Fraunhofer
PORTUGAL

ASSOCIAÇÃO FRAUNHOFER PORTUGAL RESEARCH

ANNUAL REPORT 2011

Associação Fraunhofer Portugal Research

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, 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 Development (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 by the Fraunhofer-Gesellschaft. The base line for this type of funding

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 às áreas de "Ambient Assisted Living" (AAL) e de Tecnologias de Informação e Comunicação para o 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 progressivamente menores ao longo dos primeiros anos de operação,

determines that it will be granted in decreasing amounts over the initial 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 enhance 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 (National Scientific and Technological System), 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 to 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.

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 uma melhoria 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.

"Fraunhofer Portugal: United for Innovation!"

After the analogy of sailing a ship through a storm in the Management Report 2010, I would like to dedicate this report to the motto ‚United for Innovation!', as the year 2011 ended with some key achievements, that make me believe that the team of Fraunhofer Portugal, together with the many scientific entities we are partnering with, do provide a strong and high value contribution to the innovations marketed by our industrial customers.

The most prominent and important achievement of 2011 is our excellent positioning for the year 2012. We enter the year 2012 already with a prospective business volume of significantly more than 50% of the planned volume for all the year. The vast majority of the projects are for Portuguese companies and targets on product innovations that have a short time to an international market.

Our results for 2011 show an increase of our revenue from research related activities of 138% (project revenues overall, increased 106% considering other income not related to research), and we achieved this sharp increase with only 51% higher staff costs related to the team expansion. Nearly half of our project related revenues were generated from international sources (EU, international clients). Even more important to mention is that 41% of our project related revenues were generated from direct industry revenues. One third of those direct industry revenues have been generated with international customers and 2/3 with national customers. Thus we are confident, that Fraunhofer Portugal will be able to soon meet the ‚Fraunhofer Model' that proved its benefit for the economic strength of Germany for many years.

"Fraunhofer Portugal: Unidos pela Inovação!"

Na sequência da analogia náutica adoptada no Relatório de Gestão de 2010, para ilustrar o modo como enfrentamos uma envolvente tempestuosa, gostaria de dedicar este Relatório ao lema 'Unidos pela Inovação'! O ano de 2011 terminou com algumas conquistas fundamentais que me levam a acreditar que a Fraunhofer Portugal, em conjunto com as várias entidades científicas com quem temos parcerias, oferece um contributo forte e de grande valor para as inovações que os nossos clientes industriais lançam para o mercado.

A nossa conquista mais importante de 2011, e a que mais se destaca, é o nosso excelente posicionamento para o ano de 2012. Entramos em 2012 já com uma previsão de volume de negócios que está significativamente acima dos 50% do volume total planeado para todo o ano. A grande maioria dos nossos projectos envolve empresas portuguesas, estando focados em inovações para produtos que possam rapidamente ser lançados para o mercado internacional.

Os nossos resultados de 2011 mostram um crescimento de 138% nas receitas provenientes das actividades de investigação científica (total de receitas provenientes de projectos aumentou 106%, considerado outros rendimentos não relacionados com a investigação científica) , tendo conseguido este crescimento acentuado com apenas 51% de aumento em custos de pessoal, relacionados com a expansão da equipa. Praticamente metade das receitas provenientes de projectos veio de fontes internacionais (UE, clientes internacio- nais). Ainda mais importante é o facto de que 41% das nossas receitas provenientes de projectos terem sido geradas através de receitas vindas directamente da indústria. 1/3 dessas receitas vieram de clientes interna- cionais, enquanto que os restantes 2/3 vieram de clientes na- cionais. Assim, estamos confiantes que a Fraunhofer Portugal conseguirá brevemente alcançar o 'modelo Fraunhofer', que já deu provas dos seus benefícios para a força económica da Alemanha durante muitos anos.

Key factor for that success is the highly motivated team that now can constantly grows in our new and inspiring premises that we waited for so long. Motivation and inspiration led to three of our smartphone apps, created by our dedicated and enthusiastic team being among the top finalists in international competitions from Vodafone, ZON and during the Consumer Electronics Show (CES - Las Vegas). In a poll conducted during November 2011 94% of our employees answered that they are fully satisfied with their new work environment and consider it the optimal environment to achieve top notch work results regarding all aspects of equipment, personal work space and work safety. In 12 out of 16 key parameters of the employee poll AICOS has been ranked in the top 25% of all Fraunhofer institutes. All (100%) of our staff agrees that women have equal career chances and can achieve leading positions in our team.

Being able to grow now, we are planning to expand our center. Naturally we only look for the best qualified. Therefore we already started to look for new team members in 2011 and received a significant amount of applications for senior scientists' positions, many of them from international candidates. This also demonstrates that Fraunhofer Portugal AICOS becomes more known in the research community as a place that offers interesting research topics with international relevance as well.

Um factor crucial para este sucesso é a nossa equipa altamente motivada e que agora podemos alargar constantemente, na nossa nova e inspiradora "casa" pela qual esperamos tanto tempo.

A motivação e a inspiração levaram a que três das nossas aplicações para smartphones, criadas pela nossa dedicada e entusiasta equipa, estivessem entre os finalistas em competições internacionais organizadas pela Vodafone, pela ZON e durante o Consumer Electronics Show (CES – Las Vegas).

Num inquérito realizado aos colaboradores em Novembro de 2011, 94% afirmaram estarem completamente satisfeitos com o seu novo ambiente de trabalho, considerando-o um ambiente óptimo e ideal para atingir resultados de topo, no que diz respeito a todos os aspectos relacionados com equipamento, espaço pessoal de trabalho e segurança no trabalho. Em 12 de 16 parâmetros incluídos neste inquérito, o AICOS ficou classificado nos primeiros 25%, entre todos os institutos Fraunhofer. Todos (100%) os nossos colaboradores concordam que as mulheres têm iguais oportunidades de carreira e podem alcançar cargos de liderança na nossa equipa.

Tendo agora capacidade para crescer, planeamos expandir o nosso centro. Naturalmente procuramos apenas aqueles com as melhores qualificações. Desse modo, começamos já o processo de recrutamento de novos membros para a nossa equipa em 2011, tendo recebido uma quantidade significativa de candidaturas para as posições de 'cientista sénior', muitas delas de candidatos internacionais, uma clara demonstração de que a comunidade de investigadores reconhece de forma crescente o Fraunhofer Portugal AICOS como uma instituição que oferece temáticas de investigação de interesse e com relevância internacional.

This is also the background of two applications to extend and concentrate the activities of AICOS in the fields of human falls and ICT for Developing Countries (ICT4D) we submitted to a national R&D program in 2011 and are waiting for approval:

– Fall Competence Center (FCC)

The purpose of the FCC is to extend and concentrate all our activities related to falls of humans. We already do have an international recognized track record in the area of fall detection and fall risk assessment of elderly persons and patients with specific diseases using the features of smartphones. Besides strengthening this, we intend to expand the field of activities to related solutions, namely for falls in extreme sports and falls & fights of security personnel.

– ICT4D Competence Center (ICT4D-CC)

Fraunhofer Portugal AICOS started already its first activities in the field of ICT4D in 2009, in Mozambique. We conducted a small internal project with the informal participation of SAP Research and PT Inovacão aiming at developing smartphone apps that serve local demands with the help of local resources from the Centro de Informática of the University of Maputo (CI-UEM). The project, named ‚Android for Developing' (A4D) turned out to be a big success for all participants and consequently AICOS started to prepare more activities in the field. First results are the participation in the ICT4D project of the Global Research Alliance, or activities related to future cities in developing countries as part of the ‚Morgenstadt: Cityinsights' project of Fraunhofer in Germany. In order to significantly extend our contribution to this increasingly hot topic in an early stage, we proposed to set up an international team of experts in Porto in order to run projects related to

A crescente especialização e relevância do AICOS, é também o pano de fundo para duas candidaturas que pretendem estender e concentrar as actividades científicas nas áreas do estudo das quedas humanas, e das Tecnologias da Informação e Comunicação para Países em Desenvolvimento (ICT4D), que foram submetidas a programas nacionais de Investigação & Desenvolvimento em 2011 e que estão a aguardar aprovação.

– *Fall Competence Center (FCC) / Centro de Competências em Quedas*

O propósito do FCC é estender e concentrar todas as nossas actividades relacionadas com o estudo de quedas humanas. O AICOS é já reconhecido internacionalmente na área da detecção de quedas e na avaliação do risco de quedas de pessoas idosas e de pacientes com doenças específicas, usando as capacidades dos smartphones. Além de reforçar esta área, pretendemos expandir a nossa área de actividades para outras soluções, nomeadamente para quedas em desportos radicais e quedas resultantes de confronto físico envolvendo elementos de segurança de instalações sensíveis.

– *ICT4D Competence Center (ICT4D-CC) / Centro de Competências em ICT4D*

O Fraunhofer Portugal AICOS iniciou as suas primeiras actividades na área de ICT4D em 2009, em Moçambique, tendo desenvolvido um pequeno projecto interno com a participação informal da SAP Research e da PT Inovação, com o objectivo de promover, com o envolvimento de recursos locais vindos do Centro de Informática da Universidade de Maputo (CI-UEM), o desenvolvimento de aplicações para smartphones que respondessem a necessidades locais. O projecto, denominado ‚Android for Developing' (A4D), acabou por se tornar num grande sucesso para todos os participantes e, consequentemente, o AICOS começou a preparar mais actividades nesta área. Os primeiros resultados correspondem à participação num projecto de ICT4D da Global Research Alliance, ou a actividades relacionadas com futuras cidades nos países em

ICT4D focusing in, smartphone solutions for agriculture, small businesses, mHealth and eGovernment-light jointly with African industry partners. Albeit not yet approved at the time of writing, the idea already was endorsed by Worldbank, UNCTAD, GIZ/BMZ, SAP, PT and Cisco.

All in all the year 2011 has been busy, successful and ended with a promising outlook for 2012. We will continue to do our best to help especially our national customers to face the crisis united with new and internationally competitive innovations!

Dirk Elias

desenvolvimento, como parte do projecto ‚Morgenstadt: Cityinsights' da Fraunhofer na Alemanha. De maneira a aumentar significativamente o nosso contributo para esta área, propomos a criação, no Porto, de uma equipa internacional de especialistas para levar a cabo projectos relacionados com soluções de ICT4D para smartphones, que possam servir a agricultura, pequenas empresas, mHealth (saúde 'móvel') e eGovernment-light (Governo 'electrónico'), e que sejam desenvolvidas juntamente com parceiros industriais africanos. Apesar do projecto ainda não estar aprovado à altura em que este editorial está a ser redigido, a ideia já foi apoiada pelo Banco Mundial, pela UNCTAD, GIZ/BMZ, SAP, PT e Cisco.

Concluindo, o ano de 2011 foi atarefado, recheado de sucesso e termina com um panorama prometedor para 2012. Continuaremos a fazer o nosso melhor para ajudar, especialmente os nossos clientes nacionais, para enfrentarmos a crise unidos e com inovações que possam ser internacionalmente competitivas!

Dirk Elias

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REPORT OF THE EXECUTIVE BOARD

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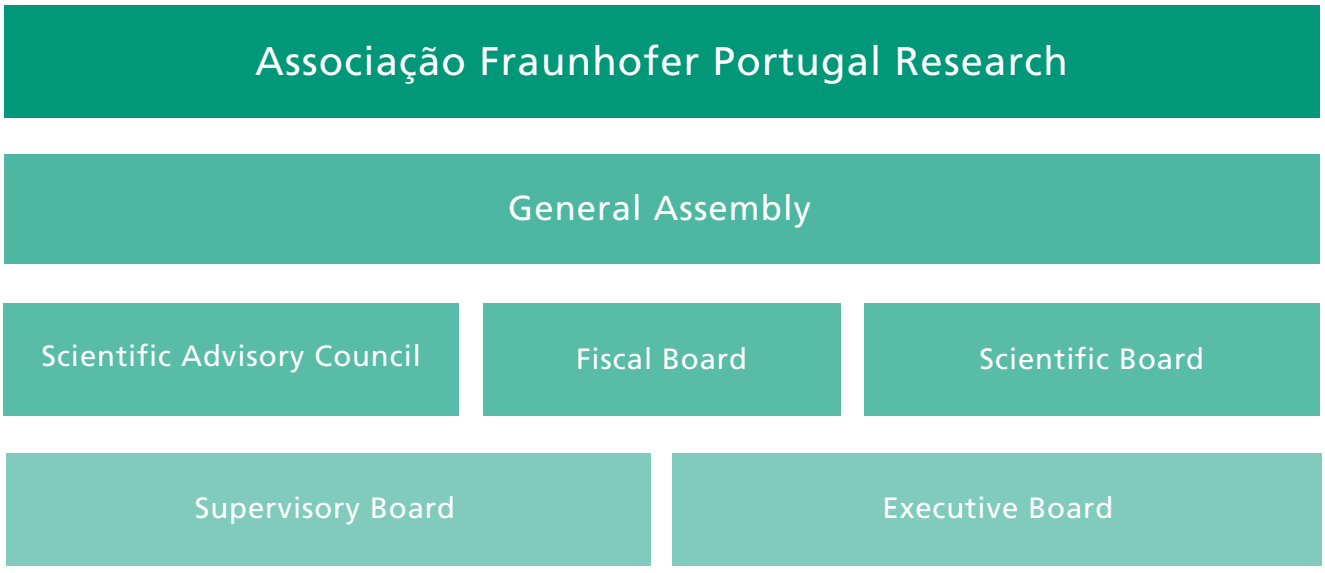
GOVERNANCE & MANAGEMENT

GOVERNANCE STRUCTURE

WE SEEK TO FOLLOW THE BEST PRACTICES IN EVERY AREA OF THE ASSOCIATION'S GOVERNANCE AND THAT IS REFLECTED IN OUR ORGANIZATIONAL STRUCTURE, OUR PRINCIPLES AND OUR TRANSPARENCY. THE ASSOCIATIVE STRUCTURE OF FRAUNHOFER PORTUGAL CLEARLY DISTRIBUTES THE FUNCTIONS, DUTIES AND RESPONSIBILITIES OF THE DIVERSE BOARDS.



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).

EXECUTIVE BOARD

Dirk Elias
President of the Executive Board

Profile:
With a professional career going from R&D activities 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:
Ivistar AG: President of the Supervisory Board, until the company was sold to a foreign investor.
Ivistar AG: CEO
Fraunhofer FOKUS Institute, Berlin: Senior Scientist & Deputy Department Leader
Fraunhofer FOKUS Institute, Berlin: Scientist

Functional Assignments:
- General Administration
- R&D Planning
- Business Development
- Facilities

Other Roles:
Executive Director of Fraunhofer Portugal AICOS
Invited "Catedrático" Professor at the Engineering Faculty of University of Porto

Miguel Barbosa
Executive Board Member

Profile:
With a professional career initiated in technical areas and evolving to corporate and business development functions, Miguel Barbosa has an MSc in Electrotechnical and Computers Engineering by the University of Porto and an MBA by the EGP-UPBS University of Porto Business School.

Professional Career Summary:
Sonaecom: Corporate Development (Corporate Strategy & Finance)
INIGraphicsNet Foundation: Business Development and Innovation Manager
Optimus: Mobile Telecommunications Network Development Manager
Siemens: Software Development Engineer

Functional Assignments:
- Business Development
- Planning & Control
- Accountancy and Finances
- Human Resources
- Legal
- Facilities

Other Roles:
Manager New Business Development and Head of Administration Fraunhofer Portugal AICOS

Invited Assistant Professor of the MSc in Innovation and Technological Entrepreneurship, Engineering Faculty of University of Porto

Berthold Butscher
Executive Board Member

Profile:
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

Functional Assignments:
- R&D Planning Support

Other Roles:
Deputy Executive Director of FOKUS Institut, Berlin

SUPERVISORY BOARD AND SCIENTIFIC ADVISORY COUNCIL

SUPERVISORY BOARD

President
Georg Rosenfeld
Division
Corporate Development
Fraunhofer Gesellschaft
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80686 Munich/München
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Deputy President
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3801-856, Aveiro

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SONAE Maia Business Center
Sport Zone – 4° Piso
Estrada Nacional 13 – km 6,78
Lugar do Espido - Via Norte
4470-179 Maia

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Alcino Lavrador
Portugal Telecom Inovação

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Sonae

Pedro Guedes de Oliveira
FEUP (University of Porto Engineering Faculty)

Sebastião Feio de Azevedo
FEUP (University of Porto Engineering Faculty)

Vladimiro Feliz
CMP - Câmara Municipal do Porto (Porto Municipality)

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.

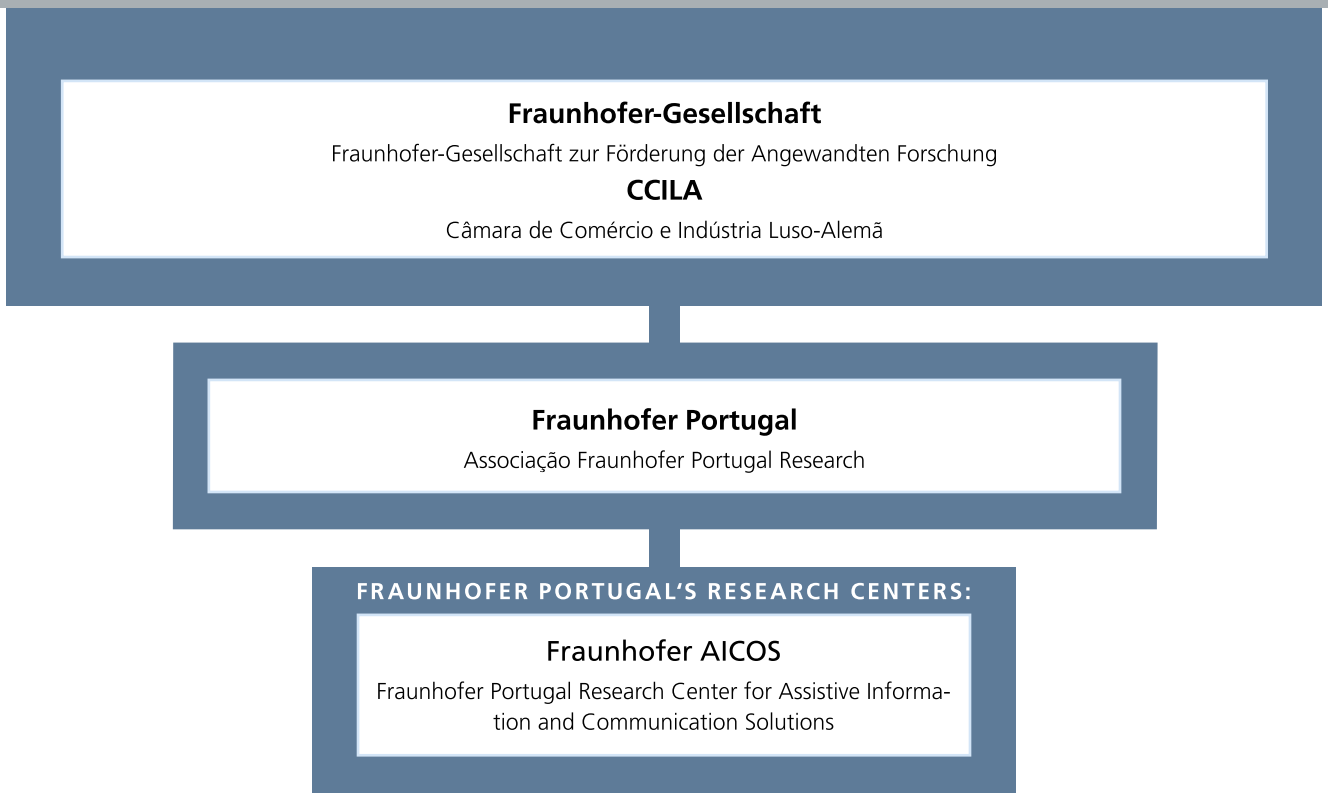
Funding Model

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

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 years, incentivizing the implementation of an efficient business model mainly financed by external revenue.

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



Fraunhofer-Gesellschaft

Founded in 1949, the Fraunhofer-Gesellschaft 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.

Presently, the Fraunhofer-Gesellschaft maintains more than 80 research units in Germany, including 60 Fraunhofer Institutes. The majority of the more than 20,000 staff is qualified scientists and engineers, who work with an annual research budget of €1.8 billion. Of this sum, more than €1.5 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.

Affiliated international research centers and representative offices provide contact with the regions of greatest importance to present and future scientific progress and economic development.

With its clearly defined mission of application-oriented research and its focus on key technologies of relevance to the future, the Fraunhofer-Gesellschaft plays a prominent role in the German and European innovation process. Applied research has a knock-on effect that extends beyond the direct benefits perceived by the customer: Through their research and development work, the Fraunhofer Institutes help to reinforce the competitive strength of the economy in their local region, and throughout Germany and Europe. They do

so by promoting innovation, strengthening the technological base, improving the acceptance of new technologies, and helping to train the urgently needed future generation of scientists and engineers.

As an employer, the Fraunhofer-Gesellschaft offers its staff the opportunity to develop the professional and personal skills that will allow them to take up positions of responsibility within their institute, at universities, in industry and in society. Students who choose to work on projects at the Fraunhofer Institutes have excellent prospects of starting and developing a career in industry by virtue of the practical training and experience they have acquired.

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.

CCILA

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 Development (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 AICOS

Fraunhofer Portugal Research Center for Assistive Information and Communication Solutions

Incorporated as a partnership between Fraunhofer-Gesellschaft and the University of Porto and focusing its activity in Ambient Assisted Living (AAL) and Information and Communication Technologies for Development (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 the Information and Communication Technologies, 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);
- 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);
- 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);
- 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 Information and Communication Technologies by the Fraunhofer-Gesellschaft and contributes to the creation of competences in activities of great relevance for the future: AAL (Ambient Assisted Living) and ICT4D (Information and Communication Technologies for Development).

- AAL includes methods, concepts, (electronic) systems, devices and 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. This can be achieved 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. These services will increase their autonomy and assist them in carrying out activities of daily life.

- 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 like Mozambique and Angola. In a second step, Fraunhofer AICOS also plans to address the exciting developments in Brazil, Fraunhofer IESE[1] will create a Project Center in Salvador de Bahia in 2012. Funding has been granted with the express wish to also explore cooperation opportunities with FhP. 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 and that contribute to a more positive user experience, which in many cases may be their first contact with ICT.

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;

1 *Fraunhofer Institute for Experimental Software Engineering*

These competences 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; creating low cost services and consumer products for underdeveloped countries;

- Mobile Solutions for Developing Countries: by 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 become professional mobile application developers;

- Multimedia and Content: by 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; exploring 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; 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 of 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 (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); enhancing and supporting urban infrastructure services (e.g. water supply, waste management).

REPORT OF THE EXECUTIVE BOARD

SUMMARY OF KEY FIGURES AND RATIOS

	2009	2010	2011
Breakdown of Expenditure in %[1]			
Personnel Expense Ratio	60%	42%	34%
Non-Personnel Expense Ratio	29%	19%	14%
Capital Expenditure Ratio	11%	39%	52%
Breakdown of Revenue in %[2]			
Total	21%	24%	34%
Industry	17%	9%	14%
Public Sector	4%	15%	20%
International	12%	1%	5%
EU	4%	14%	13%
Employees[3]	**26**	**34**	**40**

1 Total expenditures volume

2 Project Revenue/Operating Budget, imputed depreciation for contract research and provisions

3 including Grant Students

MANAGEMENT REPORT

Economic and Political Background

The economic instability in the European Union and the Euro-zone was the watermark for 2011. After the IMF and the European Union rescued Greece and Ireland in 2010, it was then necessary for these institutions to bailout Portugal, which was struggling with a large public debt and facing difficulties in accessing funding for its economy, as the borrowing costs increased in the financial markets.

While the United States economy is showing signs of recovery, the European Union faces the possibility of recession, as some of its member states had their GDP contracted in 2011, mainly due to austerity policies adopted by governments in order to balance public budgets. GDP contracted in Greece (-5%), Portugal (-1,70%), Ireland (-0,10%), and posted sluggish growth rates (<1%) in countries like Denmark, Italy, Spain and the United Kingdom.

However, GDP in the Euro-Zone grew 1,40% in the last year, mainly driven by growth in Germany (2,5%), France (1,55%), Poland (4,20%), Sweden (4,60%), Austria (2,60%) and Finland (2,70%).

The present challenge for the European leaders is to recover the financial market's trust in the Euro-Zone, by assuring that public debts in member states are under control.

For this reason, a series of austerity policies was adopted by the Portuguese government in order to balance the budget. These measures, although necessary and obligatory, caused the economy to contract: the Bank of Portugal predicts a contraction in GDP of -3,1% in 2012, followed by a small recovery in 2013, when GDP should grow 0,3%. Private Consumption is also contracting (-3,6% in 2011 and a prediction of -6% in 2012), as well as Public Consumption (-3,2% in 2011 and -2,9% in 2012) and Internal Demand (-5,2% in 2011 and -6,5% in 2012). Unemployment rate is also one of the highest in the Euro-Zone, reaching 12,5% in the end of 2011.

Despite a very harsh year for the Portuguese economy and the negative predictions for 2012, the political situation is very stable. The government, elected in 2011, has an absolute majority of representatives in the Portuguese Parliament, is perfectly aligned with the recovery program agreed with the IMF and the EU and is carrying on a great deal of effort in balancing the budget and in implementing structural reforms in the economy, in the job market and in public institutions.

Operational Review

Fraunhofer Portugal Operational Review

Our operation focuses on 'United for Innovation!' and shall be seen as our honest attempt to contribute to the defeat of the current crisis in Portugal by helping to increase the international competitiveness of our industry customers with innovations.

In 2011, our business volume reached a new peak. It comprised expenditure in contract research and major infrastructure capital expenditure.

Business Development

The business development review portrays a number of successes and an organization moving with accelerating momentum. Fraunhofer AICOS substantially reinforced its portfolio of projects, significantly enlarged its customer base with important new logo acquisitions, diversified funding opportunities for applied research, and closed the year posting steadily growing operational figures and an inspiring perspective for the following years.

Notwithstanding the partial short-term impact, Fraunhofer AICOS placed project proposals, which have a potential impact to meet the business goals in a period, that would span from two to three years, a figure that stimulates the team for the medium term in terms of scientific activities and sets a pace for project acquisition.

We observed an increase of our revenue from research related activities of 138% (project revenues overall, increased 106% considering other income not related to research) - despite delays - encouraging us to pursue our goal for 2012, with again an increase of more than 100% compared to 2011. We assess these goals as ambitious, but also realistic and inspiring.

Collaborations with Industry - National

Our adopted strategy to pre-invest in a couple of internal developments as a "proxy" to external industrial demands delivered the expected results, and AICOS attracted a number of prominent Portuguese companies as external project partners:

- The Android based "Smart Companion" internal project, converted into a QREN financed project in collaboration with Microsoft and Optimus, and was re-baptized as "Smartphones for Seniors" (S4S). In this project we will not only further develop and enhance the App as we will port it to the market's most expected platform since Google launched Android: the Microsoft/Nokia JV Windows Phone. The project was kicked off in the second half of the year and secured an important contribution to the year-end top-line.
- The internal project "Shopview" immediately awakened the interest of Sonae Distribuição and we were applying to the Fall QREN Call for Projects.

Our project approval success rate in Industry related QREN applications remained unrivalled, and the year debuted at a speedy metric. During the initial quarter the team engaged a number of industrial partners and was involved in 4 additional QREN applications together with industry (one being the above mentioned S4S Microsoft/Optimus project). Once more, all were successfully approved!

- SavEnergy: The overall project objective is to investigate and develop new solutions for energy optimization. The project leader is Optimus. Consortium partners are Efacec and Fraunhofer Portugal.

- e-Billing Mobile: This project proposes to conduct a study for the development of mobile e-Billing component, which will be integrated into e-Billing suite of the SME, Portugal Informático.

- Mobile CCTV Follow-Up: An extension of the previous project awarded by EFACEC. Its objective is to extend the functionalities to mobile devices and their users on the field.

- A fifth QREN application - "Homecare" - together with ILS - a very promising Porto based medical services start-up was submitted in the Fall QREN Call, and we wait now for a positive decision.

In addition to the aforementioned "HomeCare" in the Fall QREN Call we further prepared 4 project applications together with a diversified group of companies - from Porto based start-ups to traditional companies from the interior, from large Portuguese quoted companies to important multinationals, encompassing also remarkable scientific groups related to major international technology vendors:

- EnAware – a project focusing in "Domestic Energy Awareness" submitted with Efacec, Bosch Termotecnologia and Efapel.

- Game Foundry – a project focusing on the implementation of a new platform for knowledge management and monitoring of people behavior based on the use of network games, submitted with Ubbin Labs a local SME.

- Shopview - Fraunhofer AICOS will develop a solution which allows the supermarkets - and their suppliers, to control product placement in the store. The project was submitted in partnership with Sonae Distribuição and WeDo.

- SAL (Service Assisted Living) – a project aiming at developing applications to drive the adoption of Electronic Health Records and focusing on the Citizen's experience, as end user and as patient. Developed with Glintt HealthCare, a Portuguese quoted company. The submission of this project was postponed. At the moment the partners scout for alternatives to fund the project.

Our consistent approach to market begins to trigger opportunities for direct contract research with Portuguese companies.

As the chapter was closing we were submitting a proposal to Glintt Healthcare for a project with already a considerable extent.

Collaborations with Industry - International

Direct collaborations with international industrial partners received a gentle line throughout the year, contributing with almost 15% of our operational top-line.

Alcatel-Lucent awarded AICOS a contract that has had sound project results thus being able to generate additional activities later in the year.

In addition AICOS successfully applied with international partners for EU funding in the project REMPARK:

- REMPARK: The specific and ultimate goal of the project is to develop a PHS with closed loop detection, response and treatment capabilities for management of Parkinson Disease (PD). The consortium is formed by medical and technical renowned specialists, and PD patients are represented through the participation of the European Parkinson's Disease Association. The project was submitted with Maccabi Health and Nord Force.

Three EU project proposals are currently waiting for approval:

- Comet: Design and develop an innovative system for the comprehensive management of physical and digital documents through a combination of Radio Frequency ID, Semantic Web, Information extraction and Natural Language Processing technologies. Submitted to the FP7 Eureka Eurostars Program, with Methateke Software (Portuguese SME), Moore Design S.L. (Spain), Intermec Technologies S.L. (Spain) and Docout S.L. (Spain).

- Core3: HCI with smartphones targeting cardiac patients, interaction between PHS systems and Caretaker systems, sensor integration with smartphones. This project was submitted to the call "Research for the Benefit of SMEs" (FP7) together with Portuguese start-up company EUPA.

- Falling in Love: Smartphones and ePatch targeting elderly patients, development of fall related algorithms for ePatch. This project was submitted to the call "Research for the Benefit of SMEs" (FP7) together with Health Information Management SA (Belgium SME), Health Insight Solution Gmbh (German SME) and TB Solutions (Spanish SME).

Collaborations with other Institutions

The North Region Government Authority released a call for projects intended to strengthen the region's scientific capital. AICOS was seriously engaged in two major applications for this call:

- ICT4D-Competence Centre: proposal is backed by UNCTAD[2], World Bank, BMZ[3]/GIZ[4], APDC[5], TICE.PT[6], PT Inovação, SAP Research and Cisco.

- FCC (Fall Prevention and Prediction Competence Centre) backed by Fraunhofer IDMT, University Limerick, Health Cluster Portugal, and Polytechnic University of Catalonia

These two competence centers will be the organizational umbrella for a varied number of project activities that bear significant commercial potential.

The GRA – Global Research Alliance has initiated a cooperation of major research institutes worldwide to challenge the lack of access to the world-wide communication infrastructure in rural areas of developing countries. Partners are VTT Technical Research Centre of Finland, Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia, the Council for Scientific and Industrial Research (CSIR) Meraka Institute in South Africa, Macha Works Zambia, and Fraunhofer Fokus in Germany. This GRA Project focuses on ICT4D, Green and Low-Cost Wireless Communication Network in Africa.

Within our project applications to QREN & EU Funding programs we also collaborate with a vast number of National and International reference Academic/Research Institutions: IBM CAS[7] Portugal, INESC Porto, Open University (Netherlands), University College Dublin (UCD - Ireland), INGEMA (R&D Institution - Spain) Trinity College Dublin (Ireland), Universitaet Duisburg (Germany), Cure (R&D Institution - Austria), Fraunhofer IDMT (Germany), Delta (R&D Institution - Denmark), Region Syddanmark (Governmental Agency - Denmark), Centro de Investigación Científica y de Educación Superior de Ensenada (Baja California - Mexico); Ministerio de Ciencia, Tecnología e Innovación Productiva (Argentina), Fundación Instituto Gerontológico Matia (Spain), Cooperativa Autogestionaria de Servicios Profesionales Multidisciplinarios Sulá Batsú R.L (Costa Rica), Gjøvik University College (Norway), University Hospital Regensburg (Germany), Kingston University (UK), SINTEF (Norway), Institut Mikroelektronickych Aplikaci (Czech Republic).

2 *UNCTAD – United Nations Conference on Trade and Development.*

3 *BMZ - Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (German Federal Ministry for Economic Cooperation and Development).*

4 *GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit (German Association for International Collaboration).*

5 *APDC – Associação Portuguesa para o Desenvolvimento das Comunicações (Association of the Information and Communication Technologies).*

6 *TICE.PT - Pólo de Competitividade e Tecnologia TICE.PT, Pólo das Tecnologias de Informação, Comunicação e Electrónica (Centre for Competitiveness and Technology, Center for Information, Communication and Electronics Technologies).*

7 *The IBM Portugal Center for Advanced Studies (CAS) in Enterprise Engineering and Management (EEM) aims at being a prominent applied research center of excellence in Service Science, Management and Engineering (SSME), dedicated to foster collaboration among academia, industry, government, and IBM Research Laboratories, transfer scientific breakthroughs and innovations into IBM research, products and services, for the benefit of IBM stakeholders, in Portugal and worldwide, and influencing the evolution of education, research, business and government.*

Dance! Don’t Fall.

Internal "Pre-Industrial" Activities

Motivated with the positive results delivered by the strategy to "pre-invest" in a couple of what we considered to be "pre-industrial projects" addressing topics that are strongly related to the tasks expected in future contract research, we kept urging our engineers and scientists to work on internal research activities with similar profiles, kicking-off the already mentioned AlzNav, Dance! Don't Fall., as well as other not yet mentioned, as e.g. FUSAMI (The FUSAMI system offers smartphone developers and Human Computer Interaction (HCI) specialists a web based platform to perform advanced analytics on real-time usage data. The system helps developers to get a better insight into the user interaction and to unveil usability issues. At the moment we try to market these results to appropriate industrial partners. We are most convinced of the potential commercial success of this activity.

Scientific Results & Corporate Development

Fraunhofer Portugal's public awareness, leveraged by the success of our scientific and corporate development projects, increased at tremendous pace.

Our project results were definitely worth a read! They were not only the baseline for establishing AICOS credibility as industrial partner – providing for a number of direct contract research follow-up activities with national and international partners – as they receive increasing recognition from most prominent independent third parties! Our AlzNav Android App featured amongst the three finalists in the international contest "Vodafone Foundation Smart Accessibility Awards 2011", in the "Mobility" category. "Smart Companion" was awarded the 2nd place in the competition "Prémio Zon[8] Criatividade 2011", in the "Multimedia Content and Applications" category. And "Dance! Don't Fall.", an Android/GoogleTV application was also submitted to the CES[9] 2012 Mobile Apps Showdown, being one of the top-25 applications in the contest and receiving a positive review from one of the apps' page editors. This application addresses a very serious issue for older adults: the risk of falling.

Project results and other scientific findings are closely monitored regarding its novelty and potential to be protected. Last year we initiated the process to file our first patent request, that process is closed and the patent request is now filed and will be extended to a worldwide patent. During the year we completed a second patent research study (currently no conflicts known, but also no chance to file a new one) and have a third patent (fall detection) in analysis and preparation.

The "Fraunhofer Portugal Challenge[10]" completed its second edition reinforcing our public awareness 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.). The initiative had an increase of 40% in the number of applicants (from a much diversified number of Universities, thus definitely acquiring the "National" touch and reach). Noteworthy is the fact that the PhD category doubled the number of applications vs. last year.

8 *ZON is the Portuguese Cable TV Operator, market leader in paid TV distribution.*
9 *Consumer Electronics Show – Las Vegas – the reference show for CE.*
10 *Scientific award rewarding MSc and PhD students from Portuguese Universities that developed "Research of Practical Utility" in their thesis.*

Fraunhofer Portugal Challenge 2011 - Awarded Researchers

The year also encloses the successful – on time & on budget – implementation of the long waited for Fraunhofer AICOS's permanent installation in UPTEC – Science and Technology Park of University of Porto – in Asprela University Campus. Thus we now occupy an area of approximately 1.700 m2, transformed into open space areas with meeting rooms, private offices, leisure areas, technical areas and research laboratories designed to its specific activities. This "Relocation Project" was co-financed by ERDF and attributed by the Government Regional Authority 'ON.2 – O Novo Norte' (Programa Operacional Regional do Norte 2007-2013). Our new offices were featured in specialized media as an example of an innovative office space, prone to foster talent and creativity.

Overall, the awareness raised by our project results, the Fraunhofer Portugal Challenge, and the Relocation Project, delivered an impressive AAV (Automatic Advertising Value[11]) of 232,6K€.

Every blockbuster is the result of a highly skilled, multidisciplinary and highly dedicated pool of talent. Our story is not being written differently! Steamed up by our new AICOS premises we finally had the opportunity to grow, structure, and diversify our team in important dimensions such as experience, expertise and cultural backgrounds. Our Researchers become more and more impregnated by the outgoing – "We try harder!" – Fraunhofer culture, with evident consequences either in outstanding scientific results or in business development support activities.

In fact, not only our scientific team headcount posts an evolution of 23%, as well as we have been able to grow it in seniority by successfully filling a couple of strategic positions. In addition, we received 84 applications from 45 students for 23 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, additional team members started PhD studies in programs that are offered by FEUP, thus at the moment a large part of our Researchers are enrolled in Doctoral Studies. In addition, another member of the scientific team has finished her PhD, so we have grown the number of PhDs at Fraunhofer AICOS.

As an extremely positive footnote we report positive results in our capacity to attract senior researchers. Not only – as already reported – this year's edition of the Fraunhofer Challenge doubled the amount of PhD applicants, as well as a recruitment process for a senior scientist position opened in November had almost 30 qualified applications. Accordingly we are confident that we will equip our team with additional seniority in the very near future.

11 *AAV – Automatic Advertising Value: is calculated based on the price of advertising on each media that published an article on Fraunhofer Portugal.*

Conclusion

We are fully convinced that the development of Fraunhofer Portugal is increasingly becoming a success story.

A careful read of the previous chapters, unveils a clear stamina against a background of economic and institutional uncertainty. Gradually both factors ease the pressure imposed to our operation and it becomes clear that with Fraunhofer Portugal a "new ambition" was in fact born for Portugal's R&D landscape and Fraunhofer AICOS steadily builds a consistent reputation of being a reliable and leading R&D partner for industry.

There is however a fundamental lesson learned that is important to bear in mind as we draft the following chapters because it will prevail and it holds a considerable potential impact in our operation. Portuguese industry is extremely dependent on Public funds for R&D and highly reluctant to enroll in direct contract research activities that are not backed by such instruments. Considering the current macroeconomic adjustments this feature tends to be ever more impressive, thus any delay or shortage of these funds immediately impacts Fraunhofer ability to accelerate its growth and its trajectory of success.

We will obviously keep a prudent eye on the external environment, and for sure not ignore the stormy conditions highlighted in our previous report, but will certainly reinforce our "never surrender attitude" by fully assuming our part in writing Fraunhofer Portugal and AICOS' success stories!

In short, we remain fully addicted to "Remarkable Technology, Easy to Use!" and strive to contribute with our answer to the current crisis 'United for Innovation!'!

Financial Review 2011

The financial review reinforces the perception of 2011 as the most important chapter of our development story so far.

Fraunhofer AICOS substantially reinforced its project base, diversifying customers and funding opportunities for applied research, and closed the year posting steadily growing operational & financial figures that offer an inspiring perspective for the following years.

The fact that our project revenue volume more than doubled (+106%), that revenue from research related revenues posted an impressive +138% yoy evolution, representing already 34% of total budget (in-line with initial estimate and vs ~21% LY), unveils a concerted effort from the team to compensate and catch-up the initial delays we faced form the unavailability of the new building.

In addition, our total costs marking reinforces the idea of a streamlined operation and sound performance, posting a yoy evolution of 66%, driven by:

Firstly, by delaying the growth of the team size slightly, thus softening the corresponding expenditure.

Secondly, not only the reduced team dimension induces savings in non-staff expenses (e.g. travel costs, and recruitment), as well as, the lengthier than expected process of finalizing works in our new premises – which required immediate attention – resulted in a delayed execution of other internal activities, therefore reducing the expected remaining operational costs, that posted a 45% evolution yoy.

We prepared our start into 2012 very well and created a very strong project basis for a successful year.

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, united for innovation team.

During 2011 we were able to grow our team by 18%, with an headcount evolution that is highly fluctuating during the year due to the profile of our activity and collaborations with students. At December 31 2011, 58% of the headcount was regular staff, while 42% were students.

We operate a talented young team, and we managed to improve its gender distribution: while in 2010 we had 12% of female collaborators, that ratio has increased sharply to 27,5%. Noteworthy is also the fact that, in a recent survey, 100% of our team agreed that Fraunhofer Portugal is an equal opportunity employer where women can access leadership positions in arms-length with men.

We run a highly educated team, 97% of staff members have a university degree, 50% are MSc and 7% have a PhD degree.

Outlook and Strategic Development

Even more this year, we do want to focus on the aspect 'United for Innovation!', as we consider this the best possible support we can give to our customers to face the crisis better.

'United for Innovation!' expresses our absolute availability to support our customers with our expertise and excellence to achieve their goals faster, more economically and based on the application of the latest technologies. This is true for all fields of research that Fraunhofer is working on, but particularly true for the fields where Fraunhofer Portugal AICOS with its local team is offering its services. While we offer our support as match maker and handling agent for the first case, we are, with the increasing team size, looking to expand our business in 2012.

We do support and cover the full range of services that an applied R&D institution can offer. We are not only able to consult our customers, as we are able to do and implement what we recommend! So most of our projects include all phases, until an industrial prototype becomes available. Often we also support our customers to carry out trials and tests. For this purpose we have not only acquired high-end tools (e.g. eye-tracking device), but have also invested our own human resources in order to create an even more advanced tool, the Fraunhofer USAge MIning tool (FUSAMI) that allows to track user behavior on mobile Android and soon iOS devices. The tool has also been already licensed non-exclusive to a Portuguese company in object code.

From the technological point of view, we concentrated our activities on the post-PC era and selected smart phones and smart TVs as the most likely platforms to be used by our key target groups: aging and elderly persons, people in rural areas as well as people in developing countries. This concentration led, besides R&D project contracts, already to international recognition in form of three prizes awarded for smartphone

Perspectivas e Desenvolvimento Estratégico

Este ano queremos dedicar-nos ainda mais intensamente ao lema 'Unidos pela Inovação!', pois é este o melhor apoio que podemos dar aos nossos clientes para que enfrentem a crise melhor preparados.

'Unidos pela Inovação!' expressa a nossa total disponibilidade para apoiar os nossos clientes com o nosso conhecimento e excelência, de modo a que estes consigam atingir os seus objectivos mais rapidamente, de forma mais económica e com base na aplicação das tecnologias mais actuais. Esta disponibilização de conhecimento é válida para todas as áreas de investigação nas quais a Fraunhofer trabalha, mas muito particularmente nas áreas em que o Fraunhofer Portugal AICOS, com a sua equipa, oferece os seus serviços. No primeiro caso a Fraunhofer Portugal oferece o seu apoio funcionando como 'ponte' e como 'handling agent', com os Institutos Fraunhofer na Alemanha, enquanto que no segundo, através de serviços de I&D, esperamos, com o aumento da equipa, expandir o nosso negócio em 2012.

Damos apoio e cobrimos todo o leque de serviços que uma instituição de I&D pode oferecer. Não só prestamos consultoria aos nossos clientes, como somos capazes de desenvolver e implementar aquilo que recomendámos! Assim, a maioria dos nossos projectos inclui todas as fases, até à disponibilização de um protótipo industrial. Em muitas situações, também damos apoio aos nossos clientes quando pretendem realizar ensaios e testes. Com este propósito, não só adquirimos ferramentas de alta tecnologia (como um dispositivo que regista movimentos do olhar), mas também investimos nos nossos recursos humanos para criar uma ferramenta ainda mais avançada: o Fraunhofer USAge MIning (FUSAMI), que permite registar o comportamento de utilizadores de smartphones equipados com Android e, brevemente, com o sistema iOS. Esta ferramenta irá ser licenciada a uma empresa portuguesa, em regime de não exclusividade e em código objecto.

Do ponto de vista tecnológico, concentramos as nossas

applications we were developing in the year 2011. We focus our activities on the usability, stability and value of the solutions in the hands of our target user groups. Thus our work in UX/HCI, autonomous computing and information processing is focused on the above mentioned aspects. Noteworthy are a set of internal activities, partly carried out in form of MSc thesis, that target on using the integrated sensors of smartphones to substitute expensive and potentially unreliable external sensors in the detection of falls and the risk of falling, heart failures as well as for the analysis of potential malignant melanomas. We are achieving with our SW solutions astonishing results based on multidisciplinary problem analysis, intelligent sensor fusing and in combination with powerful and energy saving cloud computing, all on top of standard mass market smartphone platforms.

Looking at our backlog and comparing it to 2010, we can report, that not only the volume was rising by far, but also that we were able to win a significant amount of new customers in 2011, ranging from SMEs to large international cooperation. For 2012 we reserved a significant amount of our budget to the new business development in order to continue to grow our customer basis and to diversify into different industries that we expect to be interested in our expertise and services.

We are also planning to motivate our national customers, which often make use of the various QREN programs to develop innovative products with us, to join us in international R&D programs like e.g. calls from FP7 and CIP-PSP. This will not only help them to leverage their development cost beyond the possibilities of national programs, but also and even more important, will help them to get integrated in international consortia and consequently will help them to enter international markets more easily.

actividades na era pós-PC e seleccionamos os smartphones e 'smart TV's' como as plataformas com maior possibilidade de serem usadas pelos nossos principais grupos alvo: os seniores e as populações em áreas rurais ou em países em desenvolvimento. Esta concentração de actividades levou-nos a conseguir, além de contratos para projectos de I&D, o reconhecimento internacional na forma de três prémios que ganhamos com aplicações para smartphones desenvolvidas em 2011. Focamos a nossa actividade na usabilidade, estabilidade e valor das soluções que desenvolvemos, quando estas se encontram na mão dos nossos grupos alvo. Assim, o nosso trabalho em diferentes disciplinas UX (User Experience ou Experiência do Utilizador)/HCI (Human-Computer Interaction ou Interacção Homem-Computer), computação autónoma e processamento de informação, está organizado e focado em proporcionar os benefícios acima referidos. Note-se também a existência de um conjunto de actividades internas, em parte levadas a cabo na forma de teses de Mestrado, que estão orientadas para o uso de sensores integrados em smartphones como substitutos de sensores externos, caros e potencialmente falíveis, para a detecção de quedas e do risco de quedas, insuficiência cardíaca e também na análise de melanomas potencialmente malignos. Estamos a atingir, com as nossas soluções de software, resultados espantosos, baseados numa análise multidisciplinar dos problemas e na fusão de sensores inteligentes e em combinação com soluções de 'cloud computing' poderosas e energeticamente eficientes; tudo isto em cima das plataformas 'standard' para smartphones que estão largamente presentes no mercado.

Olhando para o nosso histórico de 2011 e comparando-o com 2010, podemos concluir que, não só o nosso volume de negócio cresceu imensamente, como também fomos capazes de ganhar uma quantidade significativa de novos clientes em 2011, desde PME's até à cooperação internacional em grande escala. Para 2012, reservamos uma quantia significativa do nosso orçamento para o Desenvolvimento de Novos Negócios, de forma a continuar a aumentar a nossa base de clientes e

As an example for this type of this integrated 'United for Innovation!' approach, our activities related to heart failure risk prevention and patient treatment can serve very well: together with two renowned cardiologists from the Faculty of Medicine of the University of Porto and the Catholic University we developed an idea for an advanced heart failure remote monitoring and medication control system based on a smartphone platform. As this system will have the potential to save the life and wellbeing of risk persons and in addition will help to reduce significantly health care costs, we were able to attract rapidly a SW company that is well established in the Portuguese health market. Together with this multidisciplinary team of experts we will apply to a national innovation funding program in order to recover a part of the developing costs. At the same time we will team up with a private national social support organization that operates hospitals and care centers all over Portugal in order to start with initial clinical tests. In addition and already during the development phase we will join forces with already identified European partners to establish a consortium that will apply for the next EU ICT CIP-PSP call in order to start with large international field trials in three European countries, including Germany, one of the largest potential markets for the envisaged solution.

As can be seen from the example above, and even if we currently are just talking of an opportunity, it becomes very clear, what 'United for Innovation!' is about: transforming great ideas together with innovative Portuguese partners in a rapid and well planned process into products with significant potential for international market success.

a diversificá-la para diferentes tipos de indústrias que esperamos que estejam interessadas nos nossos serviços e conhecimento.

Queremos também motivar os nossos clientes nacionais, que muitas vezes fazem uso dos vários programas do QREN para desenvolver produtos inovadores connosco, a juntarem-se a nós em programas internacionais de I&D como por exemplo o FP7 e o CIP-PSP. Isto não só os ajudará a financiar as suas inovações, para além das possibilidades dadas pelos programas de incentivo nacionais, mas também (e ainda mais importante) os vai ajudar a integrarem-se em consórcios internacionais e consequentemente, a aceder mais facilmente aos mercados internacionais.

As nossas actividades relacionadas com prevenção do risco de insuficiência cardíaca e com o tratamento desses pacientes servem muito bem como exemplo desta abordagem integrada ao lema 'Unidos pela Inovação!': em conjunto com dois cardiologistas de renome da Faculdade de Medicina da Universidade do Porto e da Universidade Católica, desenvolvemos uma ideia para um avançado sistema remoto que permite a monitorização e controlo de medicação em casos de insuficiência cardíaca, baseado num plataforma para smartphones. Como este sistema terá o potencial de salvar vidas e promover o bem-estar de pessoas em risco, além de ajudar na redução significativa dos custos com cuidados de saúde, conseguimos rapidamente atrair para esta ideia uma empresa de software que está bem implementado no mercado português da saúde. Com esta equipa multidisciplinar de especialistas, vamos apresentar uma candidatura a um programa nacional de financiamento para inovação, de maneira a recuperar uma parte dos custos de desenvolvimento. Ao mesmo tempo, vamo-nos juntar também com uma organização privada de apoio social que opera hospitais e centros de dia em todo o Portugal, para dar início aos testes clínicos iniciais. Adicionalmente, e já durante a fase de desenvolvimento, iremos juntar forças com parceiros europeus já identificados, para estabelecer um consórcio que irá concorrer ao próximo EU ICT CIP-PSP para iniciar testes no terreno em grande escala, em 3 países europeus – incluindo a Alemanha, um dos maiores potenciais mercados para a solução prevista.

This is the support and also scientific excellence we have in mind when we talk about our contribution to overcome the crisis.

Being involved now for more than three years in activities related to the digital divide and barriers to access the information and knowledge society, we have been able to identify specific market niches with very high potentials for rapid growth. Therefore we will invest in them in order to manifest our organization as international key player and R&D partner for industry. Both opportunities we will address through the creation of competence centers:

– Fall Competence Center (FCC)

The purpose of the FCC is to extend and concentrate all our activities related to falls of humans. We already do have an international recognized track record in the area of fall detection and fall risk assessment of elderly persons and patients with specific diseases using the features of smartphones. Besides strengthening this, we intend to expand the field of activities to related solutions, namely for falls in extreme sports and falls & fights of security personnel.

Como se pode ver pelo exemplo acima, e mesmo que estejamos apenas a falar de uma oportunidade, torna-se muito claro o que queremos dizer com 'Unidos pela Inovação!': transformar grandes ideias, juntamente com parceiros portugueses inovadores, em produtos com potencial significativo para atingir sucesso em mercados internacionais, através de um processo rápido e planeado.

É este o apoio e a excelência científica que temos em mente quando falamos acerca do nosso contributo para ultrapassar a crise.

Estando envolvidos há mais de três anos em actividades relacionadas com o 'fosso digital' e com as barreiras no acesso à sociedade da informação e do conhecimento, temos sido capazes de identificar nichos de mercado específicos com alto potencial para um crescimento rápido. Assim, iremos investir nesses nichos para que a nossa organização se manifeste como um importante actor a nível internacional e como um parceiro de I&D para a indústria. Ambas as oportunidades serão tidas em conta através da criação de centros de competência:

– *Fall Competence Center (FCC) / Centro de Competências em Quedas*

O propósito do FCC é estender e concentrar todas as nossas actividades relacionadas com o estudo de quedas humanas. O AICOS é já reconhecido internacionalmente na área da detecção de quedas e na avaliação do risco de quedas de pessoas idosas e de pacientes com doenças específicas, usando as capacidades dos smartphones. Além de reforçar esta área, pretendemos expandir a nossa área de actividades para outras soluções, nomeadamente para quedas em desportos radicais e quedas resultantes de confronto físico envolvendo elementos de segurança de instalações sensíveis.

– ICT4D Competence Center (ICT4D-CC)

Fraunhofer Portugal AICOS started already its first activities in the field of ICT4D in 2009 in Mozambique and developed a small internal project with the informal participation of SAP Research and PT Inovacão aiming at developing smartphone apps that serve local demands with the help of local resources from the Centro de Informática of the University of Maputo (CI-UEM). The project, named 'Android for Developing' (A4D) turned out to be a big success for all participants and consequently AICOS started to prepare more activities in the field. First results are the participation in the ICT4D project of the Global Research Alliance, or activities related to future cities in developing countries as part of the 'Morgenstadt: Cityinsights' project of Fraunhofer in Germany. In order to significantly extend our contribution to this increasingly hot topic in an early stage, we proposed to set up an international team of experts in Porto in order to run projects related to ICT4D smartphone solutions for agriculture, small businesses, mHealth and eGovernment-light jointly with African partners and industry. The idea already got endorsed by Worldbank, UNCTAD, GIZ/BMZ, SAP, PT and Cisco.

For both activities we applied for national funding that is targeting on the creation of scientific capacities with sufficient critical mass to become sustainable operations.

We think we are well prepared to accept this task!

– *ICT4D Competence Center (ICT4D-CC) / Centro de Competências em ICT4D*

O Fraunhofer Portugal AICOS iniciou as suas primeiras actividades na área de ICT4D em 2009, em Moçambique. Levamos a cabo um pequeno projecto interno com a participação informal da SAP Research e da PT Inovação, com o objectivo de promover, com o envolvimento de recursos locais vindos do Centro de Informática da Universidade de Maputo (CI-UEM), o desenvolvimento de aplicações para smartphones que respondessem a necessidades locais. O projecto, denominado 'Android for Developing' (A4D), acabou por se tornar num grande sucesso para todos os participantes e, consequentemente, o AICOS começou a preparar mais actividades nesta área. Os primeiros resultados correspondem à participação num projecto de ICT4D da Global Research Alliance, ou a actividades relacionadas com futuras cidades nos países em desenvolvimento, como parte do projecto 'Morgenstadt: Cityinsights' da Fraunhofer na Alemanha. De maneira a aumentar significativamente o nosso contributo para esta área, à qual se presta cada vez mais atenção e que está no seu estado inicial, propomos a criação, no Porto, de uma equipa internacional de especialistas para levar a cabo projectos relacionados com soluções de ICT4D para smartphones, que possam servir a agricultura, pequenas empresas, mHealth (saúde 'móvel') e eGovernment-light (Governo 'electrónico'), e que sejam desenvolvidos juntamente com parceiros industriais africanos. Apesar do projecto ainda não estar aprovado à altura em que este editorial está a ser redigido, a ideia já foi apoiada pelo Banco Mundial, pela UNCTAD, GIZ/BMZ, SAP, PT e Cisco.

Para ambas as actividades concorremos a fundos nacionais que estão destinados à criação de capacidades científicas com massa crítica suficiente para se tornarem operações sustentáveis.

Acreditámos que estamos bem preparados para aceitar essa tarefa!

REVIEW OF FRAUNHOFER PORTUGAL RESEARCH

STRATEGIC RESEARCH AGENDA
PROJECTS AND RESULTS 2011

STRATEGIC RESEARCH AGENDA

GIVEN THAT FRAUNHOFER PORTUGAL OPERATES ONLY ONE RESEARCH CENTER AT THE PRESENT MOMENT (FRAUNHOFER AICOS), ITS STRATEGIC RESEARCH AGENDA IS DICTATED BY FRAUNHOFER AICOS'S INTERESTS AND ACTIVITIES.

Activity Areas

Ambient Assisted Living

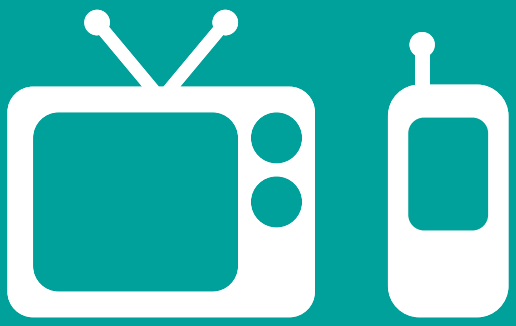
Ambient Assisted Living (known as AAL) includes methods, concepts, (electronic) systems, devices and services that are providing unobtrusive support for daily life, based on context and the situation of the assisted person. The technologies applied for AAL are user-centric, i.e. oriented towards the 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 and 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. That can be achieved 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. These services will increase their autonomy and assist 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 help 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.



ADAPTING INTERACTION TO SPECIFIC USER NEEDS

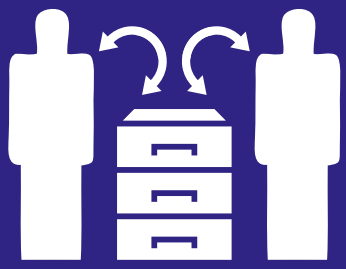
Information and Communication Technologies for Development

IInformation 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 Mobile Internet Devices will continue to play a dominant role in developing countries in terms of growing widespread usage. In developed countries the same tendency occurs, although the current use of PC's potentially slows down this trend when compared to developing countries.



FROM RAW DATA… TO MEANINGFUL INFORMATION

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

Application Areas

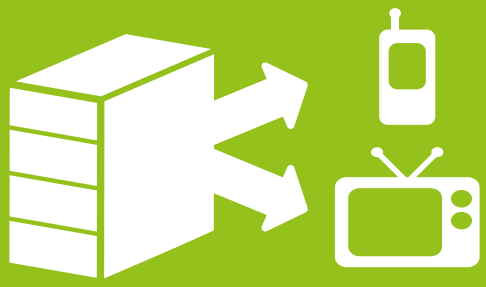
Application areas define the industry sectors in which Fraunhofer AICOS is expected to be more active, given its defined Activities and Research Areas:

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;
- wCreation 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



SMARTER MACHINES: LESS CONFIGURATION & MAINTENANCE

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 visualisation 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, smartphones, cellphones, 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 2011

External Projects

AAL4ALL

The goal of the AAL4ALL (Ambient Assisted Living for All) project is the mobilization of an industrial ecosystem of products and services in the scope of AAL, focused on the definition of specific standards. Only by assuring interoperability between products and services is the mitigation of investment risk possible in this emerging area and thus the creation of 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 a set of tests that will be performed and should assure interoperability between the different products and services.

CAALYX-MV

CAALYX-MV's main objective is to widely validate and refine the health monitoring technological solution developed within the CAALYX project.

The system will be tested and validated under real usability conditions arranged through 3 pilots in different EU countries (Spain, Italy and the Netherlands), and will obtain reliable assessment by gathering real end user's feedback. The aim of the pilots is double:

- To assess the usability and acceptability of the CAALYX-MV system by a selected target population, operating under real live conditions (the target population is composed by several actors: elderly and/or ill persons over 65 years old, their family, the teleassistance operator, and their doctor).
- To assess the validity and reliability of the system for detecting health problems in the monitored person, avoiding false alarms and decreasing the number of admissions in the hospital, visits to clinicians, etc.

The pilots will be implemented during two separated periods of 6 months. Improvements and enhancements will be performed between pilots taking into account user's feedback.

1

The final solution will be validated in a last three-month evaluation.

AICOS contribution to the project lies within the Aligned Backend Systems, End Systems topics.The project will have duration of 3 years and is being developed in partnership with the following institutions: Creativ Systems (ES), Telefónica I&D (ES), Cetemmsa (ES), 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).

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.

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 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 institutions: 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).

Mobile CCTV – FollowUP

The Mobile CCTV – FollowUP is an extension of the INOSS system from EFACEC. Its objective is to extend the surveillance functionalities provided by the INOSS system to mobile devices and their users on the field.

It should plug into the existing INOSS infrastructure and introduce additional components to the system only if they add clear value to the solution or are strictly required. The INOSS Mobile system architecture assumes that different Work Locations (WL) exist and they are managed by a Management & Support Center (MSC) which has several control operators. The INOSS Mobile system has 3 main components:

- INOSS Mobile Central Server (IMCS);
- Control & Streaming Proxy (CSP);
- Mobile Client (MC).

The INOSS Mobile Central Server is responsible for storing UI resources and structuring the logic of the mobile client. It provides a management interface that enables the system operator to customize the client functionality. The IMCS is also responsible for authenticating users of the mobile client, tracking and logging their activity and providing notifications of system events.

The Control & Streaming Proxy is a server located in each WL that is responsible for adapting the surveillance content (e.g. video streams) to the mobile device and proxy the control of the surveillance equipment.

The Mobile Client is the software module running on the mobile device that provides content and allows the user to interact with it.

2

REMPARK 2

The specific and ultimate goal of the REMPARK project is to develop a Personal Health System (PHS) with closed loop detection, response and treatment capabilities for management of Parkinson's Disease (PD) patients at two levels.

At the first level, the project will develop a wearable monitoring system able to identify in real time the motor status of the PD patients, and evaluating ON/OFF/Dyskinesia status, with sensitivity greater than 80% and specificity greater than 80% in operation during ambulatory conditions. It will also develop a gait guidance system able to help the patient in real time during their daily activities.

At a second level, the intelligent analysis of data provided by the first level, supported with a disease management system, will allow the neurologist in charge to access accurate and reliable information to decide about the treatment that best suits the patient, improving the management of their disease, in particular to adjust the therapeutic window.

REMPARK system will be tested with 60 real patients from four medical centers. The consortium is formed by medical and technical renowned specialists, and PD patients are represented through the participation of the European Parkinson's Disease Association.

S4S - Smartphones for Seniors

The mobile internet services present a high level of growth with the technological evolution of communications. The challenge for the telecommunications operators lies not on the voice services, but in providing data services and added value contents. This scenario is eased with the technological advancement of smartphones and their adoption by the consumers.

The increasing number of the senior population in Europe reflects a problem which should be faced with seriousness and also as an opportunity to invest in the usability of solutions and the accessibility for this sector of the population which has special characteristics.

Therefore, this project will develop applications and integrated services in mobile devices through the more natural and intuitive Human-Computer Interaction (voice and touch interfaces), web search by voice, commanding and controlling applications by means of voice, and others.

The project evolved from the internal project "Smart Companion" and it's being developed with DEVSCOPE – "Soluções de Sistemas e Tecnologias de Informação"; MSFT – "Software para Microcomputadores"; Optimus – "Comunicações"; Universidade de Aveiro; Faculdade de Ciências da Universidade de Lisboa and WIT Software – "Consultoria e Software para a Internet móvel".

SavEnergy - Energy Efficient Base Stations

Mobile networks have high energy consumption, especially in places with installed antennas, mainly due to heating, ventilation and air conditioning (HVAC) and UPS. The daily energy consumption for a mobile network can represent 120 Wh/day per customer.

In this context, the overall project objective is to investigate and develop new solutions to energy optimization of antennas installations, incorporating the following aspects: increasing energy efficiency, using equipment with lower energy consumption, promoting the use of renewable energies and monitoring energy consumption taking into account environmental and other conditions, in order to devise the best strategies for the operation of micro-generation solutions.

3

The project leader is BE Towering, company for management of telecommunications towers, which is responsible for the antennas installations of Optimus, reference operator for Mobile and Fixed Network, Internet and Voice.

The consortium partners are Fraunhofer Portugal and Efacec Systems Engineering, dedicated to designing and building power systems for telecommunications; and systems and solutions for energy production, namely from renewable sources, among other activities.

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.

Mover & Fall Prediction 3

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.

One of the goals of the proposed project is the development of a market ready solution for the early prevention of falls using a smartphone as main platform. The integration of compatible tests for fall prediction - similar to the ones used by physicians - to smartphones enables the use of the specific functionalities of such devices, as the compass and/or accelerometer. The development of a record of the results, accessible to both users and doctors, and the development of real world trials targeted at specific groups of users are also objectives of this solution, which will be able to serve hundreds of millions of users in their daily life.

Eye Tracking

Since its origination, eye tracking equipment has been used in research across a wide range of disciplines, including psychology, neurology, education, and marketing. In psychology, eye tracking has been used to study questions like how people read, process images and interpret symbols. When used for marketing research, eye tracking can reveal what colors, words, images, etc., have the greatest impact on consumers.

Another area of application for eye tracking is gaze-controlled input, in which the interface is controlled by tracking "gaze gestures" from the eye. In general, eye tracking research can provide insight into a myriad of psychological, cognitive, and social issues.

The first goal of this project is to set up an eye tracking laboratory that can support the future usability studies across projects being carried out in the institute. Currently, researchers are performing preliminary tests with the equipment in order to develop a set of guidelines for its use, which will be available to all collaborators in the institute. Later researchers will develop showcase projects and will evaluate a website, a shopping experience and a mobile application.

Users' Network

The Users' Network should aggregate a number of institutions, for instance adult day care centers or residences, which can provide Fraunhofer Portugal AICOS with access to senior users. These users will enable AICOS to better understand their needs and characteristics and to thoroughly evaluate the user interfaces designed for them.

Because older adults are the main end users of AICOS development scope, the access to those is of paramount importance. Therefore, the permanent collaboration with older adults can give important inputs and feedback about the quality of the user interfaces, as well as the value of the technological solutions.

Moreover, the access to a solid network of users will enable Fraunhofer AICOS to present itself as an independent partner in future projects, since the institute will be able to cover all main phases of a user-centered design process, i.e.: analysis, design, evaluation and implementation.

eHealthCom

Research in Ambient Assisted Living (AAL) aims primarily to enable seniors to live independently in their own homes and to assist people with special needs. It includes assistance to carry out daily activities, health and activity monitoring, enhancing safety and security, getting access to social, medical and emergency systems, and facilitating social contacts. Solutions are based on intelligent environments that adapt autonomously, proactively and context-sensitively to the users' needs and the tasks they wish to perform. However, these solutions must be flexible, interoperable, efficient, high quality and sustainable, requiring extended communication and cooperation between all actors (persons, organizations, systems, devices, applications, components of single objects) involved in patient's care.

The eHealthCom project presents an interoperable health-assistive platform designed to meet the requirements of the current health services in caring, monitoring and motivating the elderly population in their own environment. The solution presented is based on Web Services and on the use of international health data standards in order to ensure the access to the right information at the right time and at the right place. This platform allows patients, clinicians, managers and even researchers to make better informed decisions, leading to better patient outcomes and fewer mistakes.

The eHealthCom implements a caretaker server which expands the monitoring capabilities of eCAALYX home monitoring platform by allowing both patient and health care professionals to visualize the patient's health condition. The eHealthCom caretaker server provides the tools and mechanisms to help the physician into his/her daily practice and to help the citizens in the management of their health.

Melanoma Detection

The skin cancer corresponds to about one third of all cancers detected each year in Portugal, affecting 1 in every 7 people throughout life. It is estimated that malignant melanoma accounts for only 8% of skin cancers detected, but is responsible for more than 70% of the deaths, and around 800 new cases per year are detected in Portugal. However, early diagnosis of melanoma is extremely important since the success rates of curing skin cancer are very high if detected during the early stages of its development.

The main objective of this project is to create a prototype for a patient-oriented system of skin lesion analysis using a smartphone. This work aims to implement a self-monitoring system that collects, processes and storages information of skin lesions through its automatic classification. This classification is based on the ABCD rule, which consists in 4 visual features highly relevant for skin cancer detection (asymmetry,

border, color and differential structures), and for which were developed algorithms to measure and quantify them.

The system is formed by 3 main blocks:

- Front-end Device (The patient's smartphone): used to take photos to skin moles and send them to a server;
- Server: used to process the image and store the analysis results;
- Back-end Device: The device that will receive the analysis information collected by the server (smartphones, laptops, etc.).

The application has the following functionalities:

- Take photos with the mobile camera and send them to server for analysis;
- Open images from the mobile gallery and send them to server for analysis;
- Authentication system - only registered members can use the analysis services;
- Return a qualitative report of the automatic ABCD features classification;
- Save the analysis in the mobile phone SQLite database and add additional information.

The server supports the following functionalities:

- Authentication system - only registered members can use the analysis services;
- Receives and processes the image. The ABCD features of the lesion are automatically detected and quantified;
- Sends warnings to a specialist if the skin lesion has high risk of being a melanoma (E-mail, SMS... etc.);
- The images and analysis results are stored on the server, and the specialist can consult it online anytime.

When the specialist logs in to the server, the following information is available for each patient:

- List of analyzed moles;
- Score of each ABCD feature for each lesion after automatic classification;
- Location and size of each mole, if submitted as additional information by the patient;
- History of all check-ups made for each mole, which allows analyzing the evolution of the moles overtime.

FUSAMI

The Fraunhofer USage MIning (FUSAMI) system offers smartphone developers and Human Computer Interaction (HCI) specialists a web based platform to perform advanced analytics on real-time usage data. The system helps developers to get a better insight into the user interaction and to unveil usability issues.

Designing user interfaces is a challenging task, especially when it comes to the development of smartphone applications. The success and acceptance of the user interface

depends crucially on the designers experience and intuition. As a result, it is not uncommon that an application does not fulfill the user requirements and shows severe shortcomings in terms of usability. Common design processes try therefore to increase the usability iteratively by repeating several design and test cycles, in which the designers try to understand the users´ needs by observing their interaction with the prototypical application. The main drawback of this approach is the cumbersome and expensive execution and analysis of the test cycles. To overcome these issues Fraunhofer AICOS has developed the FUSAMI system, which significantly eases the task of testing and analysis. The system observes the user interaction in a real application and applies state of the art analytical algorithms to find and visualize the hidden patterns in the user interaction. Thus, FUSAMI draws attention to possible design issues which could have negative impact on the user experience.

Project Applications Pending Approval

ShopView

Supermarkets create nowadays a considerable share of their revenue by charging the product manufacturers a fee for the placement of the product. For example, a candy manufacturer would pay for his candies being placed close to the cash-desk.

Unfortunately the products are not always placed correctly, which leads to contractual issues or even a contractual penalty. To ease this issue Fraunhofer AICOS is developing a solution which allows the supermarkets - and the manufactures management - to control the correct placements.

The solution consists of a camera buggy and a software component. The camera buggy will be operated by a normal clerk to semi-automatically capture high quality images of the aisles. In a first phase the software component is responsible for performing several image processing steps and for presenting the images to the management for control. In a second phase the amount of human interaction will be reduced to a minimum by using image recognition technology to automate the controlling of the product placement.

HomeCare

The project HomeCare is a solution to provide remote monitoring and remote health care to patients with chronic conditions and seniors who are at home, nursing homes, senior residences or other remote locations (rural areas of difficult access).

This solution will consist of two application components. One of them will be developed on top of the Google TV platform; and the other one at a managerial level BackOffice, being responsible for managing, analyzing and evaluating all clinical data and vital signs from the patient, notify the physician whenever some of the patient's vital signs shows that he/she may be at risk, enable remote management of the implementation of the application on the patient side, prescription of new tasks and new treatment and consultation via video-conferencing, among others.

This solution features an application for the patient, which will be provided through an additional layer of Google TV, which is developed based on Android. In order for this application to be appropriate for the mental and motor skills of the patient, strict usability requirements, resulting from a large research project, will be defined and applied.

The solution remotely monitors the patient's vital signs through a set of measuring equipment such as an oximeter, a weight scale, a sphygmomanometer, glucometers, and others, being linked to the set-top box using Bluetooth technology.

It will also integrate with mobile devices like tablet PC's and smartphones that can be used by to access some of the

ShopViews' panorama on a supermarket isle

existing features such as the calendar of doctor and patient, alerts/notifications, historical charts, etc.

Finally it should be noted that in order to simplify the use by elderly people, the solution will also comprise an application for Android smartphones to remotely operate the HomeCare solution and all the remaining features of the Google TV.

The solution will also be used in public places such as homes, senior residences, health centers, etc. For that, an interactive kiosk-like interface for multi-patient interaction will be developed, integrating an authentication mechanism.

ICT4D-CC

The ICT for Developing Competence Center (ICT4D-CC) is an evolution of the highly successful 'Android for Developing' (A4D) project that Fraunhofer Portugal AICOS carried out in 2009/2010 with partners from industry (SAP Research South Africa, PT Inovação) and science (Center of Informatics Universidade Eduardo Mondlane, Mozambique).

Originally designed to gain experience in the collaboration with African partners in the development of mobile applications that meet local demands, the expectations were exceeded by far. Not only had the partners showed a great professionalism, we received invaluable input regarding the demands and related business opportunities.

The following proposal is based on the outcome of A4D and the additional information that resulted from informal collaboration and information exchange with representatives of GIZ, Worldbank, UNCTAD and industry.

The goal of the ICT4D-CC is to set up a team of international experts at Fraunhofer Portugal AICOS that are dedicated to the field and that will, within this project, work with international partners from Mozambique (Center of Informatics - Universidade Eduardo Mondlane), South Africa (Nelson Mandela Metropolitan University), Germany (Fraunhofer FOKUS) and Portugal (Faculdade de Economia da Universidade do Porto) to develop dedicated pre-commercial ICT solutions for:

- Production in Agriculture;
- Very Small Enterprises (VSE);
- mHealth;
- e-Government-light Solutions for Citizens.

These activities will get accompanied and the solutions will be based on a set of transversal activities related to:

- Socio-Economic Impact of ICT4D;
- Local Requirements and KPI assessment;
- Human Computer Interaction (HCI) and User Experience (UX);
- Low Cost Networks;
- Knowledge Transfer.

In order to achieve a significant and distinct impact, the activities will concentrate first on Mozambique and will be in line with the relevant strategies of national and international stakeholders.

FCC – Fall Competence Center

All humans can experience an unwanted fall during their entire life. Falling can represent serious consequences, including injury, psychological damage, limitations on mobility

and reduced quality of life. Some specific groups, as extreme sports practitioners or senior population, present higher risks of fall and damage. Also, these high risk groups frequently act/live alone and after a fall they are not able to request help. Particularly older persons, which are frailer, are an increasing segment of population presenting high risks of injury and other fall related consequences.

These groups would then benefit from strategies to alert and alarm when a fall occurs. Additionally to these reactive strategies, it is now recognized that falling can be prevented by modifying some specific risk factors targeted for intervention. Topical research results suggest that wearable inertial sensors can be a major strategy both to predict and detect falls and these topics are gaining increasingly attention by the research community.

Along with this, the existing strategies are not yet widely practiced, which makes falls an undertreated health problem. Therefore, the development of new solutions to manage falls would be of great value, not only for individuals presenting higher risks, but also for health care systems.

Fraunhofer Portugal is proposing to set up a Fall Competence Center (FCC), to investigate in depth all fall related aspects, including activity monitoring, in order to develop knowledge and viable solutions based on the use of smartphones for the everyday life of specific groups, which will be able to get transferred and applied in valuable products. The FCC intends to bring together experts from the different relevant fields, as Medicine, Physics, Electronics, Mathematics, Information and Communication Technologies and Human-Computer Interaction.

As these solutions are intended to be used in an unsupervised manner by the end user during his/her everyday life, they are required to be portable, easy-to-use, aesthetic and have accessible systems with multiple features (e.g. inertial sensors, memory and processing capacity, interface screen, information transmission possibilities). Specifically, the proposed project concentrates in four main areas of activity:

- Fall Risk Analysis;
- Age and Illness related Fall Detection;
- Falls in extreme sports;
- Assault Detection and Documentation;

Another important goal of the project is the development of real test trials to evaluate the systems reliability and fit the users' needs, for example, regarding the interfaces design.

Enaware

Enaware proposes the introduction of developments over a significant extension of the energy system – ranging from solutions for Demand Side Management/Demand Response (DSM/DR) to new features development for Smart Meters – contributing to strengthen the concept of aggregated energy production & consumption management. In addition, by allying the capabilities of the Advanced Metering Infrastructure (AMI) with Home Automation and domestic Intelligent Electronic Devices (IEDs), this project also aims to innovate the way residential consumption data is presented to the end user as well as the usefulness of the data. Concerning Smart Metering and home energy monitoring, the proposed solution goes beyond the simple presentation of consumption data by introducing the analysis and correlation of consumption/production of data and its transformation in personalized and near-real-time information for the end user. The alliance with Home Automation allows an intelligent use of the aforementioned information, providing the end users with the tools to control a larger number of variables with direct/indirect influence in their consumption expenses.

COMET

The project's objective is to design and develop an innovative system for the comprehensive management of physical and digital documents through a combination of Radio Frequency ID, Semantic Web, Information extraction and Natural Language Processing technologies. This management system will be able to control all procedures of document management in both digital and physical surroundings, internally, as well as externally managed, permitting for highly sophisticated and automatic semantic categorizing, archiving, searching, detecting and tracking of documents at any place, any time.

The system will be easily scalable and can be used in single departments up to entities with thousands of users. Fraunhofer Portugal AICOS will develop the technical components which will allow the other partners of the project to digitalize existing paper-based documents and to extract relevant information out of the text for further processing: the main contribution will be the research and development of an Information Extraction (IE) engine, which will extract machine-readable information from the digitalized texts. The extracted structured information might serve, for instance, as input for RFID tags.

The Information Extraction (IE) engine will integrate newly developed components for existing Natural Language Processing (NLP) frameworks to target the defined use cases. To ease the later adaption of the components to upcoming or changing use cases, the developed components will be modular and easily configurable through innovative user interfaces, enabling non-technical staff to implement new use cases for new types of documents.

In order to successfully automate the information extraction process, the identified information will be represented in a well-structured and established format that facilitates its sharing and reuse. To achieve these goals, Semantic Web technologies like the Resource Description Framework (RDF) or the Web Ontology Language (OWL) will be used. Additionally a Semantic Search Engine will be developed, which will allow for faster and more efficient search on the content of the digitalized documents. The developed search engine will be available in the mobile device and provide a user friendly interface.

GameFoundry:

The main goals of this project are the implementation of a new platform for knowledge management and monitoring of people behavior based on the use of network games. It features a wide scope, in terms of languages and geographical areas. It is intended to give the users the possibility of playing games in several environments and platforms, and to give the clients of this product the ability to create, in an independent way, a set of games with proprietary contents and put them over the network, supplying each of them for every supported platform: web, mobile, Facebook, Google+ and TV.

The client can then gather information from every user, namely their age group, location and usage data (their answers, response time, etc.). He will have also access to data analysis tools and simple visualization structures like tables, graphics and texts, using data mining techniques and automatic pattern recognition algorithms to analyze the behavior and usage methods of the players and help on their characterization.

GRA

This project description summarizes the effort of VTT in Finland, CSIRO in Australia, the Meraka Institute in South Africa and Fraunhofer Gesellschaft in Germany and Portugal to take advantage of each institute's individual expertise to jointly develop a communication infrastructure suitable to provide Internet access in rural Sub-Sahara Africa. MachaWorks supports the initiative as a local anchor-point in rural Zambia.

More specifically:

- CSIRO provides an efficient satellite-based infrastructure to reach rural areas;
- Fraunhofer Gesellschaft provides a terrestrial wireless infrastructure to bring this satellite connectivity into the wide area and Fraunhofer Portugal develops applications for targeted deployment;
- VTT integrates its network management concepts to take advantage of the network's context awareness;
- Meraka contributes its experience in wireless mesh concepts, in particular the community mesh and the wireless backhaul;
- MachaWorks will support local deployment, test and evaluation.

Academic Activities and Results

Regarding academic activities, not only Fraunhofer Portugal AICOS Director is an invited Professor at the Engineering Faculty of Porto University, but also AICOS proposes a set of topics for MSc thesis. The MSc students join the team to work on applied research projects and also in their own thesis. The topics proposed for thesis are aligned with the Strategic Research Agenda defined by the Fraunhofer Portugal scientific board.

Gesture recognition for natural interaction with applications

Nowadays, there are several motion sensors available in the market that can be used as natural user interface for applications and games through the use of gestures and spoken commands. The Kinect sensor by Microsoft and the Asus Xtion Pro sensor are two examples. These sensors were and are mainly used for games but the scientific community has been finding many areas where this kind of devices can be of major utility.

One of those areas is Ambient Assisted Living. Due to the frequent inability of most older adults in interacting with new devices and in order to promote healthy physical movements, Fraunhofer AICOS is now building a solid knowledge base in working with this kind of sensors in order to use them as interfaces for many applications in this area. The primary goal of this project is to have the Kinect sensor integrated with a set-top box that has been developed in previous projects, featuring a simplified user interface; and provide the user with the ability to interact with that interface by using simple gestures instead of the usual remote control.

For that, and in order to be able to apply this work to other applications, a daemon will be developed for the Linux OS. It will be able to listen to and process data sent by the sensor and identify simple pre-defined gestures that should be translated to input events (like the cursor keys, escape, enter, mouse click, etc.), which then should be sent to the Linux input layer.

To be able to successfully accomplish this goal, it will be necessary to study the protocol used by this kind of sensors and the existing drivers and frameworks (OpenKinect, OpenNI/

NITE, etc.) that aid in developing applications that use gesture recognition.

Finally, it may be also considered the possibility of exploring the sensor's microphone array for spoken commands, using the voice as input source.

Human-Computer Interaction via Brain Waves

Brain waves shows different rhythmic activities depending on the level of consciousness. These rhythms are captured in different areas of the cortex and are affected by different actions and thoughts. They can be grouped in order to detect brain activity patterns, and the identification of these patterns could be used to give direct commands to computers with the intention of performing specific tasks only with our thoughts.

The detection of brain wave patterns for a specific task is not straightforward due to the unique brain responses of each individual (even for the same tasks), so the system has to be previously trained for the tasks we want to detect. The training process consists on thinking about performing that specific task and detecting the brain wave patterns associated to that assignment.

Applications:

- Applications for disabled people: hands free applications such as controlling an electric wheelchair;
- Monitoring sleep disorders: nowadays people have to spend entire nights at clinics in order to perform these tests;
- Early detection of epileptic seizures;
- Games: controlling virtual environments only with the mind;
- Neuromarketing.

Android based Augment Reality

Augment reality applications enrich the real world environment with additional information available from various information sources. The domain of application ranges from gaming to information services, which provide help to humans to complete challenging tasks, like operating complex machinery. Due to the increasing market share of modern smartphones (iPhone, Android) the number of augment reality applications for mobile devices has raised significantly in the last years. Common to all this application is the fact that they utilize the camera of a modern smartphone to create the augmented image on the devices screen. Although this approach performs well in most of the situations, it might not be sufficient for certain scenarios and user groups, as the user has to look "through" the phones display.

The aim of this project is to use a (portable micro) projector to overcome this issue. The additional information will not be displayed as an overlay in the mobile screen, but will instead be projected directly into the real world. The outcome of this work will be the development of an Android framework which synchronizes the smartphones camera and the external projector and which facilitates the development of augment reality applications. In addition, the project will demonstrate the use of this approach by developing a prototypical augment reality application which will help an elderly person to operate a complex device in the house hold.

Rich VoiceXML Browser and Voice & Mobile Web based CMS

Interactive Voice Response (IVR) applications are built with the VoiceXML markup language and are accessed by users through a simple phone call. The phone call is directed to a VoiceXML interpreter which fetches and interprets VoiceXML

documents from a Web server. User input to IVRs is provided through voice or touch-tone (DTMF) input; sophisticated speech recognition and speech synthesis engines are available out-of-the-box.

However, a generalized browsing of VoiceXML content across different content providers, comparable to browsing the Web, is not supported so far. Also there is a lack of support for easy creation of voice content through users, as known from the Web with its user-generated content like blogs, Wikipedia, etc.

Especially in developing countries, where literacy rates may be as low as 40%, voice-based applications and content offer a high potential to offer services to underprivileged users; but also visually impaired users or older people in developed countries may profit. At the same time, from the other end of the user spectrum, prizes on phones and even smartphones are rapidly falling and sales are rapidly rising.

The goal of this project is to develop components for a converged Web of VoiceXML Websites, SMS services, (mobile) HTML Websites, Web Services and multimedia, the "Mobile Web 4 All", which may provide a bridge over the "digital gap".

Information Extraction from Medication Leaflets

Promoting therapy adherence requires understanding various psychosocial parameters, including patients' need for information. The availability of drug information adapted to the patients' specific needs may empower them, increase their confidence in drug therapy and, consequently, increase the success of the therapy by contributing to ensure that patients take medications as prescribed by their health care providers.

Particularly when analyzing elderly people needs, it is important to provide detailed information concerning what is the medication for (therapeutic action), the recommended dosage and administration form, the general indications, the precautions (for instance what to do if a dose is missed or taken too much), the normal side-effects and contra-indications of the prescribed medication.

This project aims to develop a Natural Language Processing system capable of automatically analyzing the free form textual information contained in the medication leaflets in order to identify, categorize and structure the information contained in such texts. The development of a conceptualization of such content, in a form of drug product information ontology, and its automatic population is also an objective of the project. The system will use Information Extraction techniques, a sub-area of Natural Language Processing, in order to extract information from natural language text, without requiring the user to analyze the text.

Data Mining and Visualization of Android usage data

Designing user interfaces for any kind of application is a challenging task, especially when it comes to the development of mobile applications. The design process depends heavily on the intuition of the designer, speculations on the users' intentions and how the users will interact with the software. As a result, many applications do not fully meet the requirements and show severe shortcomings in terms of usability. Common design processes try therefore to increase the usability iteratively by repeating several design and test cycles. The main drawbacks of this approach are the cumbersome execution of the test cycles and the demanding analysis of the test results.

Fraunhofer AICOS has developed a framework which eases this task by developing a usage mining system. The system collects usage data on android phones and applies various statistical methods on the data set, to offer a better insight to the user interface designers.

Dance. Don't Fall! usability tests

The aim of this project is to extend an existing usage mining framework with additional data mining algorithms and to develop appealing visualizations for the discovered information. The main focus of the framework is to give the interface designers insight into the user behavior; therefore there will be a close collaboration with usability experts to select appropriate algorithms or to develop new ones. As the amount of collected usage data might grow very fast, scalability is one of the key features. Using map-reduce frameworks like Apache Hadoop is one way to meet the scalability requirements, which should be explored during this project.

Design patterns library for smartphone applications targeted at older adults

This project relates with creating a user interface design pattern library for older adults under the umbrella of the S4S (Smartphones for Seniors) project. The input for the project will build upon the knowledge gathered with the Smart Companion, a project for which a vast number of usability tests were already performed and documented. The main focus of research will be on user interface design patterns. They should be structured, organized and developed in a way that they can be easily accessed through a simple Web application, that clients can access in order to guide their design and development processes. An interaction design pattern is defined as an effective solution to a recurring problem. The particular problem being addressed, in this work, concerns issues related to touch-based interaction for older adults.

The literature review suggests that these might not be adequate for this particular audience, and therefore we propose creating a new user-defined approach to gesture sets. This project intends to enable older adults to actively participate in the specification of the gestures they are expected to be able to use when interacting with touch-surfaces. The patterns will appear as a result of testing and analyzing these user-defined gestures against commercially available ones. We expect to uncover a more adequate set of gestures and document them in a pattern form, in order to facilitate their adoption by interaction designers.

Analysis and design of smartphone applications for older adults for Windows Phone 7

This project relates with the analysis and design of smartphone applications for the S4S (Smartphones for Seniors) project. The work begins with a throughout user research (including literature review and possibly interviews with older adults) to formalize the requirements of S4S. Consequent to this study, the gathered requirements in the form of personas, scenarios, and use cases that will be used throughout the project will be formalized. Depending on the size of the user research phase, prototype solutions to the problems previously identified will be proposed. This project has a target group that aren't the typical seniors, but 55 years old and above. So, it is necessary to do user research and gather the requirements for this age group, as well as to define their problems; which will be addressed further in the project.

Analysis, design and evaluation of smartphone applications for Parkinson-affected persons

This project relates with the analysis, design and evaluation of smartphone applications for the REMPARK project. A throughout user research (including literature review and possibly interviews with Parkinson-affected persons, caregivers and doctors) regarding the Parkinson-related physical changes and main consequences of the disease will be carried out. Consequent to this study, applications for the REMPARK project will be designed and evaluated with end-users.

Phone based sit-stand-sit movement analysis

Falls are one of the greatest risks facing ageing and older persons. Preventive methodologies aiming to avoid falls are

currently applied by doctors, who can predict the risk by using questionnaires and observing some physical tests. These are however applied with a low frequency, only when a visit to the clinic is necessary.

Recent studies are focusing on the use of wearable inertial sensors, such as accelerometers and gyroscopes, to instrument clinical tests of balance and mobility. In contrast with traditional methods used in laboratory environments (e.g. motion analysis systems and force plates), these can be applicable for long-term monitoring during daily life situations, being a promise for objective assessment of fall risk and its change while the subject is in their usual, daily situations.

Postural transition (PT), such as sit-to-stand (SiSt) and stand-to-sit (StSi), can be a predictor of future falls. Rising from a chair is a regular mobility related activity in daily life, and has been regarded as the most mechanically demanding functional task undertaken during daily activities. Measures of its performance are important indicators of overall functioning and balance ability in older persons. Without this capacity, many potentially ambulant subjects remain prisoners in their chairs.

Therefore, a smartphone shall be adapted for fall risk prediction purposes, through the evaluation of sit-stand-sit transitions, using its inertial sensors. It must also be considered the possibility to use commercially available sensors. Results must be provided and a history recorded and automatically transmitted to the doctor by gateway capabilities. By checking the values of the estimated parameters on a daily basis and by monitoring changes over time, the device can be used as a promising tool in home health care for the elderly, by providing objective figures of the mobility.

"Postbox Web" – Web data storage, data retrieval and data sync for shared mobile phones in areas with intermittent network coverage

In developing countries network coverage and available bandwidth pose serious barriers to data-heavy Internet services outside of urban areas. Though prices on phones, even smartphones, are rapidly falling, and sales are rapidly rising, shared phone usage is very common.

To enable data-heavy services outside of areas with sufficient network coverage, this project intends to design and implement a personal, password-protected and encrypted data storage for each user of an Android smartphone:

- Each user has a personal data storage space on the smartphone;
- Data stored in the data storage space is protected through a username and password and is encrypted to prevent unauthorized access;
- Different services can access different areas of the data storage space in a controlled way, e.g. an email service to store "multimedia" emails or a mHealth service to store medical records;
- When the smartphone establishes an Internet connection, the data storage space is synchronized with its equivalent cloud-based data storage counter-piece of the user, which might invoke a specific service: data that is stored on the device is uploaded, e.g. outgoing email messages, which are then send to their destination; data stored in the cloud is downloaded, e.g. incoming email messages.

Additionally sample services interacting with the data storage space will be developed or integrated, e.g. the email service described above.

Smart Companion workflows

Run-time management of energy efficiency on an industrial scenario - an autonomic computing approach

Considering a typical telecommunications operator, antenna installations can reclaim a significant slice of their total energy consumption (65 %). In 2005, the power requirements for an antenna base station (BTS) – considering a "traditional" structure (GSM and WCDMA) – could reach 3000W. The evolution of BTS equipment energy efficiency translates into a significant energy consumption reduction: the necessary power needs have decreased to 800W (70% reduction).

Such a reduction allows innovative solutions such as, for example, the integration of renewable energy sources within a BTS. Such integration demands an energy management mechanism, which could be performed by a "BTS Energy Box".

This "Energy Box" will be interfaced with several BTS components (e.g. radio, AC, renewable energy sources, batteries, etc.), should handle the collection and management of energy consumption data from the different components, as well as the integrated management of their operation, according to medium-to-high level energy efficiency policies (e.g. "activate supply energy to the network IF energy generation of renewable sources surplus LARGER THAN 10%").

Previous attempts to address the problem of run-time management of energy efficiency on industrial/commercial infrastructures have relied on applying principles of autonomic computing, mostly data centers and cloud computing. In this project, AICOS's researchers will participate in an industrial project and study a research "hot topic" - autonomic computing - under a novel application scenario (BTS vs. the usual data/service center infrastructure).

The main objectives of the project are:

- To research previous work and state-of-the-art on run-time management of energy efficiency on industrial/commercial infrastructures, with focus to those based on autonomic computing principles;
- -To study/identify the requirements of and specify/implement the software for a BTS Energy Box, an active element of a BTS which should handle the collection and management of energy consumption data from the different BTS components, as well as the integrated management of their operation, according to medium-to-high level energy efficiency policies.

Adapting mobile devices for seniors usage – an autonomic management approach

The complexity of mobile devices and the variety of applications running on them keeps increasing. The ability of remotely manage mobile devices creates the opportunity for mobile operators to provide services such as contact list configuration bootstrapping, user preferences, or automatic software installation, update and management. This type of services allows efficient device diagnosis and troubleshooting, auto configuration and the flexibility to time changing conditions.

These key benefits reduce the need for technical support, and ultimately help reducing operational costs, especially in the case of inexperienced users not acquainted with new technologies, as the case of elderly people. Such a framework becomes even more critical when we consider the recent push for mHealth applications, which make these devices into crucial elements in health assessment and disease management.

However, remote management standards are not being widely adopted by mobile operators, which usually implement proprietary solutions in collaboration with device manufacturers. This project consists in evaluating the restrictions of the applicability of the existing remote management open standards (e.g. OMA-DM and Broadband Forum TR-069) for mobile devices, as well as defining changes/extensions to the existing protocols that remove or at least reduce those restrictions. A proof-of-concept prototype - based on the Android OS - is expected to be developed during the project.

ANT+ medical health kit for older adults

Older adults need health care more than other adults, it's a fact. This basically means that they need to go more times to the doctor during the year than their children, for example. And this has obviously costs to the medical system. Another problem that motivates this work is related with the period of time that a health problem can be detected and successfully treated. By instance, if the patient has a problem today, for instance related with blood pressure or with the heart rate, and if he can only have a medical appointment in a month, during this month the patient can have serious health problems that could be resolved timely.

The ANT+ technology is designed for collection and transfer of sensor data. The technology can be compared with Bluetooth but the main advantage is that the sensors with ANT+ can work more than one year only with one small battery. Two of the main areas of operation of these sensors are wellness and home health. These sensors can be used for data-transfer for more than 15 different types of devices (heart rate monitors, speed sensors, foot pods, activity monitors, calorimeters, blood pressure monitors, blood glucose meters, pulse oximeters...).

This sensors are quite limited, but if we add a smartphone to this solution/sensors, we will have an independent solution that without any more requirements can do everything (do not forget that sharing data over the network is a necessary requirement).

This project aims to create an integrated solution (kit) that combines ANT+ sensors that can be used to get measurements related with a person's health. Then, there is one mobile application that collects and analyses the measurements and sends them to a possible service (managed by a health group) or a doctor that will say something back to the patient immediately or at least, as soon as possible.

There are a lot of functionalities that can be useful for these patients and that can be added to this project, like videoconference between the doctor and the patients, management of historical health data/measurements, automatic detection of casual anomalies.

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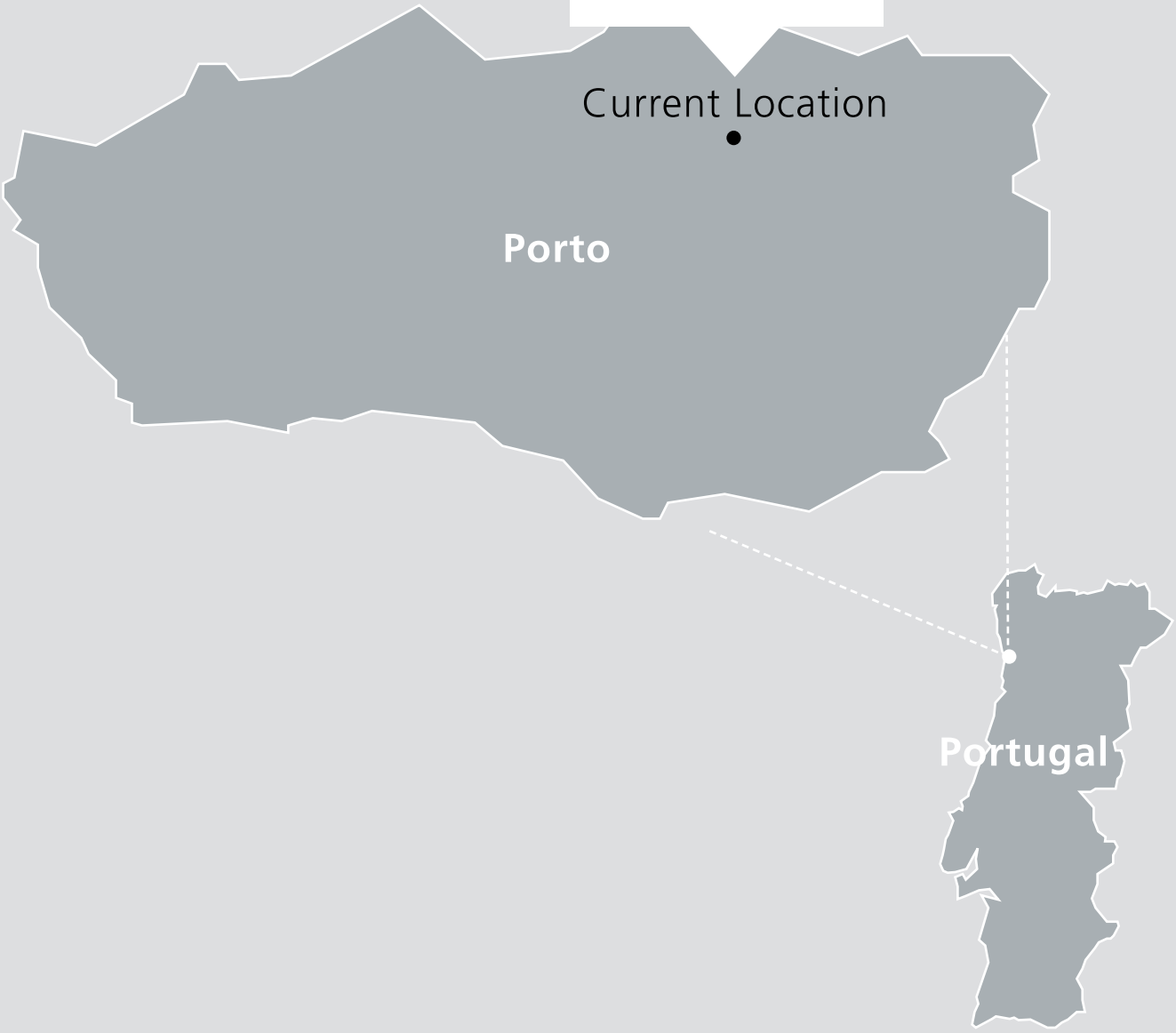
Current Location
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Portugal