologies in Access Networks”, “GPRS Architecture” and “UMTS Concepts”.

Research on understanding the management requirements of UMTS radio access networks, in order to specify a management information model for a SNMP MIB, which should cover the identified management functions, namely objects related to the performance functional area.

Development of management applications covering the element network level of TMN architecture for access network equipment, using the graphical server platform, PGRAF, and Internet open standards as Java, CORBA and WWW. Test of PGRAF concepts and implementation.

PGRAF: Platform to build Graphic User Interfaces for Service and Network Management Systems

Main objective for this project is the support, in a multi-user environment, of client interfaces with different views, built in Java and made persistent in a central repository, taking into account as a main concern, network representations made up with millions of objects.

During 1999 two main results were achieved. First one was the graphics server built on C++ and supporting multi-user access to graphical information. The second main result was the client API built on Java 2 and based on JViews library that supports the

representation network topology. Those two modules interact using CORBA with embedded XML.

IN3Net: IN & Internet Integration

The IN3Net project is in charge of studying and proposing solutions for the merging of two worlds, the IN world and the Internet world. The result of this study was the specification and the development (still ongoing) of a software architecture over a distributed platform (CORBA or DCOM based). This platform is composed by several software generic and service specific components. The service specified under the IN3Net project was the Unified Messaging Service. In order to perform this task the following steps were accomplished:

1 - Study of CORBA and RMI; 2 - Study of several protocols, naming, S100, IMAP4, POP3, SMTP, LDAP, HTTP. 3 - Install, Experiment and Evaluate several products and APIs. Among these products the following have been selected: QMail, JavaMail, ORBacus, Linux, CTMedia, Elan TTS, JSAPI, JetSpeed. 4 - Implementation of the Adaptors towards the network resources (Mail Server, IVR and TTS) and respective APIs.

The approach followed offers the possibility of using network resources (e.g. SSPs, SCPs, Vocal GateWays, PBXs or in particular for the IN3Net project IVR, TTS and Mail Servers) without carrying about specific protocols. Adaptors are developed in order to abstract from the mentioned protocols and high level APIs are built in order to be used by the applications. The Unified Message application uses a User Interaction Control API to interact with the IVR and the TTS and a Message Control API to interact with the Mail Servers.

GRESA: Gestão de Redes e Serviços

The project was mainly dedicated in evaluating OO techniques in the field of persistence solutions for objects in CORBA servers. In this line of activity a research was made in order to evaluate the theoretical solutions of implementing OO persistence using traditional Relational Data Bases. An experimental phase was also done using a commercial product from Rogue Wave – Metro. In this experiment a CORBA based existing module, from an internal project, was selected and adapted to this new solution. Comparison was done between the original persistence solution (done without any specific tool) and the one using RW Metro.

SIPA: Serviços IP avançados

Two lines of activities were involved, in the area of advanced IP services, namely:

a) research on QoS management of IP networks. In this context an evaluation was made for QoS general solutions. Theoretical QoS concepts were studied, and some ATM background solutions were studied in order to follow IP evolution on QoS. IP QoS new architectures were investigated, namely Int-Serv, Diff-Serv and MPLS. Scheduling algorithms for QoS assurance and differentiation, and the associated bounds on the maximum packet delay, were also investigated. Studies on architectural solutions for IP QoS were done, and some general QoS management solutions were evaluated.

b) research and experimentation is being carried on the implementation of diff-serv solutions based on Linux Router platforms. In this context a Linux Router node was installed and connection experiments with other diff-serv domains were done. It is expected to evaluate interoperability issues, and inter-domain management architectures. This research network, based in diff-serv, will be the base for the study

of QoS management solutions. In the short term solutions based on mobile Agents will be experimented.

SIG-World: Identify, evaluate and integrate GIS technology trends

Trimestral bulletin addressing GIS business technology trends, namely the new architecture approaches and software evolutions. An open meeting took place in June to discuss some of the assembled topics in the bulletins, namely their impact in the applications currently under development.

Development of GIS applications deployed over the intranet/internet.

Technical and economical evaluation of the impact of using spatial databases in the applications under development.

ACTS 207 – DIFFERENCE – Dissemination and Facilitation for European Research in Selected Chains

DIFFERENCE has been formulated and a “support” project for ACTS (Domain 5). In this regard, its success is reflected by the success of both ACTS and the industry fora targets. In terms of outcomes, there are three aspects to consider namely 1) Architecture cohesion outcomes, 2) Consensus facilitation and 3) Industry liaison in terms of positioning, channelling and disseminating results. In a much brief summary, main results were: 1) several white papers and position papers on the merge and integration of disparate elements of architecture in selected areas (Management, Agents and Internet) - in particular some of these have been taken by the OMG; 2) Several ACTS guidelines and consensus documents have been produced; 3) The project established and maintained excellent links to key industry fora, enabling the interaction between ACTS and these other fora, through means such as the IS&N industrial showcase.

Ph.D. Theses

Amaro Fernandes de Sousa (supervisor: Oliveira Duarte), University of Aveiro, in preparation, (subject: Transport Protocols for Multimedia Communications in Broadband Networks).

António Duarte Nogueira (supervisor: Rui Valadas), University of Aveiro, in preparation (subject: Statistical Characterization of ATM Traffic).

Paula Cristina Couto (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Wireless ATM Local Area Networks).

Susana Isabel de Miranda Sargento, (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Resource Management and Traffic Control in ATM Networks).

Paulo Jorge Salvador Serra Ferreira, (supervisor: Rui Valadas), University of Aveiro, in preparation, (supervisor: Traffic Engineering for Multiservice Broadband Networks).

M.Sc. Theses

Luís António Teles de Almeida Rodrigues Pinheiro (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Dynamic Routing in Telecommunication Networks).

Alberto J. Nascimento (supervisor: Rui Valadas), University of Aveiro, concluded in 1999, (subject: Cellular Planning and Teletraffic Engineering for Mobile Communications Networks).

Luís Pedro de Oliveira Cardoso (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Algorithms for Dimensioning ATM Networks with Dynamic Routing).

Carlos Miguel Ferreira Soares Borges Lopes (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Genetic Algorithms for Dimensioning ATM Networks).

Carlos Jorge Santiago (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Genetic Algorithms for Dimensioning ATM Networks).

Fernando José Rodrigues Henriques Simões Bastos (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Management of Quality of Service in Telecommunications Networks).

Publications

Books and Book Chapters

R. Aguiar, J. Oliveira, “New Services on an Advanced Internet”, in *Multimedia Applications, Services and Techniques*, Helmut Leopold, Narciso Garcia (Eds.), Springer-Verlag, ISBN 3-540-66082-8, pp.197-211, 1999.

Papers in Journals

R.L. Aguiar e J.L.Oliveira, “Issues on Internet Evolution and Management”, *Sistemas de Informação, Revista da Associação Portuguesa de Sistemas de Informação*, nº10, 1999, pp 39-48.

Papers in Conference Proceedings

A.Sousa, R. Valadas, L. Cardoso, A. Duarte, “ATM Network Dimensioning for Mixed Symmetrical and Asymmetrical Services with Dynamic Reconfiguration in a Multi-Network Provider Environment”, *Third IFIP Workshop on Traffic Management and Design of ATM Networks*, London, 26 - 27 April, 1999, pp. 5/1-5/15.

S. Sargento, R. Valadas, A. Sousa, "Dimensioning Methodologies for the BroadbandLoop Access Network", Proceedings of the European Conference on Networks and Optical Communications, NOC'99, Vol. 1, Broadband Access and Technology, June 22-24, 1999, Delft, The Netherlands, pp. 85-93.

A.Nogueira, P. Salvador, R. Valadas, "Fitting Algorithms for MMPP ATM Traffic Models", Proceedings of the Broadband Access Conference, Cracow, Poland, October 11-13, 1999, pp. 167-174.

S. Sargento, R. Valadas, A. Sousa, "Dimensioning FSAN (Full Services Access Networks) and BBL (BroadbandLoop) Access Networks", Proceedings of the Broadband Access Conference, Cracow, Poland, October 11-13, 1999, pp. 184-193.

R. Valadas, P. Ferreira, C. Lopes, A. Oliveira, "Laboratory Experiments for Teaching Routing in Telecommunications Networks", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 419-423, April, 1999.

R. Aguiar, J. Oliveira, "Issues on Internet Evolution and Management", 1st International Conference on Enterprise Information Systems, Setúbal, Portugal, March 1999, pp 563-571.

R. Aguiar, J. Oliveira, "New Services on an Advanced Internet", 4th European Conference on Multimedia Applications, Services and Techniques, Madrid, Spain, May 1999.

R. Aguiar, J. Oliveira, A. Richardson, D. O'Sullivan, "The Internet: Source of Expectations", TERA'99, 3rd European Conference on Techno-Economic Studies on Multimedia Networks and Services, December 1999, pp. 66-73.

J. Oliveira, R. Aguiar, "Network and Desktop Management Convergence", 33rd Hawaii International Conference on System Sciences, Maui, Hawaii, January 2000.

P. Pereira, L. da Silva, "RIA ATM OS, a TINA based Networks Management System", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 315-318, April, 1999.

Miscellaneous

Rui Valadas presented the invited talk "Dimensioning Integrated Services Telecommunications Networks", on the Summer School of Mathematics, organized by the Portuguese Society of Mathematics, Costa da Caparica, September 6-17, 1999.

Luís Miguel Silva, evaluator of EU-IST projects in July 1999, and auditor of EU ACTS projects in November 1999.

8.3.3 Optical Communications Research Line

Human Resources

Collaborators

José R. Ferreira da Rocha	Ph. D.	Full Professor, UA
Rui F. G. Sousa Ribeiro	Ph. D.	Assistant Professor, UA
Atílio Gameiro	Ph. D.	Assistant Professor, UA
António L. J. Teixeira	Ph. D.	Assistant Professor, UA
Paulo M. N. Pereira Monteiro	Ph. D.	Assistant Professor, UA
António M. R. Tavares	Lic.	Assistant, UA
Marcelino Pousa	Lic.	PT Inovação

Other Collaborators

Mário J. N. Lima	Ph. D. Student	Grant, PRAXIS XXI
Paula Couto	Ph. D. Student	Grant, PRAXIS XXI
Albano Loureiro	M. Sc. Student	Grant, IT
Sérgio L. Marques	Lic.	Engineer
Miguel M. F. Capela	BIC Student	Grant, IT
Manuel Santos	Lic. Student	UA, Final Year Project
Jonny F. R. Alves	Lic. Student	UA, Final Year Project
Alexandre M. M. da Costa	Lic. Student	UA, Final Year Project
António J. L. Jorge	Lic. Student	UA, Final Year Project
Carlos M. da S. Coelho	Lic. Student	UA, Final Year Project
Nuno A. da C. Albuquerque	Lic. Student	UA, Final Year Project
Jorge Pinto	Lic. Student	UA, Final Year Project
Tiago Maia	Lic. Student	UA, Final Year Project

Projects

FCT - PRAXIS XXI – XXI/2.1/TIT/1573/95 – DAWN – Dynamically Allocated WDM Network.

Experimental Demonstration of WDM Networks based on Reflective Semiconductor Optical Amplifier (RSOA).

FCT - PRAXIS XXI – 3/3.1/TIT/35/94 – ITCOM – Integration of Technologies for Mobile Communications

Integration of wireless communication technologies – optics, millimetrewave, and microwave technologies – in a mobile communication environment using same frame format and protocol.

FCT - PRAXIS XXI – 2/2.1/TIT/1578/95 – IRWLAN – Advanced Technologies for Infrared Wireless Local Area Networks

Development of advanced technologies for infrared wireless LANs. Investigation on adaptive transmission baud rate transmission systems and angle diversity receiver techniques to improve the performance of a non-oriented optical transmission system.

IT – CORAL

This project fits in the technical area of signal processing for digital communications. It aims at investigating techniques to combat the dispersion caused by multipath fading. Such study is intended for distribution systems where the objective is the minimization of subscriber receiver cost. The basic blocks to perform a laboratory trial were constructed and tested. Integration is going to be carried in year 2000.

Final Year Project (1998/1999) – Implementation of an Optical Wireless Transmission System using 4-PPM Modulation Scheme at 4 Mbit/s.

Final Year Project (1998/1999) – Optimisation of an Angular Diversity Receiver Laboratorial Prototype using Differential Manchester Encoding Method at 4 Mbit/s.

Final Year Project (1999/2000) – Integration of Angle Diversity Receiver Techniques into an Optical Wireless Transmission System.

Final Year Project (1999/2000) – Implementation of an Adaptive Data Rate Communication System using Repetitive Pulse Position Modulation.

Final Year Project (1999/2000) – Simulation, Analysis and Optimisation of a Laboratorial Optical Communication System at 2.5 Gbit/s.

Ph. D. Theses

António Luís Jesus Teixeira.(supervisor: J. R. Ferreira da Rocha), Universidade de Aveiro, concluded in 1999 (subject: Optimization of Optical Communication D-WDM systems).

Paulo Monteiro (supervisor: J. R. Ferreira da Rocha), Universidade de Aveiro, concluded in 1999 (Optimization of Receivers with Optical Pre-Amplification for High Bit Rate Systems).

Armando N. Pinto.(supervisor: J. R. Ferreira da Rocha), Universidade de Aveiro, concluded in 1999 (subject: Analysis and Optimization of Optical Communication Systems based on Solitons)

António Reis (supervisor: J. Rocha co-supervisor: A. Gameiro), University of Aveiro, submitted in 1999; (subject: Symbol synchronizers for high bit rate communications)

Mário J. Neves de Lima.(supervisor: J. R. Ferreira da Rocha), Universidade de Aveiro, in preparation (subject: Optimization of communication systems based in WDM technology).

Rui Alves(supervisor: A. Gameiro, University of Aveiro, in preparation (subject: Error correcting codes for infred WLAN's)

Luís Gonçalves (supervisor: A. Gameiro, University of Aveiro, in preparation (subject: Multiuser detection in CDMA systems)

António M. R. Tavares (supervisor: A. M. de Oliveira Duarte and Rui T. Valadas), Universidade de Aveiro, in preparation (subject: Optical Wireless Local Area Networks)

M. Sc. Theses

Pedro M. M. Tavares (supervisor: J. Ferreira da Rocha and L. F. Ribeiro), Universidade de Aveiro, concluded in 1999 (subject: Optical Clock Recovery in High Speed Networks)

Publications

Papers in Journal

J. F. da Rocha, P. Tavares, O. Frazão, P. Monteiro, P. S. André, A. Teixeira, M. Lima, A. N. Pinto, A. Gameiro, R. Ribeiro, L. Ribeiro, A. Cunha, J. L. Pinto, M. R. Ferreira, M. Pousa, "Research of the Optical Communications Groups at University of Aveiro and Institute of Telecommunications - Aveiro Pole", Invited Paper, SPIE Journal of Optical Engineering, August 1999.

P. Tavares, O. Frazão, A. Cunha, L. Ribeiro, J. F. da Rocha, "High Bit Rate Optical Synchronization of RZ Signals using external Cavity Lasers", SPIE Journal of Optical Engineering, August 1999.

P. S. André, A. N. Pinto, J. L. Pinto, J. F. da Rocha "Extraction of Laser Rate Equation Parameters", SPIE Journal of Optical Engineering, August 1999.

Papers in Conference Proceedings

M. J. N. Lima, A. L. J. Teixeira, J. R. F. da Rocha, "Optimization of apodized fiber grating filters for WDM systems", 1999 IEEE LEOS Annual Meeting Conference Proceedings, vol.2, paper ThZ2, pp. 876-877, November 1999, S. Francisco, USA.

Mário J. N. Lima, António L. J. Teixeira, J. Ferreira da Rocha, "Study of 16(20 Gsym/s WDM Dispersion Supported Transmission Systems Using Different Line-Codes", 1999 International Conference on Transparent Optical Networks Proceedings, pp. 37-39, June 99, Kielce, Poland.

Mário J. Lima, António L. Teixeira, J. Ferreira da Rocha, Rui Ribeiro, "Optical filters for N(20 Gbit/s WDM dispersion supported transmission systems", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 569-573, April, 1999.

Rui S. Ribeiro, J. Ferreira da Rocha, "On Modeling Thermal Effects in Semiconductor Lasers", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 276-278, April, 1999.

A. N. Sousa, J. F. da Rocha and R. F. S. Ribeiro, "Strategies for Inter-Satellite Optical Communications", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 531-534, April, 1999.

J. F. da Rocha, R. F. S. Ribeiro and A. N. Sousa, "Comparison of Signal Formats for Optically Amplified Links between GEO Satellites", in Proc. NOC'99, Delft, The Netherlands, 22-24 June 1999.

Pedro Tavares, Orlando Frazão, António Cunha, Luís Ribeiro, J. F. da Rocha, "Experimental Results on High Bit Rate Optical Synchronization of Soliton Type RZ Signals", XVIII ICO, San Francisco, California, EUA, 4-9 August. 1999.

O. Frazão, P. Tavares, A. F. Cunha, L. Ribeiro, J. F. da Rocha, "Continuous Frequency Control from 5 to 10 Gbit/s of an Optical Oscillator", IEEE IFC'99 – International Frequency Control Symposium, Besançon, France, 12-16 April, 1999.

A. Gameiro, J. Matos, J. Pereira, P. Silva, D. Rodrigues and E. Gomes, "Spread-Spectrum Transceiver for Basic Rate ISDN Signals", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp. 104-110, April, 1999.

R. Alves and A. Gameiro, "Capacity of Modulation Methods for Infrared WLAN's", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.720-724, April, 1999.

P. Silva, P. Ribau, A. Gameiro and A. Navarro, "Flexible Framing Circuit for a Wideband Radio System", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.716-719, April, 1999.

P. Silva, A. Gameiro and A. Navarro, "Precoder circuit for channels with multipath distortion", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.712-715, April, 1999.

A. Reis, J. Rocha, A. Gameiro and J. Carvalho, "Bit synchronizer operating at half rate", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, pp.550-553, April, 1999.

A. Gameiro, "Rate Adaptation through Modulation Selection for Infrared WLAN's", 5th International Conference on Telec., Zagreb, Croatia, 15-18 June 99, pp.121-124 .

R. Alves and A. Gameiro, "Coded amplitude and pulse position for infrared WLAN's", 5th International Conference on Telec., Zagreb, Croatia, 15-18 June 99, pp. 113-120.

A. Reis, J. Rocha, A. Gameiro and J. Carvalho, "Phase and Data Synchronizers in the Presence of Noise", 5th International Conference on Telec., Zagreb, Croatia, 15-18 June 99, pp. 59-64.

A. Reis, J. Rocha, A. Gameiro and J. Carvalho, "Influence of the Input Sequence Type on Data Synchronizer Jitter", Annual London Conference on Telecommunications, London, UK, 26-27 July 1999.

R. Alves and A. Gameiro, "Trellis codes based on amplitude and position modulation for infrared WLAN's", IEEE Conference on Vehicular Technology and Communications, VTC-Fall'99, Amsterdam, Sept. 1999, pp. 2934-2939.

A. Reis, J. Rocha, A. Gameiro and J. Carvalho, "Behavior of main classes of data synchronizers", Jornadas de Engenharia de Telecomunicações e Computadores, Lisboa 28-29 Oct. 1999.

A. Reis, J. Rocha, A. Gameiro and J. Carvalho, "Effects of the input signal shape on the PLL jitter", 7th International Symposium on Recent Advances in Microwave Technology (ISRAMT'99), Malaga, Spain, 13-17 Dec. 1999.

Rui L. Aguiar, António R. Tavares, José L. Cura, Eduardo de Vasconcelos, Luís N. Alves, Rui Valadas, Dinis M. Santos, "Considerations on the Design of Transceivers for Wireless Optical LANs", Proceedings of the Colloquium on Optical Wireless Communications, pp. 2/1-2/17, June 1999, London, UK.

Deliverables

Quantitative analysis of the system using other different modulation formats, 16/2/99, R3003, UA, (PRAXIS XXI – XXI/2.1/TIT/1573/95 – DAWN).

Wireless LAN Prototype I, II and III, April/99, R7100.1, R7100.2 and R7100.3, IT, (PRAXIS XXI – 3/3.1/TIT/35/94 – ITCOM).

Laboratorial Prototype of Opto-electronic Interfaces, April/99, P7100.1, IT, (PRAXIS XXI – 3/3.1/TIT/35/94 – ITCOM).

Specification of the Optical Configuration of the Optical Receiver, 30/05/99, R1.2, IT, (PRAXIS XXI – 2/2.1/TIT/1578/95 – IRWLAN).

Signal-to-Noise-Ratio Estimation and Combining Techniques", 30/05/99, R1.3, IT, (PRAXIS XXI – 2/2.1/TIT/1578/95 – IRWLAN).

Prototype of one sector of the sectored receiver, 30/05/99, P3.1, IT, (PRAXIS XXI – 2/2.1/TIT/1578/95 – IRWLAN).

Experimental Evaluation of the Prototype – Optical Sector, 30/05/99, R3.2, IT, (PRAXIS XXI – 2/2.1/TIT/1578/95 – IRWLAN).

Miscellaneous

Paulo M. N. Pereira Monteiro reviewer for Electronics Letters

Paulo M. N. Pereira Monteiro reviewer for ETRI (Electronics and Telecommunications Research Institute) Journal

J. Ferreira da Rocha and Rui Ribeiro. reviewers for CONFETELE'99 held in Sesimbra, Portugal, Abril 1999.

A. Gameiro coordinates the participation of IT in the project VISEF, described in the RMOM research line.

8.3.4 Electronic and Opto-Electronic Components Research Line

Human Resources

Collaborators

João Lemos Pinto	Ph.D.	Associate Professor, UA
Armando Nolasco Pinto	Ph.D.	Assistant Lecturer, UA
Teresa Almeida	Lic.	Researcher, PTI

Other Collaborators

Paulo Sergio André	Ph.D. student	Grant Praxis XXI
Rogério Nogueira	Lic.	Researcher, IT
Jorge Pinto	Lic. Student	Researcher, IT
Tiago Maia	Lic. Student	Final Year Project, UA
Victor Abreu	Lic. Student	Final Year Project, UA
Ana Catarina Mónica	Lic. Student	Final Year Project, UA

Projects

CAMADA WDM: Simulator for the Optical Layer Based on WDM Technology.
An optical communication simulation tool was customized and several systems were analyzed. The studies were centered in comparative analyses between laboratorial set-ups and simulations models. Special attention was given to new dispersion compensation techniques.

O-NODE: Optical Node

A point-to-point WDM technology demonstrator was implemented, in order to allow the study of add-drop multiplexing and dispersion compensation. An add-drop multiplexer was specified and is in the final stage of implementation.

Simulation, Analysis and Optimization of a 2.5 Gbit/s Communication System (Final Year Project)

An optical communication system was analyzed. The study was focused on output timing jitter analysis and characterization of a soliton source previously implemented and developed in the EMITON project.

Ph D Theses

Armando Nolasco Pinto (supervisor: J. Ferreira da Rocha), Universidade de Aveiro, concluded in 1999, (subject: Analysis and Optimization of Optical Communication Systems Based on Solitons)

Paulo Sérgio Brito André, (supervisor: João Lemos Pinto), Universidade de Aveiro, in preparation, (subject: Components for high-speed photonic networks).

Publications

Books and Book Chapters

Armando Nolasco Pinto, *Análise e Optimização de Sistemas de Comunicação Ópticos Baseados em Solitões*, Ph.D. Thesis, University of Aveiro, 22/Dec/1999.

Papers and Journals

J. F. da Rocha, P. Tavares, O. Frazão, P. Monteiro, P. S. André, A. Teixeira, M. Lima, A. Nolasco Pinto, A. Gameiro, R. Ribeiro, L. Ribeiro, A. Cunha, J. L. Pinto, M. R. Ferreira and M. Pousa, Research of the Optical Communications Groups at University of Aveiro and Institute of Telecommunications – Aveiro Pole, *Proceedings of SPIE*, n.º 3572, pp. 568-579, 1999.

P. S. André, A. Nolasco Pinto, J. L. Pinto and J. Ferreira da Rocha, Extraction of Laser Rate Equations Parameters, *Proceedings of SPIE*, n.º 3572, pp. 141-146, 1999.

Papers in Conference Proceedings

A. Nolasco Pinto, P. S. André, J. L. Pinto and F. da Rocha, Short Optical Pulses Generation by Gain Switching of a DFB Laser Diode, in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp. 182-184, April, 1999.

A. Nolasco Pinto, P. S. André, J. L. Pinto e F. da Rocha, Bit-Error Rate Evaluation in Soliton Systems, *Confetele'99*, Sesimbra, Portugal, proceedings pp. 177-181, 1999.

P. S. André, A. Nolasco Pinto, J. L. Pinto e F. da Rocha, Extraction of DFB Laser Rate Equations Parameters for Optical Simulation Purposes, in *Proc. of CONFTELE'99 – II Conference on Telecommunications*, Sesimbra, Portugal, pp. 561-564, April, 1999.

Deliverables

António Teixeira, João Lemos Pinto, Marcelino Pousa, Teresa Almeida, A. Nolasco Pinto and Paulo André, Especificação do Simulador, Deliverable 01 / Year 1, project IT/P115 CAMADA, October 1999.

Paulo Sérgio André, Teresa Almeida, João Lemos Pinto, Marcelino Pousa and A. Nolasco Pinto, Especificação do OADM, Deliverable 01 / Year 1, project IT/P114 O-NODE, October 1999.

Miscellaneous

Co-Organization of Summer School: “Low Dimensional Semiconductors for Opto-electronic Devices and Communication Systems”, aimed at scientists and engineers involved in research, development and applications of opto-electronics materials, devices and systems.

The support of one final year project involving 2 students of the Electronics and Telecommunications Department of the University of Aveiro.

8.3.5 Integrated Circuits and Systems Research Line

Human Resources

Collaborators

Dinis Magalhães dos Santos	Ph.D.	Full Professor, UA
José Luis Vieira Cura	Ph.D.	Auxiliary Professor, UA
Rui Luís Andrade Aguiar	M. Sc.	Assistant, UA

Other Collaborators

David Marques	Research Student	Grant, FCT
Rui Antunes	Research Student	Grant, FCT
Luis Nero Alves	Research Student	Grant, PRAXIS XXI

Projects

FCT - PRAXIS XXI 2/2.1/TIT/1592/95 - GENCLOCK - Architectures for High-Speed Clock Generation and Synchronization. During 1998, the project focused on the development of multi-point distribution systems, with special emphasis on architectural and modeling aspects. New generic and scaleable clock distribution architectures have been developed, and jitter modeling has been analyzed for these (and other) distribution approaches.

FCT - PRAXIS XXI 2/2.1/TIT/1578/95 - IRWLAN - Advanced Technologies for Wireless Infrared Local Area Networks. The project has developed several front-ends for IR optical communication, and has confronted the produced circuits with practical system results. A full IR receiver (comprising a front-end, a clock recovery system, an optimum demodulator and a decoder) has also been produced. Signal to Noise measuring units have been designed. This project is being developed with the cooperation of the Optical Communications Research Line.

Ph.D. Theses

Rui L. Aguiar (supervisor: Dinis M. Santos), Universidade de Aveiro, in preparation (subject: Multi-Point Clock Synchronization and Generation for Integrated Circuits).

M. Sc. Theses

David Marques (supervisor: Dinis M. Santos), Universidade de Aveiro, in preparation (subject: A transport system for mixed synchronous and asynchronous traffic).

Eduardo de Vasconcelos (supervisor: Dinis M. Santos), Universidade de Aveiro, concluded in 1999 (subject: A CMOS 622Mb/s SDH system).

Luís Nero Alves (supervisor: Dinis M. Santos), Universidade de Aveiro, in preparation (subject: Implementation of CMOS-based Analogue Dividers).

Publications

Books and book chapters

R. Aguiar e D. Santos, "Clock Distribution Strategy for IP-Based Development", in VLSI: Systems in a Chip, L. M. Silveira, S. Devadas e R. Reis (editors), Chapman & Hill, ISBN-0-7923-7731-1, pp.181-191, 1999.

Papers in Conference Proceedings

Rui L. Aguiar, J. L. Oliveira "Issues on Internet Evolution and Management", accepted for presentation at ICEIS'99 - 1st International Conference on Enterprise Information Systems, Setúbal, Portugal, March 1999.

David Marques, Rui L. Aguiar, Cipriano Lomba "An Efficient Transport System for Mixed Synchronous and Asynchronous Traffic", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Armindo Carreiró, Rui L. Aguiar, Eduardo de Vasconcelos, Dinis M. Santos, Cipriano Lomba, "A High-Gain, High-Bandwidth Receiver for Atmospheric Optical Communications", in Proc. of CONFTELE'99 – II Conference on Telecommunications, Sesimbra, Portugal, April, 1999.

Luís Nero Alves, Rui L. Aguiar, Dinis M. Santos, "A CMOS Signal to Noise Measurement Circuit for Wireless Infrared Sectored Receivers, Jornadas de Engenharia de Telecomunicações e Computadores, JETC99, ISEL, October 1999, pp-IX.9-IX.13.

E. Vasconcelos, Luís Nero Alves, Rui Valadas, Dinis M. Santos, "Considerations on the design of transceivers for wireless optical LANs", IEE Colloquia on Optical Wireless Communications, London, U.K, June 1999, pp 2.1-2.17.

Eduardo de Vasconcelos, José L. Cura, Rui L. Aguiar, Dinis M. Santos, "A Novel High-Gain, High Bandwidth CMOS Differential Front-End for Wireless Optical Systems", ISCAS'99 - International Symposium on Circuit and Systems, Orlando, Florida, May 1999 pp. IV-431-434.

E. Vasconcelos, R. Aguiar e D. Santos, A 0.8 μ m CMOS, 622 Mb/s "SDH/SONET Communication System", MWSCAS'99, 42nd Midwest Symposium on Circuits and Systems, Las Cruces, New Mexico, August 1999.

R. Aguiar e D. Santos, "Simulation and Modeling of Digital Delay Locked Loops", MWSCAS'99, 42nd Midwest Symposium on Circuits and Systems, Las Cruces, New Mexico, August 1999.

Luís N. Alves, Rui L. Aguiar, "A Differential Current-Conveyor Based Buffer for High-Bandwidth, Low-Signal Applications", ICECS'99, 6th IEEE Conference on Electronics, Circuits and System, Cyprus, September 1999.

Rui L. Aguiar, D. M. Santos, "Modeling Charge-pump Digital Delay Locked Loops" ICECS'99, 6th IEEE Conference on Electronics, Circuits and System, Cyprus, September 1999.

R. Aguiar e D. Santos, "Clock Distribution Strategy for IP-Based Development", VLSI'99, X IFIP International Conference on VLSI, December 1999 (also published as a book chapter, see above).

Rui L. Aguiar, António Tavares, José Luis Cura, Eduardo de Vasconcelos, Luis Nero Alves, Rui Valadas, "Electronic Circuits for Wireless Optical LANs – I", Revista do DETUA, Vol. 2, nº 6, September 1999, pp 766-775.

Rui L. Aguiar, António Tavares, José Luis Cura, Eduardo de Vasconcelos, Luis Nero Alves, Rui Valadas, "Electronic Circuits for Wireless Optical LANs – II", Revista do DETUA, Vol. 2, nº 6, September 1999, pp 776-786.

Luís Nero Alves, Rui L. Aguiar, Dinis M. Santos, "A CMOS Signal to Noise Measurement Circuit for Wireless Infrared Sectored Receivers", Revista do DETUA, Vol. 2, nº 6, September 1999, pp 787-791.

Luís Nero Alves, Rui Aguiar, Eduardo de Vasconcelos, José Luís Cura, "A Sectored Receiver for Infrared Wireless Networks", ISCAS'2000, IEEE International Symposium on Circuits and Systems, Geneva, May 2000 (accepted).

Miscellaneous

Icolan - R&D project sponsored by Agência de Inovação, for the development of electronic systems for open air communications. Involvement: Dinis M. Santos, Rui L. Aguiar, José L. Cura, Eduardo de Vasconcelos, David Marques.

DIFFERENCE - research project sponsored by ACTS (AC.207), for the analysis of new services on an advanced Internet infrastructure. Involvement: Rui L. Aguiar.

Rui. L. Aguiar reviewer for IEEE-Journal of Selected Areas in Communication – Wireless Series

Dinis M. Santos reviewer for CONFTELE'99 held in, Sesimbra, Portugal, April 1999.

Research topics not directly related to telecommunications activities:

Front End and data readout for radiation detector electronics (project PET, in collaboration with LIP and FCTUC and FMUC). Involvement: Dinis M. Santos and José Rosado.

Smart Power Integrated Circuits (in collaboration with IT/IST). Involvement: Dinis M. Santos and José L. Cura. Sponser: Praxis XXI. During this year a basic analogue and mixed-analogue digital library has been developed for usage in the project.

NOISE — Noise Studies in CMOS Detector Front Ends. Started April 1999. Funding: FCT (CERN Fund).

8.3.6 Integrated Communications and Multimedia Research Line

Note:

During the year of 1999 the Integrated Communications and Multimedia Research Line has been merged with the Networks Research Line. This report is the last where the activities of this research line are presented as autonomous. The new research line that has resulted from this merge is called the Networks and Multimedia Communications Research Line.

Human Resources

Collaborators

Vasco F. Lagarto	M.Sc.	Director for Research, PT-CET
A. Manuel de Oliveira Duarte	PhD	Full Professor, UA
Manuel Alberto Violas	PhD	Auxiliary Professor, UA

Other Collaborators

Victor M.L. Marques	Ph.D. Student	Grant, PRAXIS + IT
Ricardo V. Cadime	M.Sc. Student	Grant, PRAXIS + IT
F. Miguel Oliveira	Researcher	Grant, contract with PT
João C. Tedim	Researcher	Grant, UA
Jorge Miguel Jardim	Lic. Student	UA, Final Year Student
João Rocha	Lic. Student	UA, Final Year Student

Projects

BROADBANDLOOP (ACTS.038), ended May 1999

Project sponsored by the ACTS programme, European Union. The main objectives of the project were to define and demonstrate, in live field trials, a concept for a full service access network which migrates fibre gracefully into the local loop when bandwidth demand increases, with an offer of services that targets two customer groups: small to medium size businesses and residential customers. BBL solutions support the needs of network operators to provide both narrowband and broadband services such as high speed Internet Access and Video on Demand that are economically justified in a competitive environment. The field trial sites located in Denmark, Portugal and Poland, have been purposely selected to enable analysis of typical problems which may be encountered when legacy networks, such as those using the existing copper and/or coax for broadband access or those with little or old telephony infrastructures, are expanded for new service.

AMIS (Funded by Portugal Telecom), ended November 1999

This project was aimed at the development of a software platform that provides non-technical users with easy and user-friendly publishing and editing facilities for web-like documents. The AMIS Service is a Web system that enables authors to create and publish documents using visual editors. The key factor behind this functionality is the utilisation of appropriate software agents and therefore one of the primary tasks of the

project is to investigate intelligent and mobile agents capable of adding links to documents with a minimum effort on the part of the users who, as said before, are supposed to not have a profound technical knowledge about web publishing tools. In order to validate the AMIS Service, an experimental application was launched involving a selected group of users.

SATURNO: Quality of Service and Interoperability in Multimedia Networks (Funded by Portugal Telecom) ended September 1999.

This was a 2 years project sponsored by Portugal Telecom. The objective of the project was to study the problematic associated with the provision of quality of service and interoperability in multimedia networks. This involved the development of a set of multimedia communication protocols between a client and a server following a DAVIC like reference model and the identification of the appropriate interoperability tests; tests about the utilisation of different network protocols supporting quality of service in multimedia applications using such technologies as IP, RSVP and Winsock 2.0 over ATM.

TERA - Techno Economic Results from ACTS (ACTS.364)

Project sponsored by the ACTS programme, European Union. TERA is the ACTS project responsible for the techno-economic evaluations of various multimedia services and network alternatives, under several field situations. Its mission is: (i) Consolidation of guidelines for implementation of new networks and services in ACTS concertation mechanisms; (ii) Provision of a uniform and harmonized evaluation of the various ACTS trials with different focuses, enabling the construction of guidelines based on comparable results; (iii) Provision of techno-economic support for ACTS; (iv) Promotion of techno-economic results in workshops and publications in international journals; (v) Broadening the participation to non-EU Mediterranean countries.

The target audience for this project comprises: the ACTS community, decision makers, network planners, business planners, regulators, equipment suppliers, etc.

TELA: Telecommunications and Production Systems Competitiveness: the case of the district of Aveiro — PRAXIS XXI (Social and Human Sciences).

This is a project funded by PRAXIS XXI (Social and Human Sciences), involving a multidisciplinary team of researchers (members of the Department of Electronics and Telecommunications – Institute of Telecommunications and members of the Department of Environment and Planning) and also benefiting from the collaboration of Portugal Telecom through its R&D Centre in Aveiro and the University of St. Andrews, UK.

The main objective of this project is to study the role of advanced telecommunications services as fundamental factors conditioning the competitiveness of the productive structures and trying to put forward a set of guidelines and recommendations for the elaboration of an integrated services telematic platform for the region of Aveiro.

Acquisition of Know-How in Planning, Operation, Administration and Management of Integrated Broadband Networks

This is an activity partially funded by the Research Institute of the University of Aveiro. Its implementation is carried out in co-operation with the Department of

Electronics and Telecommunications, the Centre for Informatics and Communications of the University of Aveiro and the local branch of INESC (Institute for Computers and Systems Engineering).

The main objective of this activity is to plan, to install, to configure and to operate an ATM network covering most of the University Campus and providing R&D facilities for a number of studies relative to broadband communications and services. Consideration is given to the requirements of as many as possible types of potential users of the network within the Campus. A survey of the relevant ATM standards and/or recommendations and of the available equipment from the main ATM vendors was done as a way to anticipate possible evolution and implementation scenarios. A number of training actions was carried out in order to disseminate the know-how acquired relative to planning, operation and management of ATM Networks.

Recently this activity has been enlarged to encompass the requirements of connectivity between the University of Aveiro Campus, other Universities and FCCN (Fundação para o Cálculo Científico Nacional).

Regional Scientific and Technological Development (PRAXIS XXI, Social and Human Sciences)

The main objective of the Regional Scientific and Technological Development project is the organisation of science and technology policy and the funding of scientific and technological development at the regional level. The approach includes the assessment of the participation of relevant actors and institutions in a regional research and innovation system. The project also addresses the conditions for knowledge development and for stimulating the interaction between knowledge users and producers. Research includes: Policies and Structures; Attitudes; Education and Information; and the Dissemination and Utilisation of Knowledge. Interaction between these research lines is foreseen (e.g. structures and flows of knowledge transfer; information and knowledge diffusion).

The Aveiro region is taken as a reference for some of the studies in progress. Previous experiences of success and failure of actor's and institutions intentions will be analysed and new types of interactions foreseen. An international comparative analysis of policies and structures for science and technology policies will be used for this special purpose.

The researchers of IT involved in this project are particularly concerned with the following issues:

How do infocommunication technologies influence the transfer of knowledge from the scientific and academic communities to the socio-territorial systems in which they are implanted?

What kind of stimulus does a social community with a higher degree of scientific culture impart upon the "agenda setting" of the scientific and academic communities?

Ph D Theses

Manuel Alberto O. R. Violas (supervisors: A.Manuel de Oliveira Duarte and David Heatley, British Telecom Research Laboratories, UK), University of Aveiro, concluded (subject: Wideband Optical Receivrs)

Amaro Fernandes de Sousa (supervisor: Rui Valadas), University of Aveiro, in preparation, (subject: Multiservice ATM Networks Dimensioning: Integer Linear Programming Models).

Victor Manuel Letra Macedo Marques (supervisor: Manuel de Oliveira Duarte with the collaboration of Amaro de Sousa and Rui Valadas), University of Aveiro, in preparation, (subject: Multimedia Services in ATM Networks).

M.Sc. Theses

Manuel António Esteves Batista (supervisor: A.Manuel de Oliveira Duarte), University of Aveiro, in preparation, (subject: New Telematics and Home Automation Technologies for the Support of Disabled People with Special Needs).

Ricardo Nuno Vicente Cadime, (supervisor: Manuel de Oliveira Duarte with the collaboration of Amaro de Sousa and Rui Valadas), University of Aveiro, in preparation, (subject: Quality of Service in Multimedia Networks).

António Barreiros, (supervisor: Manuel de Oliveira Duarte with the collaboration of Eduardo Anselmo de Castro, Dept. Environment and Planning, UA), University of Aveiro, in preparation, (subject: Strategic Regional Telecommunications Planning: Concepts and Issues)

Ricardo Jorge Ferreira, (supervisor: Manuel de Oliveira Duarte with the collaboration of Marcelino Pousa, Portugal Telecom Inovação), Portugal Telecom, in preparation, (subject: Access Networks Trends).

António Leandro, (supervisor: Manuel de Oliveira Duarte), Universidade de Aveiro, Digital Cities Office, in preparation, (subject: Planning and Organisational Issues in the Uptake of Information and Communication Technologies in Universities).

Publications

Papers in Conference Proceedings

Sousa, A.F., R Valadas, L Cardoso, A. M. Oliveira Duarte, "ATM Network Dimensioning for Mixed Symmetrical and Asymmetrical Services with Dynamic Reconfiguration in a Multi-Network Provider Environment", 3rd IFIP Workshop on Traffic Management and Design of ATM Networks, London, 26 - 27 April 1999.

Silva, Lúcia Oliveira, A. Manuel de Oliveira Duarte, "Infocommunication technologies as catalysts of scientific and social development", in: ICPPIT - International Conference on Public Participation and Information Technologies, Lisboa, 20-22 Outubro / October 1999.

Tedim, João M., A. Manuel de Oliveira Duarte, Lúcia Oliveira Silva, "The School, the Science Centre and the Internet: Elements of a New Integrated Learning Environment", in: ICPPIT - International Conference on Public Participation and Information Technologies, Lisboa, 20-22 Outubro / October 1999.

Oliveira, Fernando Miguel, João M. Tedim, A. Manuel de Oliveira Duarte, “A Problemática da Divulgação da Cultura Científica Usando os Recursos Proporcionados pela Internet e pelas Redes Telemáticas / The Role of the Internet and Telematic Networks as Factors Raising Public Awareness of Science and Technology”, in: 3º Encontro Lusófono de Ciências da Comunicação – Investigação: convergências e desafios, LUSOCOM, Braga, 27-30 Outubro / October, 1999.

Silva, Lúcia Oliveira, A. Manuel de Oliveira Duarte, “Tecnologias infocomunicacionais como catalisadores da cultura científica / Infocommunication technologies as catalysts of scientific Culture”, XIV Jornadas Internacionales de Comunicación - Divulgar la ciencia, Facultad de Comunicación, Universidad de Navarra, Pamplona, 4-5 Novembro / November 1999.

Silva, Lúcia Oliveira, A. Manuel de Oliveira Duarte, “As novas navegações: à descoberta das cidades digitais / The New Navigations: in Search of Digital Cities”, III COMBAHIA, Universidade Federal da Bahia, S. Salvador da Bahia, 1-3 Dezembro / December 1999.

Castro, Eduardo Anselmo, A. Manuel de Oliveira Duarte, J. M. Jardim, P. Pego, “Network externalities: effects and trends in emerging telecommunication services”, Proceedings of 3rd European Workshop on Techno-economics for Multimedia Networks and Services, Aveiro 14-16 December 1999

Azevedo, Fernando, J.M. Jardim, A. Manuel de Oliveira Duarte, “The BroadBandLoop concept: a techno-economic study”, Proceedings of 3rd European Workshop on Techno-economics for Multimedia Networks and Services, Aveiro 14-16 December 1999

Monath, Thomas, Combes, Cecile, Azevedo, Fernando, Jardim, J.M., Dostal, Josef, Elnegaard, Nils, A. Manuel de Oliveira Duarte, “Techno-economic analysis of the Fibre Access Evolution”, Proceedings of 3rd European Workshop on Techno-economics for Multimedia Networks and Services, Aveiro 14-16 December 1999

Project Deliverables

The following list includes a selected choice of the most relevant deliverables issued in 1999 by the projects where this research line has been involved.

Project ACTS.364 – TERA (Techno Economics Results from ACTS)
Del.6: New Techno Economic Tool: Methodology and Documentation

Project TELA: Telecommunications and Production Systems Competitiveness: the case of the district of Aveiro — PRAXIS XXI (Social and Human Sciences).
Annual Review Report

Project Regional Scientific and Technological Development (PRAXIS XXI, Social and Human Sciences)
Annual Review Report

Miscellaneous

Orientation of theses and dissertations of postgraduate students associated with other Research Units.

Some of the research activities in IT have an inter-disciplinary nature and give rise to the formation of research teams with members from IT and from other Research Units. The following thesis and dissertation are a consequence of some of these activities and involve researchers from the Communication and Arts Department and from the Environment and Planning Department of the University of Aveiro:

Lídia de Jesus Oliveira Loureiro da Silva (supervisors: Manuel de Oliveira Duarte and Armando Jorge Oliveira) University of Aveiro; in preparation; (subject: Cognitive and Social Impact of the Globalisation of Communication Networks).

António Leandro, (supervisors: Manuel de Oliveira Duarte and Eduardo Anselmo de Castro, Department of Environment and Planning), Universidade de Aveiro, Digital Cities Office; in preparation; (subject: Planning and Organisational Issues in the Uptake of Information and Communication Technologies in Universities).

Manuel de Oliveira Duarte, Jorge Miguel Jardim:

Organization of: “3rd European Workshop on Techno-economics for Multimedia Services and Services”, Universidade de Aveiro, Portugal, 14-16 December 1999.

Vasco Lagarto:

Member of the Telematics Applications Programme Management Committee.