Fraunhofer
PORTUGAL

ASSOCIAÇÃO FRAUNHOFER PORTUGAL RESEARCH

MANAGEMENT REPORT 2010

Fraunhofer: A new ambition for Portugal's R&D

Research of Practical Utility lies at the heart of all activities developed by Fraunhofer Portugal.

Founded in 2008 – as a result from the Portuguese-German long term collaboration in Science and Technology – Fraunhofer Portugal focuses on companies as customers and partners to promote innovative product development by delivering Applied Research results in an international context.

Adopting the well tested – and undisputedly successful – model operated in Germany by the Fraunhofer-Gesellschaft, Fraunhofer Portugal supports the economic development and serves the wider benefit of society. Our services are provided to customers and contractual partners in industry, the service sector and public administration.

At the moment, the Associação Fraunhofer Portugal Research (Fraunhofer Portugal) owns and operates the Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions (Fraunhofer AICOS) – a partnership between Fraunhofer-Gesellschaft and the University of Porto – focusing on "Ambient Assisted Living" (AAL) and Information and Communication Technologies for Developing Countries (ICT4D).

During the start-up phase, our Scientists and Engineers work with a budget financed by external revenue (projects and licensing) and institutional funding provided by the Portuguese Foundation for Science and Technology (FCT) and Fraunhofer-Gesellschaft. The base line for this type of funding determines

Fraunhofer Portugal

A investigação de utilidade prática está no centro de todas as actividades desenvolvidas pela Fraunhofer Portugal.

Fundada em 2008 – e resultando de uma colaboração de longo prazo em Ciência e Tecnologia entre Portugal e a Alemanha – a Fraunhofer Portugal mantém um enfoque nas empresas como parceiros, promovendo e desenvolvendo actividades de investigação aplicada num contexto internacional.

Adoptando o bem-sucedido modelo de negócio operado na Alemanha pela Fraunhofer-Gesellschaft, a Fraunhofer Portugal apoia o desenvolvimento económico e promove o bem-estar ao contribuir para o incremento da qualidade de vida das populações.

Neste momento a Associação Fraunhofer Portugal Research (Fraunhofer Portugal) detém e opera o Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions (Fraunhofer AICOS) – uma parceria entre a Fraunhofer-Gesellschaft e a Universidade do Porto – dedicada aos temas do "Ambient Assisted Living" (AAL) e das Tecnologias de Informação e Comunicação para Países em Desenvolvimento (ICT4D).

Durante a fase de arranque deste centro, os nossos cientistas e engenheiros vêm a sua actividade financiada por receitas externas e financiamento institucional atribuído pela Fundação para Ciência e Tecnologia (FCT) e pela Fraunhofer-Gesellschaft. A linha orientadora do financiamento institucional determina que este deve ser concedido em montantes

that it will be granted in decreasing amounts over the initial five years, incentivizing the implementation of an efficient business model mainly financed by external revenue.

Fraunhofer Portugal offers its key stakeholders a strong value proposition!

To the users of our solutions we offer an increment in quality of life by developing relevant and practical solutions that match their needs.

To our industrial clients we offer the opportunity to increment their innovation dynamics by developing new prototypes for highly competitive products and services that contribute to a bigger differentiation and internationalization of their business.

To those that invest in the promotion of the NSTS , we offer a committed collaboration in the qualification of human resources: by enrolling Portuguese students and scientists in market-oriented R&D activities, and enabling them apply their knowledge in solutions that meet real market demands, we are providing for the urgently needed future generation of highly skilled scientists and engineers.

Recognized by the Portuguese Government as an "Institution of Public Common Interest", Associação Fraunhofer Portugal Research (Fraunhofer Portugal) takes its name from Joseph von Fraunhofer (1787-1826), the illustrious Munich researcher, inventor and entrepreneur.

progressivamente menores ao longo dos primeiros cinco anos de operação, incentivando assim a Fraunhofer Portugal a adoptar um modelo de negócio eficiente primordialmente financiado através de receitas oriundas de Projectos de Investigação realizados com entidades externas.

A Fraunhofer Portugal apresenta aos seus parceiros uma forte proposta de valor!

Aos utilizadores das nossas soluções oferecemos um incremento na sua qualidade de vida ao desenvolver soluções relevantes mas sobretudo práticas para as suas necessidades.

Aos nossos clientes industriais oferecemos capacidades de incremento das suas dinâmicas de inovação através do enfoque que os nossos esforços de I&D colocam na disponibilização de novos produtos e serviços capazes de contribuir para uma maior diferenciação e internacionalização dos seus negócios.

A todos aqueles que investem na promoção do Sistema Científico e Tecnológico Nacional, oferecemos uma colaboração empenhada em contribuir para a crescente qualificação dos nossos recursos humanos, permitindo a estudantes e cientistas portugueses a aplicação prática do seu conhecimento ao serviço de reais necessidades do mercado.

Reconhecida pelo Estado Português como Pessoa Colectiva de Utilidade Publica, a Associação tem o nome do famoso cientista, inventor e empreendedor Joseph von Fraunhofer (1787-1826), originário de Munique, Alemanha.

"Sailing through the Storm"

We close our second complete year of operation in Portugal with the sensation of having experienced an exciting and challenging stage of this sail-trip across the storm that not only the portuguese, but also the global economy is undergoing in the last couple of years.

The objective of all heavy weather tactics is to avoid capsizing the boat. One of the major goals of heavy weather tactics is to keep the bow of the boat head-on into the waves. Despite strong currents from the economic crisis, as well as important delays in industry oriented R&D funding programs, we were able to sail into a handful of waves, winning a couple of projects, keeping on-going projects on track, as well as to deliver promising project results to existing industrial customers.

The most important factor to surviving a storm is to have a skilled crew to maneuver the boat into the wind. Notwithstanding strong front winds generated by having to – unexpectedly – operate the full year in temporary installations, we were able to grow our scientific staff and are quite impressed with the increasing attractiveness that Fraunhofer Portugal enjoys among the talented young Researcher and Student community.

"Velejando na Tempestade"

Encerramos o segundo exercício completo da nossa operação em Portugal com a sensação de termos experimentado uma etapa entusiasmante e desafiadora desta navegação à vela através da tempestade a que a situação económica está exposta.

O objectivo de todas as tácticas de velejar em condições de intempérie é evitar que o barco se vire. De todas, talvez a táctica mais importante seja manter a proa do barco de frente para a ondulação. Apesar das fortes correntes provocadas pela crise económica, assim como atrasos relevantes nos programas de incentivo e financiamento à I&D, velejamos com sucesso uma mão cheia de vagas, adquirindo alguns projectos, mantendo a execução de projectos existentes sob controlo, bem como apresentando resultados interessantes a clientes industriais.

O factor mais importante para sobreviver a uma tempestade em alto mar é possuir uma tripulação preparada e capaz de manobrar a embarcação de encontro ao vento. Não obstante ventos frontais intensos trazidos pela necessidade – inesperada – de operar todo o exercício em instalações que não são, ainda, as ideais, foi-nos possível alargar a nossa equipa. Estamos a este respeito positivamente impressionados com a atractividade crescente de que a Fraunhofer Portugal beneficia na talentosa comunidade de jovens estudantes e cientistas.

Velejar apresenta a vantagem de permitir posicionar a embarcação numa zona que possibilite navegar a tempestade da melhor forma. A Fraunhofer Portugal seguiu esta táctica de forma dual:

Sailing also has the advantage of helping you to position your boat in an area where it can better ride out the storm. Fraunhofer Portugal pursued this objective following a dual strategy:

Increased effort in the acquisition of large National/EU research projects, where the AAL4ALL project acquired by Fraunhofer AICOS is the largest sign of its success.

Investing in awareness generating activities, such as the International Policy Workshop on Ambient Assisted Living and the Fraunhofer Portugal Challenge Scientific Award targeted to MSc and PhD Students from Portuguese Universities.

Furthermore, given that you are in a coastal area, you may want to approach a windward shore. Leveraged by the higher profile of institutional funding available during our start-up phase, we urged our engineers and scientists to work on internal research activities and kicked-off a couple of what we consider to be "pre-industrial projects". This enabled us not only to reach informal agreements for a couple of industry projects that we believe will come in the near future, as well as to reach one of our own secretly pursued milestones: we have filed our first patent request for a technology that we trust to have a realistic mass market potential.

We closed last year's report highlighting 2010 as a fundamental indicator about the future development of Fraunhofer Portugal and Fraunhofer AICOS. Although we've sailed quite some miles, no one can tell for sure that we have already crossed the eye-of-the-storm, or if the weather conditions will

Aumentando o esforço de aquisição de grandes projectos financiados por programas nacionais e europeus, do qual o sucesso na aquisição do projecto bandeira AAL4ALL é o mais evidente sinal de sucesso.

Investindo em actividades criadoras de notoriedade como por exemplo uma workshop internacional sobre o tema do AAL, e o lançamento do prémio científico para alunos finalistas de Mestrado e Doutoramento – Fraunhofer Portugal Challenge.

Além disso, caso a embarcação se encontre numa zona costeira, é aconselhável aproximar o barco de uma zona abrigada. Alavancados pelo maior perfil de financiamento institucional disponível nesta fase de arranque, desafiamos os nossos cientistas e engenheiros a trabalhar em actividades de investigação promovidas internamente e arrancamos com duas actividades que consideramos serem "projectos pré-industriais". Tal não só nos permitiu estabelecer acordos informais para um par de projectos com parceiros da industria, como também atingir um dos objectivos que secretamente vínhamos prosseguindo: a Fraunhofer Portugal apresentou o seu primeiro pedido de registo de patente para uma tecnologia que acreditamos ter um potencial de mercado muito realista.

Encerramos o nosso relatório do passado ano apontando o exercício de 2010 como um indicador fundamental acerca do desenvolvimento futuro da Fraunhofer Portugal e do Centro AICOS. Apesar de termos velejado bastantes milhas, ninguém poderá com certeza assegurar que atravessamos já o "olho da tempestade", ou se, pelo contrário, as condições climatéricas tenderão a piorar no curto prazo.

significantly worsen.

Whatever happens we are confident to be pursuing the appropriate strategy to sail us successfully out of the storm. We reinforce our boat as we finally kicked off the fit-out construction works for our installation, we increase our awareness with important audiences, we strengthened the team and we accumulate knowledge and results important to attract customers and acquire projects.

In addition, we are convinced that an economic recovery in Portugal will directly concern applied research as industry will be in greater need of innovation for internationally successful products than ever before! Following the two main topics 'Ambient Assisted Living' (AAL) and 'ICT for Developing Countries' (ICT4D), Fraunhofer AICOS dedicates its projects to a variety of themes that are paramount to the challenges that will prevail in the storm aftermath: health and well-being for an ageing society, increased productiveness for labor intensive tasks e.g. related to maintenance of public transportation systems, or stocking in hyper markets and tools to help a sustainable economic growth in developing countries.

The latter is a powerful evidence of the focus we put into people, their real needs, and the impact that people have in our creative process, in the ideas we explore, and the R&D projects we develop.

Fraunhofer Portugal already created a wealth of specialist knowledge, and our attractiveness to talented young Researchers gives us a profile to compete for the best

Em qualquer caso, confiamos estar a seguir a estratégia apropriada para atravessar a tempestade com sucesso. Reforçamos a embarcação, tendo finalmente iniciado a construção das nossas futuras instalações, aumentamos a nossa notoriedade junto de públicos muito importantes ao nosso sucesso, fortalecemos a equipa e acumulamos conhecimento e resultados científicos importantes para atrair o interesse das empresas e adquirir projectos.

Acresce que estamos convencidos do papel determinante que uma actividade como a da Investigação Aplicada terá na recuperação das economias, especialmente na Portuguesa, uma vez que as industrias, mais do que nunca, sentirão a necessidade de inovar e lançar produtos bem sucedidos nos mercados externos. Dedicando-se aos seus tópicos principais "Ambient Assisted Living" (AAL) e "TIC para Países em Desenvolvimento" (ICT4D), o Fraunhofer AICOS concentra-se em projectos dedicados a uma variedade de temas que serão incontornáveis para ultrapassar as causas (e consequências) da intempérie: saúde e bem-estar na sociedade envelhecida, produtividade acrescida em tarefas de mão-de-obra intensiva, ou ferramentas para promover o crescimento económico nas sociedades em desenvolvimento.

A Fraunhofer Portugal vem criando um capital de conhecimento especializado, e a nossa atractividade na camada de investigadores mais jovens permite-nos competir pelos melhores e pelos que têm em mente aplicar com utilidade pratica o conhecimento adquirido. Não ignoramos a importância deste talento pois este é essencial para ultrapassar a tarefa intelectualmente mais desafiante do nosso trabalho: combinar

Researchers, Students and Engineers that have Practical Utility in mind. This is important because we need outstanding talent to tackle the most demanding intellectual challenge of our work: Combining real user needs, economic viability and science. Knowledge is today's most valuable resource, when applied successfully to provide solutions that meet market demands and lead to superior user experience.

In short, we are fully addicted to "Remarkable Technology, Easy to Use!"

as necessidades dos utilizadores das nossas soluções e a viabilidade económica das nossas ideias com o conhecimento científico. Quando aplicado com sucesso na criação de soluções que satisfaçam as necessidades dos mercados e proporcionem uma experiencia de utilização superior, o conhecimento torna-se o activo mais valioso da actualidade.

Em suma, estamos absolutamente focados em criar "Remarkable Technology, Easy to Use!"

Dirk Elias
President of the Executive Board
Presidente da Direcção

REPORT OF THE EXECUTIVE BOARD

GOVERNANCE & MANAGEMENT

OVERVIEW OF FRAUNHOFER PORTUGAL

2010 KEY PERFORMANCE INDICATORS

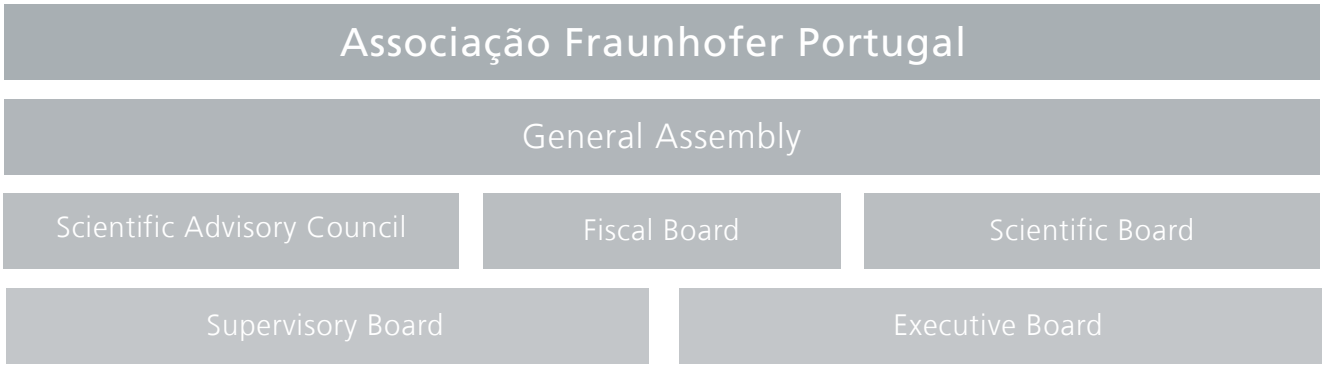
MANAGEMENT REPORT

GOVERNANCE & MANAGEMENT

Governance Structure

We seek to follow best practice in every area of the Association's governance and that is reflected in our organization, our principles and in our transparency.

The Associative Structure of Fraunhofer Portugal clearly distributes the functions, duties and responsibilities of the diverse boards.



The General Assembly is the deliberative body of Fraunhofer Portugal. The Fiscal Board is a non-executive governance body with consulting, counseling and controlling competences. The Scientific Board and the Scientific Advisory Council (SAC) are non-executive governance bodies with counseling and consulting competences.

Management

Fraunhofer Portugal Management is a responsibility of both the Supervisory Board (with broad assessment powers) and the Executive Board (responsible for the daily management and current management actions).

Supervisory Board

Georg Rosenfeld
President of the Supervisory Board

With experience in the areas of management of scientific research, Georg Rosenfeld has a PhD in Physics and received the *Venia Legendi* in Physical Chemistry by the University of Bonn.

Professional Career Summary:
Fraunhofer-Gesellschaft, Division Director Corporate Development
Fraunhofer-Gesellschaft Vice-Director, R&D Planning
Fraunhofer-Gesellschaft, R&D Planning
MESA/Applied Physics Faculty of the University of Twente, Senior Scientist
Jülich R&D Center, Scientist

João Paulo Oliveira
Deputy to the President of the Supervisory Board

With a professional career in the areas of production engineering and global management with growing levels of responsibility, João Paulo Oliveira has an MSc in Industrial Production Engineering by the *Universidade de Lisboa*, having also an MBA by the *Instituto Empresarial de Portugal* in partnership with ESADE (Barcelona), and attending advanced international executive training programs (Carnegie Bosch Institute Pittsburgh and IESE/ *Universidade de Navarra*)

Professional Career Summary:
Robert BOSCH: Vice-President of the hot water and solar residential unit
Robert BOSCH /Vulcano Portugal: Representative for BOSCH Group in Portugal
Robert BOSCH Thermotechnik Germany
Vulcano Termodomésticos Portugal
Vista Alegre Group
Robert BOSCH France, Chile and China
Vulcano Termodomésticos Portugal

Paulo Simões
Supervisory Board Member

With experience in strategic planning, financial controlling, organizational development and management, Paulo Simões has a MSc in Biotechnology by the *Universidade Nova de Lisboa*, an MBA by the *Universidade Nova de Lisboa*/Wharton Business School (UCLA), and attended the Harvard Business School General Management Program.

Professional Career Summary:
Sonae: Investment Management
Sonae: Portfolio management and controlling, Secretary to the Board of Directors
Optimus Telecomunicações: Business Unit Marketing IS Leader
Sonaecom SSI: Financial Administrator
Sonaecom: Management control and Secretary to the Board of Directors
Sonae: Management Planning
I.T.Q.B.: Researcher

Supervisory Board of the Associação Fraunhofer Portugal Research	Non-Executive	
	Independent	Non-Independent
President		
Georg Rosenfeld		Yes
Board Members		
Paulo Simões	Yes	
João Paulo Oliveira*		Yes

*João Paulo Oliveira was invited to integrate the Supervisory Board in the quality of Vice-President of Robert Bosch GmbH/ Bosch Termotecnologia Portugal, being in that quality a Non-Executive Independent Member. Afterwards he was also elected President of the Directory Council of the *Câmara de Comércio e Indústria Luso-Alemã*, a founding associate of FhP, therefore assuming the quality of Non-Executive Non-Independent Member.

Executive Board

Dirk Elias
President of the Executive Board

With a professional career going from R&D activities development to entrepreneurial experiences and management, Dirk Elias is a Dipl. Ing. in Electrotechnical Engineering by the Technical University of Munich, having developed his PhD in the Technical University of Berlin.

Professional Career Summary:
President of the supervisory board of Ivistar until the company was sold to a foreign investor.
CEO of Ivistar AG
Senior Scientist & Deputy Department leader in Fraunhofer FOKUS Institute, Berlin
Scientist in Fraunhofer FOKUS Institute, Berlin

Miguel Barbosa
Executive Board Member

With a professional career initiated in technical areas, evolving to corporate and business development functions, Miguel Barbosa has an MSc in Electrotechnical and Computers Engineering by the University of Porto and has an MBA by the *Escola de Gestão do Porto*.

Professional Career Summary:
Corporate Development (Corporate Strategy & Finance) in Sonaecom
Business Development and Innovation Manager in INI-GraphicsNet foundation
Mobile Telecommunications Network Development Manager - Optimus
Software Development Engineer at Siemens

Berthold Butscher
Executive Board Member

With a career highly oriented to R&D, both in industry and in R&D institutions, Berthold Butscher has a Dipl. Ing. in Electrotechnical and Computers Engineering by the University of Applied Sciences of Konstanz and by the Technical University of Berlin.

Professional Career Summary:
Deutsche Telekom Berlin/Germany: Leader of the Integrated Communication Systems Unit
Hahn-Meitner-Institute Germany: Distributed Systems Department Chief
Hahn-Meitner-Institute Germany: Scientist

The functions and responsibilities of the Executive Board

President	Executive Director	Executive Director
Dirk Elias	Miguel Barbosa	Berthold Butscher
General Administration	Business Development	R&D Planning Support
R&D Planning	Planning & Control	
Business Development	Accountancy and Finances	
Facilities	Human Resources	
	Legal	
	Facilities	

Other roles carried out by the Members of the Executive Board

President	
Dirk Elias	Director of Fraunhofer AICOS
	Invited "Catedrático" Professor at the Engineering Faculty of University of Porto
Directors	
Miguel Barbosa	Invited Assistant Professor of the MSc in Innovation and Technological Entrepreneurship, Engineering Faculty of University of Porto
Berthold Butscher	Vice-Executive Director of FOKUS Institut, Berlin

OVERVIEW OF FRAUNHOFER PORTUGAL

Vision: A Driving Force in Innovation

Fraunhofer Portugal proposes a radical change regarding technological innovation in collaboration with scientific institutions in Portugal, and aims at creating scientific knowledge capable of generating added value to its clients and partners, exploring technology innovations oriented towards economic growth, the social well-being and the improvement of the quality of life of its end-users.

Mission: Research of Practical Utility

Fraunhofer Portugal promotes applied research of direct utility to private and public institutions and of wide benefit to society, by managing and coordinating the cooperation of its research centers with:

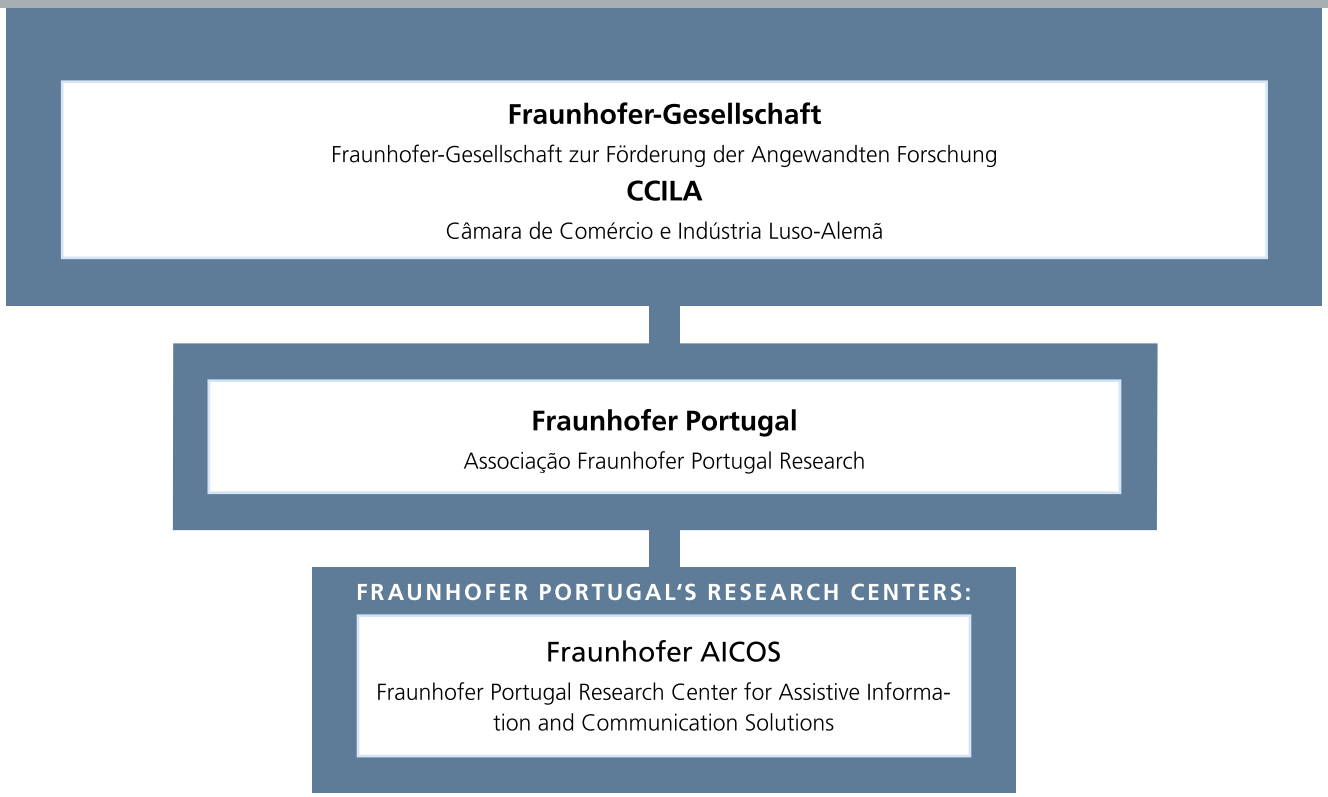
- Other Research Institutions – such as Universities and other relevant Portuguese or non-Portuguese research institutions, as well as Fraunhofer Institutes and other research centers integrated in the knowledge network of Fraunhofer-Gesellschaft;
- Industry Partners – Being clearly understood as our main customer group, we are developing partnerships and cooperation agreements with private and public enterprises, as well as participating in business associations;
- Supporting Partners – Government Institutions and other Institutional partners.

Funding Model

Fraunhofer-Gesellschaft and FCT agreed on a tripartite funding model similar to the one used in Germany by Fraunhofer-Gesellschaft.

During the start-up phase, our Scientists and Engineers work with a budget financed by external revenue (projects and licensing) and institutional funding provided by the Portuguese Foundation for Science and Technology (FCT) and Fraunhofer-Gesellschaft. The base line for this type of funding determines that it will be granted in progressively smaller amounts over the initial five years, incentivizing the implementation of an efficient business model mainly financed by external revenue.

External revenues should be guaranteed through revenues from research projects and development projects and/or contracts celebrated with third parties within Fraunhofer Portugal's activity fields, revenues from intellectual property rights and revenues from licensing the commercial exploitation of products and services resulting from Fraunhofer Portugal's R&D results.



Fraunhofer-Gesellschaft

Founded in 1949, the research organization undertakes Applied Research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector and public administration.

At present, the Fraunhofer-Gesellschaft maintains more than 80 research units in Germany, including 60 Fraunhofer Institutes. The majority of the 18.000 staff are qualified Scientists and Engineers, who work with an annual research budget of €1.65 billion. Of this sum, more than €1.4 billion is generated through contract research. More than 70 percent of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects. Almost 30 percent is contributed by the German Federal and Länder governments in the form of base funding, enabling the Institutes to work ahead on solutions to problems that will not become acutely relevant to industry and society until five or ten years from now.

The Fraunhofer-Gesellschaft is a recognized non-profit organization that takes its name from Joseph von Fraunhofer (1787–1826), the illustrious Munich Researcher, Inventor and Entrepreneur.

German Portuguese Chamber for Industry and Trade

With over 1000 associates in Portugal and Germany, the objective of the Chamber is to enhance the economic relations between the two countries.

Associação Fraunhofer Portugal Research

Founded in 2008 – under the framework of a Portuguese-German long term collaboration in Science and Technology – the *Associação Fraunhofer Portugal Research* (Fraunhofer Portugal) promotes Applied Research that drives economic development and serves the wider benefit of society. Its services are solicited by customers and contractual partners in industry, the service sector and public administration.

At the moment, Fraunhofer Portugal owns and operates the *Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions* (Fraunhofer AICOS) – a partnership between Fraunhofer-Gesellschaft, Fraunhofer Portugal, and the University of Porto – focusing on "Ambient Assisted Living" (AAL) and Information and Communication Technologies for Developing Countries (ICT4D).

Our development strategy accommodates the option to establish additional research units whenever a sustained demand for R&D services applied to a determinate area of scientific knowledge is detected in the market.

Services

Fraunhofer Portugal's Research Services, rendered through the Research Institutions it operates, provides three different types of collaboration to industrial customers that will also be rendered under public funded project participations:

- Contract R&D
- R&D Consulting
- Living Labs

Fraunhofer Portugal will strive to build a reputation of excellence along different service dimensions as valuable as knowledge, credibility, professionalism, creativity, flexibility, response time, and price.

Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions

Incorporated as partnership between Fraunhofer-Gesellschaft and the University of Porto and focusing its activity in "Ambient Assisted Living" (AAL) and Information and Communication Technologies for Developing Countries (ICT4D), Fraunhofer AICOS is the first Research Institution operated by Fraunhofer Portugal.

Extending the Reach of the Information and Knowledge Society

Fraunhofer AICOS aims to enhance people's living standards by offering them intuitive and useful technology solutions, capable of facilitating their access to ICT, and therefore leading to the integration of an increasingly larger sector of the population in the Information and Knowledge Society.

Remarkable Technology, Easy to Use

Fraunhofer AICOS mission is to generate 'Remarkable Technology, Easy to Use'. This means offering specialized competences centered on the improvement of end-user experience and usability of applications, generating applied research solutions capable of contributing to the market success of our client's products and services.

Collaboration plays an essential role enabling the Center to fulfill its mission. Therefore Fraunhofer AICOS is intensively involved in partnerships and cooperation with key players and influencers in its strategic research areas, namely:

– Health Cluster Portugal (organization focused in the promotion and implementation of initiatives and activities leading to the creation of an innovation and technology-based national cluster);

– University of Porto (access to the university know-how and infrastructures, as well as privileged contact with students interested in enrolling in advanced training at Fraunhofer AICOS labs),

– Fraunhofer FOKUS (Fraunhofer Institute based in Berlin operating in closely related scientific fields thus allowing to pool expertise in interdisciplinary collaborative projects as well as facilitating Fraunhofer AICOS seamless integration with Fraunhofer-Gesellschaft in different institutional aspects);

– Center of Excellence for Dematerialization of Transactions (entity that coordinates a network of knowledge and competences in the dematerialization of transactions in Portugal)

Strategic Research Agenda

Fraunhofer AICOS constitutes a new approach to ICT by the Fraunhofer-Gesellschaft, and contributes to the creation of competences in activities of great relevance for the future: AAL[1] & ICT4D[2].

AAL includes methods, concepts, (electronic) systems, devices as well as services that are providing unobtrusive support for daily life based on context and the situation of the assisted person. The technologies applied for AAL are user-centric, i.e. oriented towards the needs and capabilities of the actual user. They are also integrated into the immediate personal environment of the user. As a consequence, the technology is adapting to the user rather than the other way around.

Fraunhofer AICOS intends to address mainly the needs of the ageing population, to reduce innovation barriers of forthcoming promising markets, but also to lower future social security costs, by the use of intelligent products and the provision of remote services including care services that extend the time senior citizens can live in their home environment by increasing their autonomy and assisting them in carrying out activities of daily living.

ICT4D is a general term referring to the application of Information and Communication Technologies (ICTs) within the field of socioeconomic development or international development. ICT4D concerns itself with directly applying information technology approaches to poverty reduction.

Fraunhofer AICOS currently intends to focus its ICT4D activities on the African continent, with special attention to Portuguese Speaking countries as Mozambique and Angola. Naturally and if opportunities are developing, Fraunhofer AICOS is also very interested in addressing the exciting development of Brazil. The primary target user group will be ICT users in rural and developing areas, and the objective is to provide solutions for mobile device services and applications that meet the local users' demands that contribute to a more positive user experience, which in many cases may be their first contact with ICT.

1 Ambient Assisted Living

2 Information and Communication Technologies for Development

Fraunhofer AICOS nurtures the creation of a wealth of scientific knowledge in three key areas:

- Human-Computer Interaction: focusing in User & Social Experience, Mobile & Future Devices, and Evaluation & Usability;
- Information Retrieval: focusing in Acquisition & Processing of Remote Data, Context Awareness, Context Retrieval, and Multimodal Information Fusion;
- Autonomic Computing: focusing in Remote Management, Self-Management, and Configuration & Control

That it applies to different industry sectors such as

- Care, Well-Being and Inclusion: by focusing on helping people with chronic (and other) conditions to live more independent lives, increasing the responsiveness and efficiency of the health care services, contributing to the creation of a competitive health care industry in Europe, and creating low cost services and consumer products for underdeveloped countries;
- Mobile Solutions for Developing Countries focusing on developing locally demand-driven implementation of mobile Internet solutions in cooperation with local developers; designing Mobile applications that fit the local ICT realities (e.g. lower bandwidth, service interruptions, (digital illiteracy), training and coaching for students to get professional mobile application developers;
- Multimedia and Content focusing on making content creation services and devices more interoperable and more intuitive to use; devising content visualization and manipulation techniques and systems that improve accessibility and productivity; explore new ways of retrieving the most relevant information to the user; developing and improving business processes by creating unified interfaces supported by a variety of devices; and enhancing user interaction experience;
- Environment and Energy Awareness: by focusing its research efforts in the reduction of energy consumption, namely through reduction of domestic energy demand; motivating the use renewable energies and adoption of energy efficient technologies; reducing CO2 emissions by motivating modal change to the way energy is used in the domestic area and following the idea, that the consumption of energy in the future will be more supply driven, in contrast to today's paradigm of providing energy according to the demand; enhancement and support of urban infrastructure services (e.g. water supply, waste management).

MANAGEMENT REPORT

Economic and Political Background 2010

The crisis of the Euro Zone's sovereign debt was the watermark of 2010. Mainly because of the strong imbalances on public budget executions in Greece and difficulties from the banking sector in Ireland. The necessity to have the IMF and EU rescuing these economies created the profound concerns that these difficulties might be contagious and could spread to other economies, namely Portugal and Spain. This has aggravated significantly the financing conditions for these two markets.

The downgrading of sovereign ratings on the Euro Zone peripheral countries and the fears that its credits quality was deteriorating (on sovereign as well as mortgage markets) have affected the funding conditions for the European banking system as well.

Despite fears of financial instability, the year registered a favorable evolution in the key economic activity areas. Following negative records in 2009, German GDP grew by 3,6%, Euro Zone GDP was up by 1,7%, and the US GDP posted a growth of 2,8%.

In Portugal, notwithstanding the degradation of the financial situation and the unfavorable evolution of the internal demand during the second semester – as result of the difficult measures adopted by the government in July – the economy posted an evolution above the expectation: 1,3%.

This evolution is explained on the one side by the recovery in the external demand, which has fostered Portugal's exports by 9%, and on the other by the sluggish evolution – 1,8% - of the internal demand. Public consumption has also had a positive evolution yoy (+3,8%) which has a dual effect: on the upside, it has contributed to the stimulus of the country's economic activity, but on the downside, it has worsened the national financial situation, given the increasing external borrowing rates.

Market Review

Evolution and Global Trends

Fraunhofer Portugal's activities should be put into context regarding certain general R&D market trends that are identifiable at a global level:

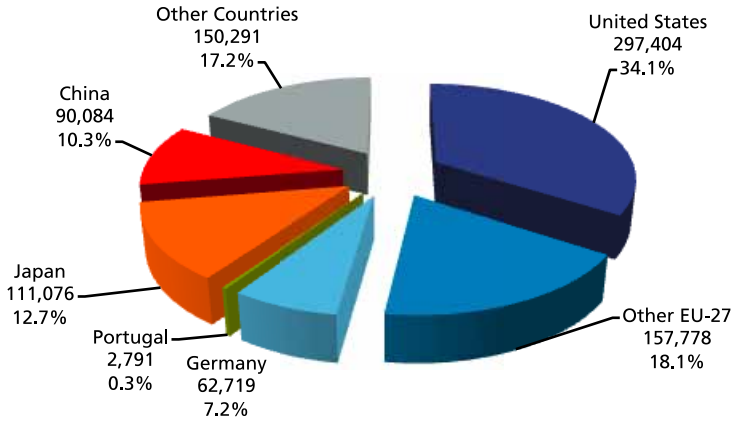
- Growth in R&D expenditures at a global level – both in absolute and relative terms - as companies and governments become increasingly aware of the importance in investing on innovation and knowledge to strengthen their competitiveness and economic growth perspectives.

- Increased internationalization of research and development activities - as companies tend to relocate their R&D efforts in specialized knowledge clusters that are emerging at regional levels;

- Increased R&D subcontracting activities - as companies try to improve their cost effectiveness by searching for more efficient ways to source specialized competences.

In terms of total volume, the world's R&D expenditures are concentrated in a relatively small number of developed countries (the top 15 countries represent more than 90% of the world's R&D expenditures volume), but that tendency is gradually changing as emerging economies intensify their effort in R&D. For example, China occupies already the 3rd place in the ranking of Gross Expenditure on Research and Development (GERD) per country, relegating Germany to the 4th place and being only surpassed by Japan and the USA:

GERD, MILLION €, LATEST AVAILABLE YEAR

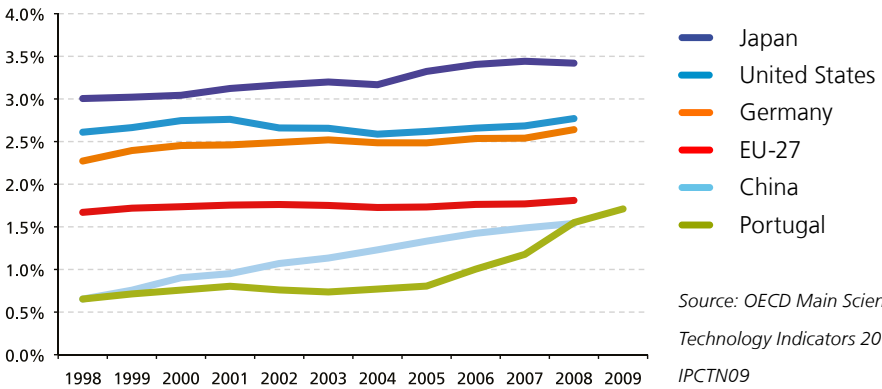


Source: Adapted from OECD Main Science & Technology Indicators 2010 + IPCTN09

TOTAL GERD = 846.969 Million €

Regardless of the recent economic crisis, the global expenditure on R&D has been able to maintain its steady growth pace, partly due to emerging economies intensifying their effort in R&D (usually measured through GERD as percentage of GDP), as they try to 'catch-up' with the levels of investment in developed economies:

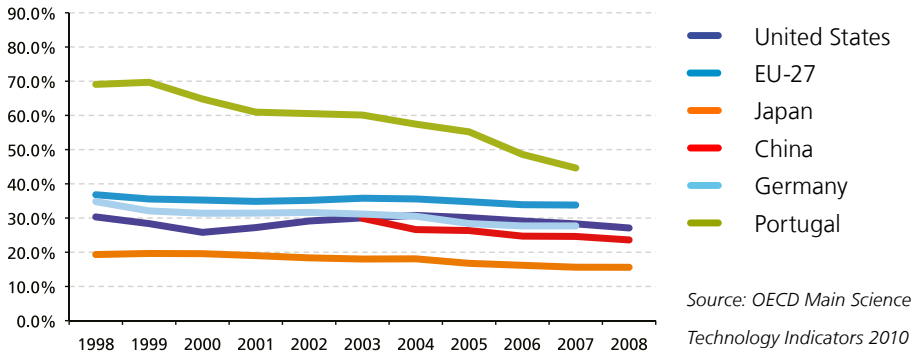
GERD, as % of GDP



Source: OECD Main Science & Technology Indicators 2010 + IPCTN09

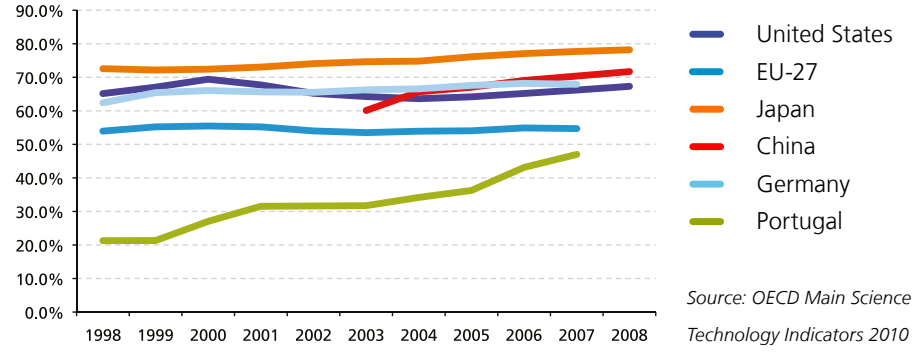
From a funding point of view, the world's R&D market has suffered profound and enduring changes with regards to the financing sources of its activity. The last decade saw a significant growth of R&D financing from industry – today the leading source – while government financing has suffered the inverse trend in terms of relative significance:

GERD, % Financed by Government



Source: OECD Main Science & Technology Indicators 2010

GERD, % Financed by Industry



Source: OECD Main Science & Technology Indicators 2010 + vIPCTN09

Evolution and Trends in Portugal

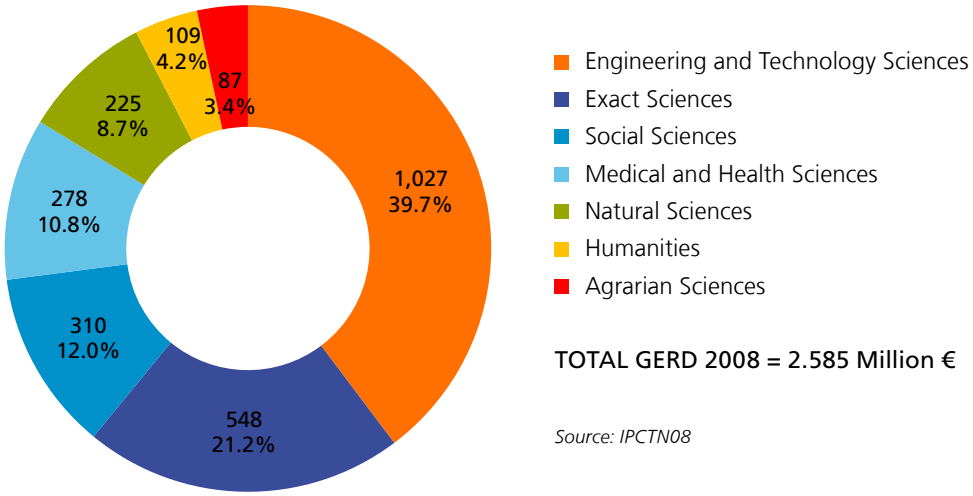
In 2009, Portugal's total expenditures in R&D represented approximately 2,79 billion Euro, the equivalent to 1,71% of Portugal's GDP, and a year-to-year compound growth of 8%.

In the past decade, Portugal has been converging to the EU27 average in terms of GERD as a percentage of GDP, showing a clear commitment from both Industry and Government to close the existing gap.

The R&D financing sources have also suffered dramatic changes. In fact, the change in the financing "mix" during the last decade from Government to Industry as the main financing source for R&D activities has been highlighted as a case study within the EU27, as can be seen in the last chart.

When decomposing the R&D expenditure by scientific and technological domain, it becomes clear that all domains continue to grow in absolute terms and that Engineering and Technology Sciences continue to represent the most important slice of expenditure in Portugal (almost 40%), although losing ground in terms of relative weight to the remaining domains:

GERD by Scientific and Technological Domain, Million €, 2008

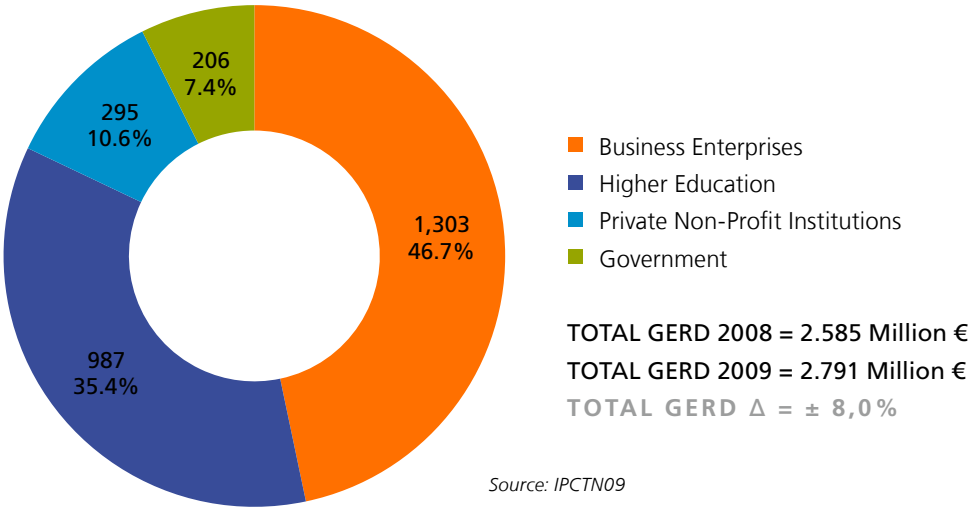


TOTAL GERD 2008 = 2.585 Million €

Source: IPCTN08

When analyzing in more detail the R&D expenditure by performance sector, we can conclude that, although all sectors have grown in absolute terms, the relative weight of Business Enterprises has diminished, mainly due to a stronger growth in R&D done by Private Non-Profit institutions (40,2%) and Higher Education institutions (10,7%), when compared to the relatively weak growth on R&D made by Business Enterprises (0,6%):

GERD by Performance Sector, Million €, 2009



TOTAL GERD 2008 = 2.585 Million €
TOTAL GERD 2009 = 2.791 Million €
TOTAL GERD Δ = ± 8,0%

Source: IPCTN09

Fraunhofer Portugal Operational Review

We close our second complete year of operation in Portugal with the sensation of having experienced an exciting and challenging stage in this sail-trip across the storm that global economy is undergoing in the last couple of years.

Despite strong currents from the economic crisis, as well as important delays in industry oriented R&D funding programs that kept us from reaching the desired milestones, we were able to sail into a handful of waves, winning a couple of projects, keeping on-going projects on track, as well as to deliver promising project results to existing industrial customers.

Sailing actively under merciless weather conditions has the advantage of helping to position the boat in an area where it can better ride out the storm. Fraunhofer Portugal pursued this objective by increasing its effort in the acquisition of large National/EU research projects, and by investing in promoting important awareness creating activities, such as the International Policy Workshop on Ambient Assisted Living and the Fraunhofer Portugal Challenge scientific award rewarding MSc and PhD students from Portuguese Universities that developed "Research of Practical Utility" in their thesis.

This strategy delivered important successes. On the one side Fraunhofer AICOS was acquiring its AAL flagship initiative: the AAL4ALL project, an initiative in the framework of a special QREN call promoted by Fraunhofer AICOS that was strongly endorsed by the Health Cluster Portugal. Final project volume is 7.300K€. On the other side, the International Policy Workshop, organized together with the EU AAL Association not only increased Fraunhofer AICOS institutional visibility as provided for interesting networking. Also, the Fraunhofer Portugal Challenge can be considered success, as in its debut edition it was able to create an impressive "buzz" on formal press and informal social media (with appearances in reference newspapers, radios, and TVs - on air/on-line – and several references in science related forums, blogs, etc.), to attract a reasonable number of applications (from a very diversified number of Universities, thus definitely acquiring the "National" touch and reach), and have 90% of its participants recommending future editions of the Challenge to their colleagues.

Furthermore, given that you are in a coastal area, you may want to approach a windward shore and look for a safe harbor. Leveraged by the higher profile of institutional funding available during our start-up phase, we were able to foster two important activities with an internal profile. Firstly, trying to compensate heavy delays in national incentive programs to industrial R&D, we urged our engineers and scientists to work on internal research activities and kicked-off a couple of what we consider to be "pre-industrial projects" addressing topics that are strongly related to the tasks expected in future contract research projects. In addition we promoted our very first ICT4D activity (A4D: Android for Developing, targeting on ICT4D in the area of mobile application development for Android OS) setting up an important collaboration with Universidade Eduardo Mondlane in Maputo, Mozambique.

This strategy proved also fruitful as both activities yielded interesting results.

The pre-industrial projects developed internally have enabled us not only to reach informal agreements for a couple of industry projects that we believe will come in the near future, as well as to reach one of our own secretly pursued milestones: we have filled our first patent request for a technology that we trust to have an immense mass market potential.

The A4D collaboration, closely monitored by SAP Research South Africa and PT Inovação, delivered all sorts of positive outcomes: firstly, its results were publicly presented at AFRICOMM 2010 in South Africa; secondly it created opportunities to enroll in discussions with different companies towards

possible future collaboration, thirdly it called the attention of important development aid agencies like BMZ and GIZ (formerly known as GTZ) , which have shown such an interest in the activities that further discussions at higher levels are scheduled for the beginning of 2011.

The most important factor to surviving a storm is to have a skilled crew to maneuver the boat into the wind. Notwithstanding strong front winds generated by having to – unexpectedly – operate the full year in temporary installations, we were able to considerably grow our scientific staff, involve our researchers in doctoral studies, and are quite impressed with the increasing attractiveness that Fraunhofer Portugal enjoys among the talented young researcher and student community.

In fact, not only our scientific team headcount posts an evolution of 44%, as well as we have been able to grow it in seniority by successfully filling a couple of strategic positions. In addition, we received 98 applications from 53 students for 16 Master Thesis proposals (please note that this compares with less than 10 applications for 12 Thesis proposals in 2008/2009), thus we will again expressively increase the scientific headcount figure in the near future.

In the meantime, three of our team members started PhD studies in programs that are offered by FEUP. As a late development we have received indications from the UP Rectory that they would support the creation of our own PhD program related to AAL. It is the intention of the Director of Fraunhofer AICOS to follow this recommendation, but to keep the program open for the participation of other universities in Portugal.

We closed last year's annual report considering 2010 to be a fundamental indicator about the future development of Fraunhofer Portugal and Fraunhofer AICOS.

Although not being able to cruise as far as expected, we have performed successfully a significant amount of complex maneuvers and learned important lessons.

On the one hand, teachings from the business development front show that Portuguese industry is extremely dependent on Public funds for R&D and highly reluctant to enroll in contract research activities that are not backed by such instruments – thus any delay or shortage of these funds immediately impacts operation.

On the other hand – and contrary to our initial expectation – Fraunhofer AICOS needed to operate the full year in temporary installations (lacking the space and infrastructure to accommodate a responsible growth in headcount and projects), and was only able to initiate construction activities on site for its permanent installation in early December.

Although we've sailed quite some miles, no one can tell for sure that we have already crossed the eye-of-the-storm, or if the weather conditions will significantly worsen. Whatever happens we are confident to be pursuing the appropriate strategy to sail us successfully out of the storm. We reinforce our boat as we finally kicked off the fit-out construction works for our installation, we increased our awareness in important audiences, we strengthened the team and we accumulated knowledge and results important to attract customers and acquire projects.

Financial Review

Although none less than encouraging, our financials clearly reflect stormy conditions and heavy weather sailing.

Although our external revenues grew by 45% - representing already 20% of total revenue – we still have a significant way to go in order to reach our goal of 2/3rds of our budget coming from external revenues Our expenditure currently grades 27% below forecast.

The lower than expected growth in either revenue or expenditure is explained mainly by the teachings highlighted in the operational review:

The reluctance of Portuguese industry to invest in contract research activities without public incentive instruments, which has directly hit our backlog and topline.

And, contrary to our initial expectation, the need to operate the full year in temporary installations, dramatically reducing our ability to post a capital expenditure in line with expectations, and impacting also the related operational expenditure

We reacted on this through two actions:

Firstly, by not growing the team to the planned level In the given time period

Secondly, by suspending the execution of activities related to the installation in the permanent office setting, therefore reducing the remaining operational expenditure.

Investments

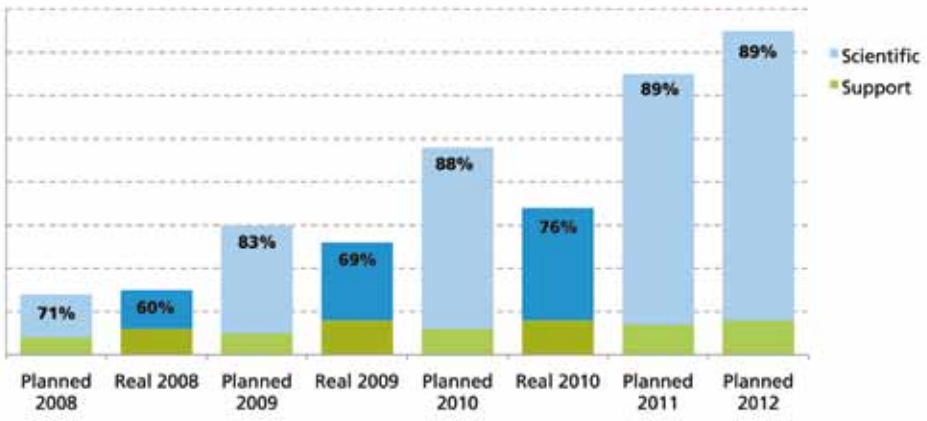
Even though our investments post an immense evolution (x5 yoy) they still remains modest vs. successive forecasts due to the derail introduced in our development by the delay in the Relocation Project. Major investments are planned for 2011 to finish the new building and enable the Relocation of AICOS to its new premises.

Fraunhofer Portugal Human Resources

Fraunhofer Portugal's success and its Human Resources policy is based on the respect for the human values, the merit, the pro-activity, the observance of the law, and on knowing how to reach the goals we propose, in order to achieve a motivated, dynamic and solid shaped team.

During 2010 we were able to grow our team by more than 30%

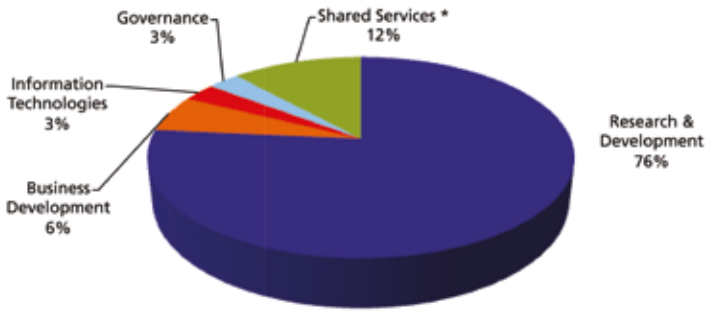
Headcount Evolution by Type of Activity



During 2010, the planned increase in collaborators continued to be conditioned by the availability of space and working conditions offered by the current Fraunhofer Portugal's offices, located in Campo Alegre Campus.

More than ¾ of our team is now fully dedicated to R&D related activities, while the remaining staff is distributed in support tasks.

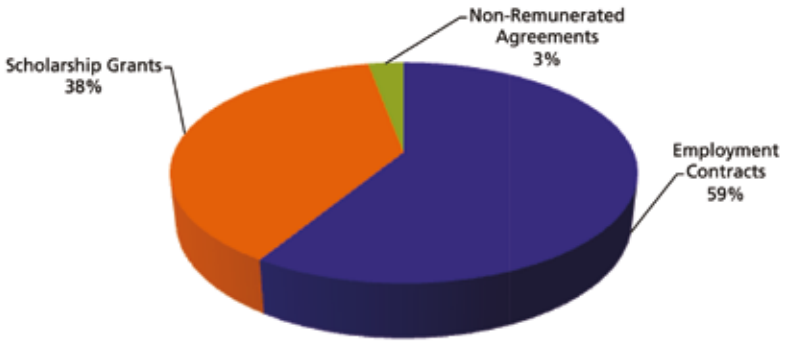
Headcount by Department, 2010



** Administrative + Finance + Legal + Human Resources*

When analyzing the type of contractual vinculum with Fraunhofer Portugal, the total number of collaborators can be divided into three major groups: employment contracts, scholarship grants* and other, non-remunerated agreements**:

Headcount by Type of Collaboration, 2010

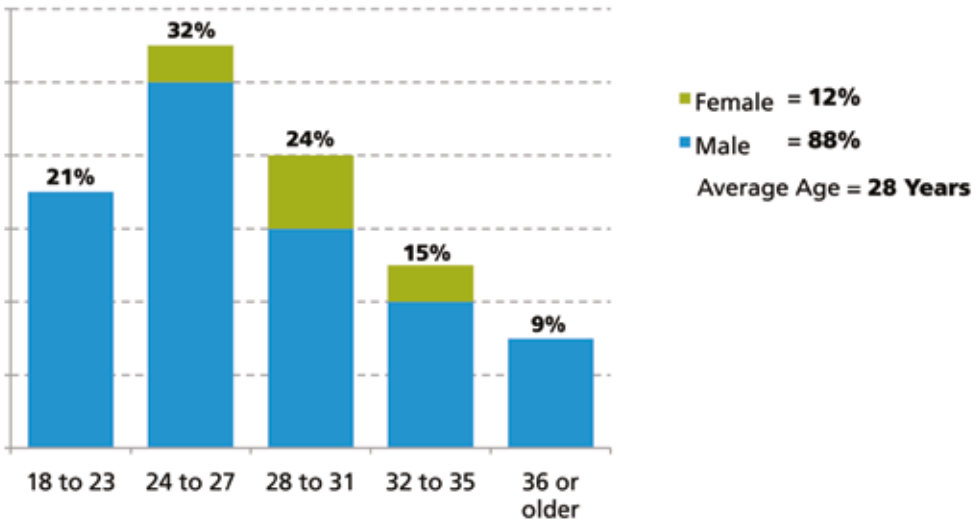


**In order to promote advanced and practical education in technology research and development in the areas connected to its specific activities, Fraunhofer Portugal awards scholarship grants for university students and graduates interested in pursuing a scientific career.*

***Fraunhofer Portugal established a non-remunerated agreement with 1 visiting researcher.*

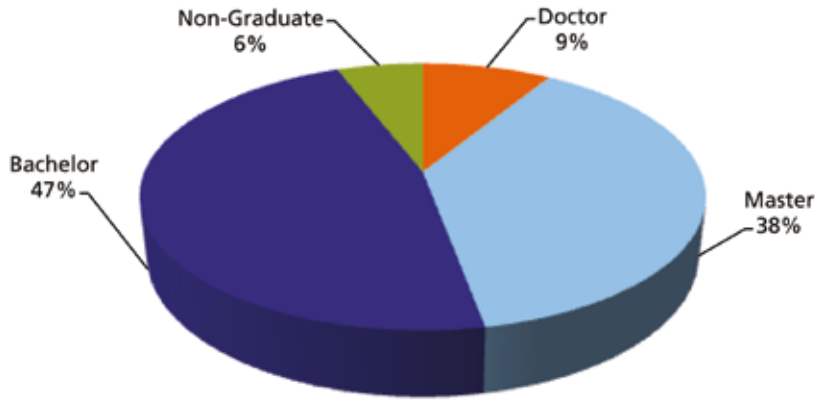
We operate a talented young team while aiming to improve its gender distribution.

Headcount by Age Group and gender, 2010



When analyzing the educational level of Fraunhofer Portugal's collaborators, we can see that the great majority of our staff (94%) has a university degree:

Headcount by Academic Degree, 2010



Risk Management & Risks

Active risk management allows Fraunhofer Portugal to safeguard against risks, so that they do not jeopardize the fulfillment of its mission nor its ability to meet business objectives.

Business risks

Business risks include risks that arise out of changes in the general environment (politics, market environment, competition). As a non-profit organization and beneficiary of public funds, we are subject to national government regulations and wider EU legislation that is important to be monitored, especially considering that Fraunhofer Portugal has been incorporated in a national regulatory framework different from the one that has shaped the Fraunhofer Model and associated KPI.

Fraunhofer Portugal is actively scouting to diversify its fund-sourcing. In its AAL "line" of business it is intensifying its activity in EU funding programs, while in its ICT4D business, it is directly addressing development aid agencies (either public or private) that want to invest in the field.

Financial Risks

Continuous monitoring of project pre-financing and accounts receivable coupled with effective dunning and contractually agreed payment terms, helps to minimize credit risk, which essentially relates to project pre-financing and unrecoverable payments.

In order to avoid any risks, Fraunhofer Portugal proactively manages its activities to comply with the pertinent laws governing non-profit organizations and corporate taxation.

Overall Assessment

Although facing some heavy rain – common to organizations with similar profiles that are learning the culture – it is our overall assessment that Fraunhofer Portugal's risk situation contains no notable events that could strongly jeopardize the organization future performance.

Outlook & Strategic Developments

Outlook

The projections for the Portuguese economy point to a strong contraction of GDP in 2011 (1,3%) and a limited growth in 2012 (0,6%). This weak development in economic activity will be accompanied by the reinforcement of the adjustment process related to macroeconomic imbalances that were accumulated over more than a decade. The current projections imply, in particular, a significant fiscal consolidation, against the background of a substantial fall in domestic demand.

Within this adjustment framework, economic developments worldwide and, in particular, the sustained recovery of international trade flows will be critical for the recovery of economic activity in Portugal.

The risks surrounding the current projections for economic activity are clearly on the downside. The need for additional consolidation measures to meet the demanding fiscal targets for 2011 and 2012 also imply non-negligible downside risks. Moreover, these projections assume the maintenance of a significant liquidity backed by the Euro system to the national banking system, which is essential to ensure a gradual and orderly adjustment of households' and firm's balance sheets.

Public consumption and public investment are expected to decrease in real terms in 2011 and 2012.

Worthy of note within the external environment is the projection of external demand growth for Portuguese goods and services, which is expected to remain a effervescent market.

In face of such stormy economic outlook one cannot ignore the threat of heavily reduced innovation activities in firms, with a direct impact on our activity and ability to deliver the desired results.

Perspectiva Futura e Desenvolvimento Estratégico

Perspectiva Futura

As projecções para a economia portuguesa apontam para uma forte contracção do PIB em 2011 (1,3%) e um crescimento muito limitado em 2012 (0,6%). Esta débil evolução da actividade económica será acompanhada pelo reforço de medidas de ajustamento dos desequilíbrios macro económicos acumulados ao longo de mais de uma década. As projecções actuais implicam, nomeadamente, uma consolidação fiscal relevante no quadro de uma quebra significativa da procura interna.

Em face destes ajustamentos, o desenvolvimento da economia mundial e a recuperação sustentada dos fluxos comerciais internacionais, em particular, serão críticos para a capacidade de recuperação económica de Portugal.

O risco das projecções actuais é claramente o de serem revistas em baixa. A necessidade de medidas de consolidação adicionais para respeitar os deficits orçamentais comprometidos para 2011 e 2012 é um risco não negligenciável. Além disso, estas projecções assumem a manutenção de condições de liquidez garantidas pelas instituições do EuroSystem ao sistema bancário nacional.

Espera-se também uma redução do consumo e investimento publico nos anos de 2011 e 2012

Na envolvente externa, é digna de nota a projecção do crescimento da procura externa para os bens e serviços portugueses, esperando-se que este permaneça um mercado efervescente.

Em face de uma perspectiva económica tão tempestuosa não devemos ignorar a ameaça de reduções muito fortes nas actividades de inovação empresariais, as quais teriam um impacto directo na nossa actividade e capacidade de apresentar os resultados desejados.

Strategic Developments

The latter confirms what had already been mentioned in the opening message - no one can tell for sure if we have already crossed the eye-of-the-storm, or if the weather conditions will significantly worsen, but one may certainly agree that we won't be sailing in quiet seas as soon as one would desire.

Notwithstanding we reaffirm that we are confident to be pursuing the appropriate strategy to sail us successfully out of the storm.

We currently analyze the possibility to participate as research partner in ICT development aid activities in Africa. First contacts with BMZ and GIZ have shown a general interest in the activities related to the A4D project. A further discussion is scheduled for the end of January with the head of the ICT4D strategy group of GTZ.

In addition we also start to benefit from internal research projects that attracted the attention of industry and thus will potentially lead to industry revenues in the next future. Also our efforts to focus our R&D activities to few areas are leading to results. Although Fraunhofer AICOS is still a young organization, we are starting to get addressed by national and international entities specifically in the areas where we were able to show remarkable results (e.g. fall prediction and detection with mobile phones, or HMI/UX related to seniors using smart phones). Therefore and even after being able to grow the team inside our new premises, we will make a strong effort to concentrate our forces on some topics in order to gain critical mass and to become renown in the field, if possible the best.

Already in the initial quarter of 2011 we will host over a dozen new MSc graduates that will develop their thesis with us on topics that are all aligned to our three major research areas.

Desenvolvimento Estratégico

A secção anterior reforça a interrogação levantada na mensagem de abertura deste relatório – ninguém poderá com certeza assegurar que atravessamos já o "olho da tempestade", ou se, pelo contrário, as condições climatéricas tenderão a piorar no curto prazo – mas poderemos certamente concordar que não estaremos a navegar águas tranquilas com a rapidez desejável. Ainda assim importa reforçar a convicção de que a Fraunhofer Portugal está a seguir uma estratégia apropriada para vencer a tempestade.

Estamos a analisar a possibilidade de participar como parceiro de I&D em actividades de apoio ao desenvolvimento no continente africano. Contactos iniciais com as autoridades alemãs com competência na matéria demonstraram o interesse dessas instituições com o projecto A4D desenvolvido pelo AICOS. Estão já agendados novos contactos para o início do próximo ano com o grupo de estratégia de ICT4D nessas instituições.

Começamos também a sentir e beneficiar dos projectos pré-industriais que lançamos internamente, uma vez que começam a atrair a atenção de parceiros na indústria e a apresentar potencial de vir a proporcionar receitas de clientes industriais no curto prazo. Os esforços levados a cabo no sentido de focar a nossa actividade de I&D num conjunto reduzido de áreas começam também a produzir resultados, apesar de o AICOS ser ainda uma instituição recente, temos já recebido contactos de entidades nacionais e internacionais relativos a áreas em que fomos capazes de apresentar resultados dignos de nota (e.g. predição e detecção de quedas recorrendo a telemóveis, ou HCI/UX aplicada a cidadãos seniores utilizadores de smartphones). Assim, e mesmo tendo a possibilidade de aumentar a equipa com a mudança para as novas instalações, iremos acentuar o nosso esforço num conjunto muito limitado de tópicos de modo a podermos atingir alguma massa crítica e nos merecer algum reconhecimento nessas áreas.

All in all we will fortify our boat and will soon be sailing our craft with a more complete crew. As we move into the permanent offices of Fraunhofer AICOS we will fully equip our labs and endorse our scientists' creativity by exhorting them to try and test new ideas that produce more pre-industrial project results in order to attract more industrial customers.

We will reinforce our messages to all ships at sea, and all the ports of call. Awareness building within important segments of our audience is paramount to achieve and sustain a strong positioning for the Fraunhofer Portugal and Fraunhofer AICOS' brands. The Fraunhofer Portugal Challenge will have its second edition with renewed energy, and we will organize and influence the organization of important international scientific events in our Activity areas.

Já no primeiro trimestre de 2011 iremos acolher mais de uma dúzia de finalistas dos cursos de mestrado que irão desenvolver o trabalho das suas teses com o AICOS.

De uma forma geral iremos fortificar a nossa embarcação e teremos em breve uma equipa mais alargada e completa. Ao ocupar as novas instalações iremos equipar fortemente os nossos laboratórios e apoiar a criatividade dos nossos cientistas exortando-os a experimentar e testar ideias inovadoras que permitam alcançar mais resultados de projectos pré-industriais e atrair mais clientes na indústria.

Iremos reforçar as mensagens enviadas a todas as embarcações e portos de abrigo. A criação de notoriedade em segmentos importantes das audiências a que nos dirigimos é fundamental para alcançar e manter um posicionamento forte para as marcas Fraunhofer Portugal e Fraunhofer AICOS. O Fraunhofer Portugal Challenge terá a sua 2ª edição com energia renovada, e iremos organizar – assim como influenciar a organização – eventos científicos internacionais nas nossas áreas de investigação.

We strive to position Fraunhofer Portugal as a key strategic partner within a well-chosen set of themes that are paramount to the challenges that will prevail in the storm aftermath: health and well-being for an ageing society, increased productiveness for labor intensive tasks, and tools to help a sustainable economic growth in developing countries.

The Executive Board would like to thank the organization members for their support. In addition we would like to cherish our staff for remaining fully addicted to "remarkable technology, easy to use!"

Esforçamo-nos por posicionar a Fraunhofer Portugal como um parceiro estratégico dentro de um conjunto de temas criteriosamente escolhidos e que consideramos fundamentais para vencer os desafios que irão prevalecer no final da intempérie: saúde e bem-estar numa sociedade em envelhecimento, produtividade acrescida em tarefas de mão-de-obra intensiva, e ferramentas que contribuam para o desenvolvimento sustentado das economias em desenvolvimento.

A Direcção agradece, reconhecida, o apoio dos associados e saúda a equipa por se manter absolutamente focada em criar "Remarkable Technology, Easy to Use!"

Dirk Elias
President of the Executive Board
Presidente da Direcção

REVIEW OF FRAUNHOFER PORTUGAL RESEARCH

STRATEGIC RESEARCH AGENDA
PROJECTS AND RESULTS 2010

STRATEGIC RESEARCH AGENDA

Given that Fraunhofer Portugal operates only one Research Center at the present moment (Fraunhofer AICOS), its SRA is dictated by Fraunhofer AICOS's interests and activities.

Activity Areas

Ambient Assisted Living (AAL)

Ambient Assisted Living (known as AAL) includes methods, concepts, (electronic) systems, devices as well as services that are providing unobtrusive support for daily life based on context and the situation of the assisted person. The technologies applied for AAL are user-centric, i.e. oriented towards the needs and capabilities of the actual user. They are also integrated into the immediate personal environment of the user. As a consequence, the technology is adapting to the user rather than the other way around. In order to share relevant information between systems and services, technologies for AAL should ideally be based on modular and interoperable concepts.

A main driver for the development of AAL technologies is Population ageing. AAL technologies can be instrumental in tackling the massively increasing cost of healthcare. Another driver is the rising number of single person households in combination with rising expectations towards the quality of life. AAL technologies also cater towards the increasing demand of safety, comfortable living environments as well as the increasing demand for communication and stronger social interaction with others.

Fraunhofer AICOS intends to address mainly the needs of the ageing population, to reduce innovation barriers of forthcoming promising markets, but also to lower future social security costs, by the use of intelligent products and the provision of remote services including care services that extend the time senior citizens can live in their home environment by increasing their autonomy and assisting them in carrying out activities of daily living.

The research and development of Ambient Assisted Living solutions by Fraunhofer AICOS has as primary target user group the Ageing and Elderly, with the objective of:

- Extending the time people can live in their preferred environment by increasing their autonomy, self-confidence and mobility,
- Maintaining health and functional capability of the elderly individuals,
- Promoting a better and healthier lifestyle for individuals at risk,
- Enhancing the security, to prevent social isolation and to support maintaining the multifunctional network around the individual,

– Supporting caretakers, families and care organizations,

– Increasing the efficiency and productivity of used resources in the ageing societies.

Information and Communication Technologies for Development (ICT4D)

Information and Communication Technologies for Development (ICT4D) is a general term referring to the application of Information and Communication Technologies (ICTs) within the field of socioeconomic development or international development. ICT4D concerns itself with directly applying information technology approaches to poverty reduction.

Fraunhofer AICOS intends to focus its ICT4D activities on the African continent, with special focus on Mozambique and Angola. The primary target user group will be ICT users in rural and developing areas, and the objective is to provide solutions for mobile device services and applications matching the local users' demands and contributing to a more positive user experience, which in many cases may be their first contact with ICT.

One of the most dominant differences between ICT usage in industrial and developing countries is the type of devices and technologies utilized when interacting with ICT. In industrial countries interaction with ICT is made primarily via PC's, while in developing countries the mobile phone took over the role as the primary device of access and interaction with ICT.

Mobile devices, like smart(er)-phones and MIDs[1] will continue to play a dominant role in developing countries in terms of growing widespread usage. In developing countries the same tendency occurs, although the current use of PCs potentially slows down this trend when compared to developing countries.

Research Areas

The Research Areas identify the main subjects for the creation of scientific knowledge:

Human-Computer Interaction

– User & Social Experience

– Mobile & Future Devices

– Evaluation & Usability

Information Processing

– Context Awareness

– Content Retrieval

– Multimodal Information Fusion

Autonomic Computing

– Adaptive Systems

– Architectures and Enabling Technologies

1 *Mobile Internet Devices*

Application Areas

Application areas define the industry sectors in which Fraunhofer AICOS is expected to be more active, given its defined Activities and Research Areas:

Care, Well-Being and Inclusion

- Help people with chronic (and other) conditions to live more independent lives;
- Help promoting a pro-active attitude of the population towards disease prevention and adopting healthier life styles;
- Increase the responsiveness and efficiency of the health care services;
- Contribute to the creation of a competitive health care industry in Europe;
- Facilitate the interplay between human learning activities and technology;
- Contribute with new technological solutions to support learning practices and activities;
- Creation of low cost services and consumer products for underdeveloped countries.

Mobile Solutions for Developing Countries

- Local, demand-driven implementation of mobile Internet solutions in cooperation with local developers;
- Mobile applications design that fit the local ICT realities (e.g. lower bandwidth, service interruptions, (digital) illiteracy);
- Concentration on open-source tools;
- Training and coaching for students to get professional mobile application developers

Multimedia and Content

- Make content creation services and devices more interoperable and more intuitive to use, by potentiating communication, knowledge sharing and social interaction between users with different backgrounds;
- Devising content visualization and manipulation techniques and systems that improve accessibility and productivity for applications oriented to more expert users;
- Explore new ways of retrieving the most relevant information to the user;
- Development and improvement of business processes by creating unified interfaces supported by a variety of devices (e.g. foldable displays, tablet PCs, smart-phones, cell–phones, etc.), enhancing user interaction experience;
- Integration of consumer devices and information services creating new added value products with enhanced usability.

Environment and Energy Awareness

- Reduction of energy consumption, namely through reduction of domestic energy demand;
- Motivation to use renewable energies and adoption of energy efficient technologies;
- Reduction of CO2 emissions by motivating modal change to public transportation and car sharing, and green cars; environment;
- Enhancement and support of urban infrastructure services (e.g. water supply, waste management).

PROJECTS AND RESULTS 2010

External Projects

Among the activities being developed by Fraunhofer AICOS with industrial customers we'd like to highlight two projects: one with Deutsche Telekom that was completed in the end of the first quarter and a second with Efacec (Mobile CCTV) that will expectably evolve to a follow up of the project.

Fraunhofer AICOS was awarded an additional project by DTAG in the last quarter of the year 2009 that was completed in first quarter of 2010. The main focus was on content and end systems and the goal was how DTAG could approach a new market segment by providing a variety of applications and content services that to a large extent make use of the existing infrastructure and already available services. The results of this project also showed how usability barriers, that often lead to purchase barriers, can be lowered by thoughtful design of the User Experience.

On the national front Fraunhofer AICOS continued to work on the second phase of the Mobile CCTV QREN project and got a QREN mobilizing project approved, AAL4ALL. The project is considered one of the major flagships projects for the AAL area for Portugal and involves 34 partners who are considered major stakeholders in the Portuguese industry and research area of AAL solutions.

Mobile CCTV

The goal of the project is to enhance a Supervisory Control and Data Acquisition (SCADA) system with mobile support. Currently the monitoring infrastructure comprises a set of cameras spread around a large area, like a train or a subway station, and a central operation point where the monitoring of the video feeds and the management of issues/events is done. The mobile infrastructure developed by Fraunhofer AICOS interfaces with a Central Server and receives events, notifications and alarms that are forwarded to the mobile clients in the field. When a given event is received, the field officer can watch the video stream from the nearest camera and control it via pan, tilt and zoom. The main goals are to reduce reaction time to events and improve the management of events. During 2010 the second phase of this project was developed and concluded. At the moment we are discussing with the customer the options to proceed into phase three of the project.

AAL4ALL

The goal of the AAL4ALL project is the mobilization of an industrial ecosystem of products and services in the scope of Ambient Assisted Living (AAL), focused on the definition of specific standards. Only by assuring interoperability between products and services is the mitigation of investment risk

1

possible in this emerging area and thus create a better offer of products and services. The project comprises 5 work packages that should address the challenges mentioned previously in an integrated way. The work packages were defined following a market-oriented rationale taking into account the specificities of products and services being developed to the users. Therefore, WP2, WP3, and WP4 were created with the goal of segmenting the products into 3 different areas: (1) user services; (2) logistics and ICT services; (3) providers of primary care services. WP1 will be the aggregator of all these stakeholders and will define and validate the global architecture of the AAL4ALL ecosystem. In WP5 a process of certification will be elaborated as well as perform a set of tests that should assure interoperability between the different products and services.

Regarding international project activities at the EU research programs level, Fraunhofer AICOS continues to work on the eCAALYX project and is waiting for the kick-off of the project CAALYX-MV.

eCAALYX 1

eCAALYX – Enhanced Complete Ambient Assisted Living Experiment – is an European project part of the AAL joint Program, that aims to create a holistic solution that improves the quality of life of older adults with chronic conditions, by fostering their autonomy, while, at the same time, reducing hospitalization costs. This goal is to be attained not only by improving the communication with their caretakers, but also by enabling older adults to monitor their health regularly and by educating them on how to avoid risk situations, among others.

Namely, Fraunhofer AICOS is responsible for the development of the main components of eCAALYX's Home System: a Home Gateway that is able to interpret the set of Observation Patterns that are defined by caregivers and a Set-Top Box that displays the health parameters measured by the health kit the user has at home and was prescribed by the doctor.

The project will run for 3 years and is being developed in partnership with the following partners: Telefónica I&D (ES), Cetemmsa (ES), Corscience (DE), INESC Porto (PT), Fundació Hospital Comarcal Sant Antoni Abat (ES), Telemedic Systems (UK), Univ. Limerick (IE), Univ. Galway (IE), Charitee Berlin (DE).

CAALYX-MV

CAALYX-MV's main objective is to widely validate and refine the health monitoring technological solution developed within the CAALYX project. Three field trials will be performed, namely in Spain, Italy, and the Netherlands. Through the pilots it will be demonstrated that CAALYX-MV can be easily integrated into the contemporary technological infrastructure of most European network operators as well as with coming New Generation Networks integrating fixed and mobile networks seamlessly and homes and will be also available when users visit their second homes or are in vacation in a foreign country. Fraunhofer AICOS contribution to the project lies within the Aligned Backend Systems, End Systems topics.

The project will have a duration of 3 years and is being developed in partnership with the following partners: Creativ Systems (ES), Telefónica I&D (ES), Cetemmsa, Corscience (DE), INESC Porto (PT), Fundació Hospital Comarcal Sant Antoni Abat (ES), Universidad Politécnica de Cataluña (ES), Stichting Smart Homes (NL), COOSS Marche Onlus (IT).

Internal Projects and Results

In order to foster core competence building and to enhance our team's experience, we frequently assess ideas and launch internal project initiatives. In 2010, we continue the Mover activity and created 2 new internal projects.

Smart Companion

Mobile phones are everywhere and getting more powerful by the day. However, the challenge is to keep them easy to use. The Smart Companion makes it simple for inexperienced users to master general mobile phone's features, such as making calls and sending voice and text messages. The Smart Companion also enables its users to receive medication reminders and to call the emergency line from the Home screen in one step only.

The Smart Companion is based on the Android platform and has been specially designed to meet older adults' needs.

EMA – Low-cost Wireless Electricity Metering System

Design and implementation of an open architecture that enables gathering in back-office of energy consumption data for individual domestic appliances and provides its visualization in a platform-independent manner from any device connected to the Internet. The system was designed for low cost of physical devices to be installed, ease of installation, use of as much existing infrastructure as possible, interoperability and support of different business models. The architecture and hardware modules are developed and tested in a master thesis in 2009. The goal for this internal project was to develop a gateway based on a SoHo (Small office/Home office) router to collect the energy consumption from the metering devices.

Mover

The lack of physical movement is one of present day concerns. Population is more and more exhibiting health problems partially caused by their lack of movement. Among these issues we find the risk of cardiovascular diseases and obesity. One way to solve the problem would be to go to a gym on a regular basis, however, people do not always find the time and motivation to do it and even if they do, there is rarely a systematic advice from a personal trainer. Nonetheless, a few minutes of walking or other similar activities can significantly improve people's daily routines.

Falling unconscious is another problem, which is difficult to solve, especially for older adults. In order to detect falls, there is the need to continuously monitor the movement of the user. Once a fall is detected people who can help, should be warned, since there is often the possibility the user is completely alone.

A4D

The main goal was to jump-start an African Android Developer Community, enabling people to start implementing applications for devices that can have a huge impact in these markets. The local community considers smartphones as powerful as Personal Computers and mobile phones already have a huge market share in these African countries. We consider ourselves as experts in various aspects of using Android and are interested in transfer our knowledge and to help these communities in the development of applications for this environment. The first idea is to contextualize the daily life in Mozambique and learn what is important or exciting and involves mobile Internet devices. The objective is to gain experience with UEM as a partner for future projects.

2

Academic Activities and Results

Regarding Academic Activities, not only Fraunhofer's AICOS Director is an invited Professor at the Engineering Faculty of Porto University as also Fraunhofer AICOS received MSc students that, having selected some of the different scientific topics Fraunhofer AICOS had proposed for MSc graduation thesis, joined the team to develop their work between March and July 2010. Noteworthy is the fact that every student received excellent classifications at the University for the results produced while at Fraunhofer AICOS. For the Academic year 2010/2011, we have increased the number of MSc thesis being developed at Fraunhofer AICOS, and 13 students in total were joining in October to have their experience with us.

Automatic Photo Collections (2009/2010)

Images play an important role in sharing, expressing and exchanging information in our daily lives. Today, the typical user takes hundreds of photos that are then stacked in a hard disk. However, too often the photos are not labeled properly and remain unorganized, which results in enormous collections of photos that are difficult to skim through.

The focus of this project was to develop new ways of photo searching in a personal collection and give users a better experience when browsing them. In order to simplify image navigation, an unsupervised image clustering framework was implemented through an adaptation of the k-means algorithm. The clustering method is based on hierarchical image grouping using content-based and metadata features. Also, a new visualization and interaction method of image browsing is proposed for mobile devices. Experimental results demonstrated the good performance of the proposed methods on a real image database.

Email Visualization (2009/2010)

Over the years, email has become a widespread mean of communication. Thanks to this broadcast, nowadays most people have one or more email accounts. With the growing email usage, the number of incoming emails also increases. As email messages stack in the inbox for long time, it becomes more difficult to find information.

Email has been added characteristics, but the display of email systems has not undergone many changes. The main objective of this study was to design new email visualization for college students that could fit their needs and help them being more organized. This goal was attained by exploring different email visualizations, studying the characteristics of users and iteratively designing new email visualization. Finally, a medium fidelity prototype was created to simulate the actual operation of certain features of the application.

Home Display for Ambient Assisted Living (2009/2010 project co-oriented with University of Minho)

This project aimed at exploring the concept of a home display in the context of AAL scenarios. The home display enables not only some basic interactions but also the continuous and autonomous selection of contents for presentation. These were chosen with regards to its context, which includes the room in the house, people, time of day, day of week and events gathered by sensors and explicit interaction of the house users.

The home display was fully integrated in the home services ecosystem. Particularly, there is the assumption that the house is equipped with some kind of home gateway, where one can find a diversity of sensors related to AAL applications. Moreover, the home display serves also as a way to provide visibility and generate a greater awareness regarding events associated to it. One of the requirements was the possibility to

interrupt any task in order to deal with emergency situations that might occur. This is important in many AAL situations, in which sensors may initiate a variety of alarms.

This work has been carried out based on an existent screen software manager; for this reason, its main goal was the development of the concept, exploring multiple applications and modes of interaction, functioning and reaction to external events.

Open Location Based Services (LBS) Application Platform (2009/2010)

Location Based Services are information services accessible with mobile devices through the mobile network and utilizing the ability to make use of the location of the mobile device. While there certainly isn't a shortage of Internet based applications that provide Location Based Services, problems such as bad connectivity, high Internet access costs and technological impairments keep those applications from running properly. Moreover, internet connectivity is not yet ubiquitous. Besides that, systems that have off-line functionality use closed and proprietary formats to convey data to the end user, denying him the chance to produce his own content.

The focus of this project was to provide user generated localized content to a user without the need for the user to be online. In order to achieve this goal, a cache of the content is stored in the user's mobile device, and kept up to date using a web application with a central repository. To prove the validity of this concept, a prototype regarding a mobile application for the Android Operating System and a central repository that also acts as a content generation platform for this project was fully implemented.

Location Based Services for Everyone (2009/2010)

Most mobile phones nowadays have GPS, WIFI and 3G incorporated, allowing users to connect and interact with web services. Although an internet connected device provides endless capabilities, many possibilities are still reserved to the more technology savvy. Another problem is that as content grows in the web, it becomes increasingly difficult to search. Over the past years people have tried to associate meta-tags to content to be possible through automation the deduction of knowledge implicit in the content. One of these examples is the local services and particularly the availability of these services on the Internet. When these services are made available, there is an intrinsic attribute - its location. Thus, it is desirable that these services are indexed by their location and made available by an aggregator with tools that enable categorization and search. However it is imperative that this system can be used by everyone.

The goal of this project was to create a system with common technology that allows people to easily create and consume services based on their location. The developed solution uses a web user interface to create a location-based service and an augmented reality android application to consume these services.

Healthcare TV Based User Interfaces for Older Adults (2009/2010)

Designing for older adults is different from designing for younger adults. Older adults are usually less enamored with technology than they are about getting things done and usually experience a range of perception and cognition issues.

This study project concerned the analysis, design and evaluation of a TV system for the European project eCAALYX – Enhanced Complete Ambient Assisted Living Experiment – targeted at older adults suffering from a selection of chronic

conditions. User-Centered Design methodology was used to concentrate on older adults' specificities and therefore create an adequate product that is easy to use by them.

In the context of this project, user research, personas, low-fidelity prototyping and user based evaluation were used. User Research was used to understand the target audience of the project. Personas were created to concentrate on the goals of the different types of users of the system. Finally, a low-fidelity prototype of the Health Channel was created and iterated a number of times with feedback from user based evaluation. Based on the knowledge derived from the process described before, guidelines were created to drive the design of user interfaces for the TV and the preparation of usability tests targeted at older adults.

Personal Health Channel (2009/2010)

Europe's demographic pyramid is inverting at an ever-growing pace, bringing along drastic consequences to social security. The active workforce can no longer provide for the senior citizens. To revert this situation, which puts this increasing age group at risk, the social system must undergo a paradigm shift in order to cut costs and at the same time guarantee high standards of elder healthcare. Telemedicine is one of the most promising areas in this context.

This project's core is strongly connected to telemedicine and was developed in the context of eCAALYX. One of the eCAALYX components is the Personal Health Channel, a software application that enables users to manage their health and to streamline communication with the health services. The main goal of this project was to perform a comparative study of the available technological tools to develop and deploy the Personal Health Channel using COTS solutions. An in-depth analysis of these tools was performed in order to understand how they can be leveraged to pursue the project's goals.

Optimization of municipal solid waste collection routes based on the containers' fill status data (2009/2010)

The main goal of this thesis was to implement and compare algorithms for calculation of efficient trash collection routes for a pre-defined number of collection trucks according to different scenarios and constraints. Besides, a description of the architecture design of the information system to store and retrieve data regarding the containers' status is provided. Furthermore, it provides a description of several algorithms that can be used to obtain efficient collection routes. This optimization problem is modeled as the Capacitated Vehicle Routing Problem. To address this problem, two approaches were analyzed; the first involves solving the associated Asymmetric Traveling Salesman Problem - in which vehicle capacity constraints are ignored - followed by clustering the resulting tour into feasible routes. This approach is called route-first-cluster-second. The second approach relies on the usage of a construction heuristic by Clarke and Wright. Regarding the optimization of the Asymmetric Traveling Salesman Problem solution, this study compares several techniques: two construction heuristics - greedy and repetitive nearest neighbor - and three meta-heuristics - hill climbing, genetic algorithms and MAX-MIN ant system. Additionally, MAX-MIN ant system was subjected to a parameter sensibility analysis.

Doctor Router (2009/2010)

In the last few years, the population ageing resulted in a significant raise of search for healthcare causes older people are more likely to suffer multiple health conditions, chronic physical diseases and mobility limitation, often with concurrent mental and cognitive disorders. So we watched the democratization of access to health and well-being services, which took us to re-think the financial sustainability of the actual both public and private health care systems. One of the ways found to reduce costs and raise the health care efficiency, was the introduction of ICT in the health and

well-being sectors. This new paradigm allows not only the significantly increase of the efficiency, but also the possibility of adopting new features that were not possible before, such as disease prevention.

This is the environment where the Enhanced Complete Ambient Assisted Living Experiment (eCAALYX) project comes in, a health monitoring solution to provide reliable long-term and maintenance-free operation in non-technical environments, thus, ready for real-world deployment.

In this work it was developed one of the eCAALYX software modules for a Linux router, the ObservationManager. The goal was to process the incoming measures and to use web services to send the processed measures and alarms to the caretaker server. Additionally, it should be able to parse a file which is a standard for exchanging health information, the ObservationPattern.

HTML5 for desktop and mobile devices (2010/2011)

The use of the mobile is proliferating by the day. As mobile platforms appear however, it becomes increasingly difficult to develop for all the devices. HTML5 aims to overcome this difficulty by giving tools for the developers to create fully-powered applications that can play video, audio, work offline, enable geolocation, etc. This thesis aims to explore the state of HTML5 for the mobile and the desktop by implementing an application that enables older adults to share their memories with family and friends.

The tabletop as a game development platform (2010/2011)

Multi-touch interactive surfaces are emerging as a new and exciting research area. Display technologies coupled with input sensors capable of enabling direct interaction, are being experimented with table tops, walls and floors to support a diversity of collaborative activities like games. This thesis will focus on exploring different platforms for developing for tabletops by implementing a number of group games for older adults, which were previously analyzed, designed and evaluated.

Tabletops as a gaming development platform for older adults (2010/2011)

One of older adults' favorite tasks is related to group games, such as card games and dominoes. This work aims to explore the potential of multi-touch tabletops to support this kind of activity. Things such as older adults' favorite games as well as task-related habits and gestures are to be studied. This thesis will focus on analysis, design and evaluation of group games for older adults, which run on tabletops.

The mobile phone as a platform to share personal life stories for older adults (2010/2011)

Older adults are very keen to share their personal life stories with others. However, the distance from their family and friends may render this contact difficult. Social networks and instant messaging have tried to fill this communication gap, nevertheless, so far, these systems are still far from older adults' daily routines. This thesis will focus on the analysis, design and evaluation of a system that enables elders to share their memories and life stories with friends and family using an Android mobile phone.

The use of tablets as a gaming platform for older adults (2010/2011)

One of older adults' favorite tasks is related to group games, such as card games and dominoes. This thesis aims at exploring the potential of tablets (such as the iPad) to support this kind of activity. Things such as older adults' favorite games as well as task-related habits and gestures are to be studied. This

thesis will focus on the analysis, design and evaluation of a system that enables elders to play a number of group games on tablets (such as the iPad).

The Android tablet as a game development platform (2010/2011)

With the expansion of touchscreens on mobile phones, tablet computers started appearing on the market with the same touchscreen capabilities. Unlike previous tablets, this new generation of touch enabled devices do not focus so much on productivity, but on communication, entertainment and gaming. This thesis aims at exploring the tablet development focused on game development.

Development of services and applications for STBs in AAL environments (2010/2011)

Ambient Assisted Living aims at developing technologies and services to improve life quality of elderly people. In this context a Set-Top Box is being developed to provide elders with services like medical agenda, schedule for taking medication, video-conferencing with doctors and so on. The proposal is for the development of new services and applications that will "run" on the STB and may include useful information for elders. An example may be a list of open pharmacies and correspondent schedules in the neighborhood, or information about the nearest health center and suggestions on how to get there, etc.

Phone Based Fall Risk Prediction (2010/2011)

Ageing and elderly people are facing an increasing risk to suffer from a fall. In contrast the possibility to detect a fall and to ask for help by ICT solutions, the proposed thesis shall concentrate on the prediction of the risk to fall. Today doctors and nurses are able to predict the risk by questionnaires and the observation of some physical tests (e.g. gait and balance). Naturally those tests can be carried out only with low frequency as a face to face visit is necessary. On the other hand side the risk to fall is influenced by various factors that can change constantly. Besides a slow overall change of the risk, many external influences can have an impact on the risk to fall (e.g. medication like sleeping pills might create a high risk to fall during the morning hours if the doses are too high). Tests that can be carried out with a smart phone will help to reduce the risk to fall as the person, as well as the care takers will be able to predict a higher risk and can react by recommendations or modified medication in order to avoid a fall. Very special attention shall be given to the fact that the users will be aging and elderly people, so not only a user friendly interface, but also an 'interactive' user manual that will guide the users through the tests will be needed. Therefore questionnaires and physical test shall be 'translated' to smart phone compatible versions (e.g. by using compass and accelerometer functionalities). In addition the phone shall preprocess (either locally or by cloud computing) the results of the test in order to build a history of results and to match the results with a 'health pattern' that characterizes a 'healthy and safe' status. The target device to be used will be an Android based smartphone.

Phone Based Heart and Lung Function Monitor for Elderly People (2010/2011)

Modern smartphones are well suited due to the set of sensors and possibility to install additional SW to be used as mobile e-health (also called m-health) devices. The target of this thesis is to connect a low cost stethoscope microphone to the hands-free audio connector of the phone and to develop software that will allow specifically elderly people to perform every-day tests of their heart and lung functions (heartbeat, blood pressure, breathing noises, etc.). Very special attention shall be given to the fact that the users will be aging and elderly people, so not only a user friendly interface, but also an 'interactive' user manual that will guide the users through the

tests will be needed. In addition the phone shall preprocess (either locally or by cloud computing) the results of the test in order to build a history of results and to match the results with a 'health pattern' that characterizes a 'healthy and safe' status. Functions to exchange the test results with health care professionals shall be implemented as well, preferably using HL7. The target device to be used will be an Android based smart phone.

A Mobile Phone Navigator for Older Adults (2010/2011)

Alzheimer is an incurable, degenerative, and terminal disease that affects over 25 million people worldwide. This disease is predicted to affect 1 in 85 people globally by 2050. The course of Alzheimer's disease is unique for every individual but there are some common symptoms. The most commonly recognized symptom is inability to acquire new memories, such as difficulty in recalling recently observed facts. For instance, this loss of memory prevents people to remember the path to their home. This disease has some stages that tend to worsen and on initial stages people can maintain some independence and do a normal life. Although initial/medium Alzheimer patients will benefit from this system, the general older adult will also feel safer by having this system. The thesis aims to explore the best way to navigate older adults home or to get help from family or friends when necessary.

Platform independent Usage Mining Framework (2010/2011)

Modern applications interact with human users through a graphical interface. Although a lot of research has been invested in developing useable and appealing interfaces, designers and developers still face issues when it comes to understanding user behavior. This work is intended to ease the problem by developing a system, which will track the user interaction in detail, perform advanced statistical analysis, and present the result of the analysis to the developer.

Health monitoring of elderly persons with multiple chronic conditions in the home environment (2010/2011)

Elderly persons with multiple chronic conditions are most of the times sent to live in institutions that have health professionals looking after them. Another solution could be to monitor the health condition of these elderly persons remotely, improving their quality of life and increasing their freedom and safety. In order to achieve this goal the deployed solution should be reliable, managed remotely, and should use a common Small Office / Home Office (SOHO) broadband access router. The SOHO-router will work as a communication bridge between the sensors and the remote caregivers professionals. The SOHO-router will run a framework called OSGi that will enable the applications or services to be remotely installed, started, stopped, updated and uninstalled without requiring a reboot. The objective of this thesis is to develop a service for the OSGi framework that will be able to collect data from an ECG sensor and analyze the observation patterns. The sensor is connected through Bluetooth to the router and is necessary to develop a service to collect the ECG data. A second service will be developed to analyze the ECG observation pattern and to export the data to a remote caregiver.

HTML5-based Mobile Video Surveillance

This project aims at exploring such advances to implement an experimental mobile video surveillance application. In particular, testing different video codecs, from H264 to Motion JPEG and assess their suitability for low-latency, variable frame rate video transmission, which are typically required by real-time surveillance applications. Also explore different approaches to the problem including the new video, WebSockets and canvas components of HTML5.

Development of a remote management troubleshooting platform and self-healing algorithms (2010/2011)

It happens frequently that remotely managed network equipment becomes unreachable due to various reasons ranging from ADSL line failures, IP address changes, to software/process crashes and so on. On a first step the equipment should run a self-healing algorithm that combines MDD (Multivariate Decision Diagram), Fuzzy Logic and Neural Network in order recover the system from the failure. Several symptoms can be monitored in real-time and the system should automatically find out the consequences (memory leak, memory overflow) and the correct prescriptions (reclaim leaked memory, release some memory).

SERVICE

LOCATION AND CONTACTS

LOCATION

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