Fraunhofer – Portugal

An international collaboration in Science and Technology

Memorandum of Understanding towards a long-term collaboration

18 April 2007

The Portuguese *Science and Technology Foundation* and the *Knowledge Society Agency*, and the *Fraunhofer-Gesellschaft* agree on conditions for establishing a long-term collaboration focused on emerging technologies, exploring mutual interests in science and technology oriented towards social well-being, economic growth and quality of life. Focus areas identified on the basis of a preliminary assessment exercise, as performed during 2006, will include information and communication technologies, biotechnology, nanotechnology, advanced manufacturing and logistics. The ultimate goal of this MoU is to establish a collaborative framework to promote continuous and systematic cooperative actions between *Fraunhofer Institutes* and R&D institutions in Portugal and, in the short term, to expand these actions to include establishing a new FhG-owned institute in Portugal in the area of new content applications and services based on information and communication technologies for ambient intelligence.

For the purposes of this agreement, the Portuguese parties include:

Fundação Para a Ciência e Tecnologia (Science and Technology Foundation)
http://www.fct.mctes.pt/
Av. D. Carlos I, 126, 1249-074 Lisboa,
Called hereafter FCT
Represented by its President, Professor João Sentieiro

and

Agência para a Sociedade do Conhecimento (Knowledge Society Agency)
http://www.umic.pt/
Taguspark, Oeiras,
Called hereafter UMIC
Represented by its President, Professor Luis Magalhães

These parties agree to sign the present Memorandum of Understanding with:

Fraunhofer-Gesellschaft (Fraunhofer Society)
http://www.fraunhofer.de/fhg/
Hansastraße 27 c, 80686 München
Called hereafter FhG
Represented by its Senior Vice President, Ulrich Buller, representing the Executive Board

WHEREAS, the Portuguese Science and Technology Foundation, FCT, is the public body, under the Ministry of Science, Technology and Higher Education, with the statutory mission of promoting, following up and evaluating science and technology programs and projects, including human resources qualification;

WHEREAS, the Portuguese Knowledge Society Agency, UMIC, is the public body, under the Ministry of Science, Technology and Higher Education, with the statutory mission of planning, coordination and projects development in the area of information and knowledge society;

WHEREAS the Fraunhofer-Gesellschaft, FhG, is Europe's largest research institution with more than 12,500 employees and 56 institutes. Its annual budget is close to 1.2 billion Euros, two thirds earned through industrial and public funded projects. As a link between academic research and business practice, FhG contributes considerably to technology transfer between among universities and industry;

WHEREAS FCT is interested in developing a strategic cooperation with FhG across all areas of science and technology and UMIC is specially focused on fostering specific cooperative arrangements with FhG in information and communications technologies, including emerging new content applications and services for ambient intelligence, and Grid Computing;

WHEREAS FhG has performed a preliminary assessment of the potential for collaboration with related institutions in Portugal during the second half of 2006 and, after visiting institutes and verifying that their scientific and technological infrastructure is well advanced and predominantly coinciding with the international standards and the scientific personal is internationally competitive, is interested in expanding its R&D activities into Portugal.

WHEREAS the parties are interested in promoting forms of collaboration in an European context, leading to successful proposals for funding in a competitive basis, namely through the 7th EU´s Framework Program, as well in facilitating research groups to attract private funding to co-sponsor their research work.

The parties herewith agree to develop a long-term research agreement based on the following:

1. ACTIVITIES – Patterns of cooperation will be established as follows:

   1.1 Specific and thematic cooperation programmes will be developed by Portuguese institutions and Fraunhofer Institutes in Germany, to be regulated on a case by case basis by a contract between the parties directly involved in order to define milestones, deliverables, Intellectual Property Rights and related costs and funding schemes. These programmes are expected to apply for funding to FCT, the European Commission Framework Programme and private sources, in a way that Portuguese public funding, given on a competitive basis, will match that from other sources. Four main potential programmes have been identified during the preliminary assessment conducted during 2006, namely:

   a) Logistics, bringing together a consortia of engineering centers and research laboratories in Portugal and specific competencies in logistics at FhG;

b) Augmented and virtual reality for advanced engineering design, bringing together a consortia of engineering centers and research laboratories in Portugal and specific competences on computer graphics at FhG, with particular application to the automobile industry;
c) Advanced manufacturing, bringing together a consortia of engineering centers and research laboratories in Portugal and specific competences on advanced manufacturing at FhG, to work together with manufacturing firms in Europe;
d) Biotechnology, including new contents and services for life sciences, bringing together a consortia of major research laboratories in Portugal and related Fraunhofer Institutes in Germany;
e) Nanotechnology, with a focus on the implementation of nanomaterials and nanotechnologies for advanced systems integration in microelectronics and MEMS/MOEMS applications. Beside technology this will also include design, test, prototyping and reliability evaluation.

1.2 Planning the design and implementation of major task forces in the areas of grid computing and nanotechnology, namely to foster research and development networks among Portuguese institutions, Fraunhofer Institutes and other European research institutions.

1.3 Installation of an FhG-owned research centre in Portugal during late 2007 as a nucleus for a future Fraunhofer institute, as follows:
a) The detailed area, scope and mission of the centre will be jointly defined, with emphasis on content and services for ambient intelligence, as described in Annex 1 to this MoU. Industry, with special emphasis on the local industry, should be interested in cooperating with the centre (namely through subcontracting) in the various sub-areas of work.
b) Application areas have been identified through the preliminary assessment exercise conducted in 2006, namely cultural heritage, shopping-malls and ambient assisted living, with special emphasis on support to extended active participation of the elderly in society and the economy, inclusion of people with low qualifications or disabilities, and enriched learning environments.
c) During the launching phase, the Fraunhofer Center will be adjoined to a mother institute to facilitate integration into the FhG. The legal status of the centre will be jointly defined by the parties following the best international practices and the specific experience of the FhG.
d) The research team of the centre should consist of about 30 senior researchers by 2009, to be internationally recruited on a competitive basis;
e) A suitable Portuguese individual with scientific, managerial and entrepreneurial competences, preferably German speaking, must be identified to serve as director for the centre. An accompanying board of directors must also be identified.
f) The undersigning parties agree that the research centre (as well as a future institute) must be able to operate within the Fraunhofer Financing Model, which should be reached within five years.
g) The Portuguese Science and Technology Foundation, FCT, guarantees basic funding following current procedures for basic funding of research centers upon evaluation by peer review. An overall amount of up to 6 M€, subject to evaluation, should be envisaged over the period 2007-2009, but an additional financial programme to support the activities of the centre for at least five years has to be defined before the formal decision for founding the centre by the supervisory boards of Fraunhofer in their fall 2007 meetings can be taken.

h) The development of the centre into a full-fledged Fraunhofer-Institute will depend on a successful evaluation by year 4 of its operation, which will be jointly conducted by the parties with respect to scientific and financial performance, as well as to a business plan to be formulated by the director for the centre after consultation with the parties.
i) In case of a negative evaluation, any plan to dissolve the research centre should be covered by the base funding of year 4 and 5 of the starting period.

1.4 Study and implementation of other potential forms of cooperation, namely through the installation of other specific and thematic cooperation programmes, as well as other potential FhG-owned institutes in Portugal;

2. GOVERNANCE – The cooperation Fraunhofer – Portugal based on this MoU will be overseen, managed and further developed by a "Joint Fraunhofer – Portugal steering committee", called hereafter "The committee", as in Annex 2 to this MoU. Portugal will be represented by the President of FCT, the President of UMIC and a third member nominated by the Portuguese Minister of Science, Technology and Higher Education. FhG will nominate three members for this committee, but both parties, Portugal and FhG, may nominate other members depending on the number and breath of the scientific fields to be included. The committee will be chaired by the President of FCT and its vice-chairman will be designated by FhG. The nomination is for three years with the following commitments regarding the activities described above.

2.1 The committee must guarantee that, for each of the programmes identified in 1.1 above, both research and business plans are submitted to FCT within the next three months for analysis in a competitive basis. These plans must set forth models to further develop the projects in sustained ways.

2.2 The committee will identify within the next three months working groups to establish major task forces in the areas of grid computing and of nanotechnologies. The activities of this task force should be submitted to FCT in order to be made operational by the end of that period, if positively assessed.

2.3 The committee will guarantee that the installation of the FhG-owned research centre in Portugal will be made operational within the next three months, in a way that should guarantee launching the activities of the new centre before the end of 2007. The identification of the funding sources and their relative level, will determine the scope and governance of the new Institute and consists in one of the main tasks of the committee.

2.4 The identification of other potential forms of cooperation, namely through the installation of other specific and thematic cooperation programmes, as well as other potential FhG-owned institutes in Portugal, will continue in a systematic and permanent way under the coordination of the Committee. The Committee may act proactively in identifying potential projects, but will also provide preliminary assessment of proposals from Portuguese Institutions and related FhG Institutes and will inform FCT and FhG accordingly.

2.5. The committee will advise the director of the research centre, later the institute, in analogy to the curatorium of a Fraunhofer Institute. During the installation of the centre,

the director will report to the director of the affiliated mother institute. Upon installation of the institute, the director will report to the Fraunhofer Board directly.

3. GENERAL CONDITIONS FOR COOPERATION:

3.1 The potential areas for cooperation mentioned in 1. above are to be agreed by the Committee and any collaborative efforts should be implemented in a way to allow for the continuous monitoring and evaluation of the program, as well as for launching new areas of application, whenever they rely on well documented scientific principles and relevant problems for Portugal and FhG. In particular, the management of technological innovation and the commercialization of information and communication technologies should be considered by promoting strategic visions for public and private ventures and by developing the necessary skills to help foster collaborations for innovation at an international level.

3.2 We recognize that many considerations need to be further explored to ensure that the collaboration will meet the objectives of both Portugal and FhG, and that there are many decisions that FCT and UMIC, and any entity that they might create to manage this partnership, and FhG must make., Therefore, it is appropriate at this time for FhG and for FCT and UMIC to further explore and assess the intellectual objectives of this joint program, as well as the options for structuring the collaboration, its feasibility and scope, and thus identify other terms that may govern the long-term collaboration.

3.3 Changes and amendments to this MoU have to be done in writing and accepted by both parties.

3.4 This MoU becomes valid upon its complete signature for three years Unless terminated in writing by one of the parties with six months prior notice to the end of the initial term, this MoU shall continue to be valid for additional 12 months-terms from each renewal date. .

Annex 1

Proposal for launching in Portugal
a Fraunhofer Institute for Applied Research on
"Technology, Applications and Services for Ambient Assisted Living"

March 2003

1. Proposed Mission

The Institute will undertake applied R&D on technologies, applications and services for ambient assisted living, exploiting how ICTs can contribute to improve the quality of life of all citizens. The Institute will contribute to spread out the effective reach of the Information and Knowledge Society (IKS) by promoting innovative ways to deliver ubiquitous access to ICTs, by fostering the steady deployment of innovative content, applications and services for all and by promoting life-long learning through emerging forms of edutainment. The Institute will devote particular effort towards citizens with low qualification, the elderly and citizens with special needs, who traditionally lag behind in what concerns the advent of the IKS. During the launching phase, the Institute will be initiated as a research center to be focused on new technologies and services for places where many people convene, such as shopping malls, and on new technologies and content for virtual, augmented and simulated reality, with application to ambient-assisted living as well as to health-care devices. Achieved developments in this area will be applied to enhance the active capacities of the elderly, to increase the access of people with low qualifications or disabilities to the benefits of information society, and to enrich learning environments.

2. Justification

Education determines the extent to which people perceive and derive benefit from using ICTs. In the European Union only in a few northern countries, such as Sweden, Denmark, Finland and The Netherlands people with low and high qualification use ICTs regularly. Germany, Estonia and Luxembourg lead the group of remaining countries in this respect. In most countries, and in particular in countries like Portugal, Greece and Cyprus, adults without secondary education lag behind in what concerns adoption and regular use of these technologies.

Several recent studies and research analysis have focused on the evidence found on the correlation between ICTs usage and the educational and social/economical conditions of citizens and families, which shape their activities, hobbies and behavior. These approaches conclude that the involvement of citizens and families in Information and Knowledge Society (IKS) is path dependent, and rarely the role of technology has influenced educational and social change just by itself. The rationale is that the activities carried on the digital world are basically the same activities that people had before.

Thus, there is a need to better understand how ICTs can accelerate bridging the digital divide in the future, by involving more people with fewer qualifications in the IKS, namely by promoting the use of innovative applications and devices, and how the regular use of ICTs can provide a framework for qualifying these citizens on a regular basis..Recent developments in the field of human-machine interaction, namely new interfaces and applications for 3D-visualization for gaming and entertainment, can be applied to develop innovative tools for education and training that stimulate active learning and thus enhance the effectiveness of traditional learning environments. The vast network of Community Technology Centers (CTCs) in the US, which aims at empowering people with equitable

access to ICTs and with the necessary skills to use these technologies meaningfully, provides a benchmark in this regard.

Wealth also helps determine the extent to which people engage in the IKS. Those with fewer qualifications perceive little benefit from using ICTs, and rather spend their income on more essential goods. Bringing these people to the realm of the IKS is paramount for inclusive social development. This can be mostly achieved by designing new easy-to-use applications and services, that can be flexibly adapted to particular user groups needs and interests, to help navigating through an ever more connected world. Applying such innovations to those with fewer qualifications can provide a means for making these people more comfortable with using ICTs.

In parallel, most **forecasts show that aging rests upon Europe as a whole**, as in other large regions of the world. Effective new devices and applications targeted to the elderly benefit from the opportunities provided by a large and expanding global market. The number of elderly persons per working person in Europe will more than double during the first half of the XXI Century. But, ICTs can provide the right tools to assist the elderly and citizens with special needs to participate more fully in their jobs and in their private lives. ICTs, namely technical aids, can help the elderly to better appreciate their retirement options, tourism in particular, and to extend their active participation in society and the economy. ICTs can also help citizens with disabilities to engage more easily in their jobs through teleworking.

Technology developed for this purpose will also support social interaction with family and others and will have direct application to virtual teams and organizations. Further applied research and development on these technologies can have direct application for virtual, augmented and simulated reality. In fact, these technologies can help everyone navigate in today's world making use of more intelligent environments, which embed smart interactive devices to provide increased quality of life and comfort.

3. Positioning and Rational for Activities

The new Institute will **study, develop and experiment**, innovative ways to integrate more citizens into the realm of the IKS, with particular application to **Southern and Eastern European countries**, by finding and promoting ways in which ICTs can effectively bring added value to the life of the info-excluded citizens. Most elderly are usually retired and the less skilled are typically unemployed or earn little income. Both are seldom found among the first willing to pay to use ICTs, unless these technologies allow them to become part of meaningful online communities or to extend their active roles in society or the economy.

The new Institute will contribute to stimulate building such communities by developing, and by supporting the development of, new applications, content and services, with special focus on "social-construction" platforms and location based services, and by promoting emerging forms of both entertainment and edutainment. Innovative applications and devices developed by these industries, including new interfaces controlled by voice, gesture, vision and the brain, will be used to promote new ways of education and training that better stimulate learning. Potential applications at the launching phase can also include advanced technologies and services for places where many people convene, such as shopping malls, which can be expanded to ambient-assisted living and health care devices.

While delving into this new technological wave, the new Institute must account for the accelerated convergence among digital TV, mobile phones and personal computers. New applications and devices that can bring new content and services closer to the end-user, by providing ubiquitous access through interoperable and unified platforms, can contribute significantly to enhance the active capacities of the elderly, to increase the access of people with low qualification or disabilities to the benefits of information society and to enrich learning environments.

In addition, the new Institute will contribute to develop a better understanding of what public policies can help close up the digital divide, by devoting significant resources to **study the relationship between e-inclusion, education, ageing and wealth creation**. It must thus operate in close relationship with governments, namely through agencies that foster the development of the IKS.

The new Institute will **focus activity on large markets** that given the right incentives to adhere to the IKS can surely heave attractive earnings. The Institute will help firms tap these markets by developing applied R&D on high-tech products expected to mature into marketable products. The activities developed will be of major interest to firms in the telecommunications industry and in the services sector, namely to Internet service and content providers. All knowledge created will also be of extreme relevance to develop applications for those already familiar with the information age, as the principles used for deploying ubiquitous access and user-friendly services may easily apply, and thus spillover, to the entire society, within and across borders.

The new Institute will devote significant effort to contribute to the steady development and growth of an industry of information technology, content and services. To this end, two complementary driving forces must emerge in Portugal. First, there is a need to foster the development of **digital content that triggers innovative services**. Some of the most successful firms that provide digital content and services worldwide offer news, email, search, instant messaging and targeted advertisement all together in unified applications.

However, most of these information and services providers, most notably Yahoo!, MSN and Google, rely on third-party content and, currently, have more users than traditional information sites such as The New York Times and BBC. In fact, there is a growing industry of popular **websites for social construction and online networking** that provides easy-to-use tools for people to develop and upload their own content and thus build online communities. These websites are meeting points for communities of users that post information online, in the form of text, audio and video, and thus exchange ideas, experiences and knowledge. The rapid growing success of these sites shows that significant potential to create and develop attractive content lies with the users themselves, who must thus become empowered to do so in sound legal ways.

Despite the growing number of such popular websites and online services, the digital divide still lingers. In fact, these tools provide additional ways to connect those who are already familiar with ICTs, but they fail to reach out to society at large, namely to those with lower qualification. In truth, there is still significant lack of knowledge about how digital inclusion works and how new contents and services can effectively generate enough benefit to attract the bulk of the info-excluded citizens. The **new Institute will contribute to create and develop this knowledge** by devoting particular emphasis to applied research and development. The Institute will apply this knowledge to policy-making,

through its tight relationship to the government, and to the commercialization of innovative technology, content and services, through its partnerships with firms.

4. Why a new Fraunhofer Institute? And why in Portugal?
The new Institute will focus on a **new research area** for the Fraunhofer Society and will thus contribute to enlarge its expertise into a very relevant field for the future of Europe. Choosing to locate this Institute in Portugal will place it at the very heart of the issues at stake, therefore facilitating experimentation and learning.

In Europe, most institutes developed to address the issues of digital inclusion focus on study and analysis leaving behind the actual development, implementation and testing of new technologies, applications and services to help close up the digital divide. The new Institute can resort to the vast experience of the Fraunhofer Society to develop applied R&D and to take inventions all the way to the marketplace where they can finally have a real impact on society at large. Digital inclusion can benefit from smart ambient technology that helps people navigate in today's intricate environment at the same time they get acquainted with innovations in ICTs.

In this way, and also by strategically using technology developed at existing Fraunhofer Institutes, such as the Institute for Information Technology (FIT), the Institute for Communication Systems (ESK), the Telecommunications Heinrich-Hertz Institute (HHI), the Institute for Computer Graphics (IGD) and the Open Communications Systems Institute (FOKUS), to facilitate the integration of citizens with low qualification, the elderly and citizens with special needs, into the IKS, the new Institute will provide an innovative approach on how ICTs can contribute to improve the quality of life of all citizens and, in particular, help to bridge the digital divide in Europe, becoming therefore an international landmark for promoting social cohesion through ICTs and learning.

In fact, applied R&D and technology developed in the abovementioned Institutes have direct and immediate application to promote digital inclusion. The Fraunhofer Society as a whole has already accumulated a vast expertise in managing ICTs that can be rapidly put into practice and have a very positive impact on closing the digital divide and, therefore, the web of distributed knowledge developed at these Institutes is the best context to raise the new Institute. Effective collaboration between the new Institute and other Fraunhofer institutes must be straightforward to implement. In addition, the new Institute will, per si, **launch new activities at the Fraunhofer Society and contribute to extend its scope outside Germany, particularly to southern and eastern Europe**.

The new Institute must be developed in close relationship to the government, firms and research centers in universities. In what concerns the relationship to the government, the new Institute must be launched in close cooperation with the Portuguese governmental Knowledge Society Agency (UMIC), in ways that can complement current activity to foster the development of the IKS in Portugal.

During the launching phase, the new Institute will focus on technology, content and services for places where many people convene, namely to shopping malls. Sonae, through Sonae Sierra, could be a prime partner at this stage and contacts should be established in that direction. At later stages, the new Institute can focus on technology for households, namely for homes for the elderly and for the workplace, which are European-wide markets that many firms of different sizes and scopes, including large firms such as Siemens, Philips and SAP, can be interested in addressing jointly. Further research and

development on these technologies can have direct application for virtual, augmented and simulated reality prompting the development of “intelligent-ambient” solutions.

Other firms that, in Portugal, develop relevant applied R&D for the new Institute include, at least, Sonae.com, PT - Comunicações, REFER Telecom, Brisa and REN for ubiquitous deployment of backbone connectivity; PT - Inovação, ONI, Rádio Móvel, ARTELECOM and Sonae.com for the deployment of local loop access, and terminal vendors, such as IBM, Toshiba, Sony and Motorola. CISCO Systems and Alcatel should also be considered prime partners in what concerns all switching equipment and facilities. At the services layer, interesting firms include content providers, such as RTP, SIC, TVI, Microsoft and creative companies like YDreams and Critical Software. Again, contacts are to be established at the launching phase of the new Institute in order to identify potential partners and business areas.

Research centers with significant competence in areas of interest to the new Institute include INESC-ID in Lisbon, INESC-PORTO in Oporto, the Institute for Systems and Robotics (ISR) in Lisbon and in Coimbra, the Institute for Telecommunications (IT) in Lisbon and in Aveiro, the IPP Hurray Center and the Knowledge Engineering and Decision Support Group at the Polytechnic Institute of Oporto, the Rehabilitation Engineering Center at the University of Trás-os-Montes, the Algoritmi Center at the University of Minho, the Institute of Electronics and Telematics Engineering of Aveiro at the University of Aveiro, the Large-Scale Informatics Systems Laboratory at the University of Lisboa, the Artificial Intelligence and Computer Science Laboratory at the University of Oporto and the Research Center for Informatics and Information Technologies at the New University of Lisbon.

Proposed Calendar

The following calendar can be used to proceed with the tasks needed to launch the new center:

1. March 2007	Signing of MoU for launch Appointment of *Steering Committee*
2. March – May 2007:	Meetings with potential partners Validation of funding model Definition of installation plan Definition of start-up projects
3. May 2007:	*Steering Committee* presents report Partners evaluate and decide (Fraunhofer Executive Board)
4. June-September 2007:	Installation plan begins Hiring process (human resources) starts
5. October - November 2007	Formal approval by Fraunhofer supervisory boards ("Senate" and Federal/State Government Council)
6. November-December 2007	Establish all operational needs Launch first set of R&D projects Engage partners in activities/projects
7. January 2008	Formal launch of the new center

Annex 2

Joint Fraunhofer – Portugal Steering Committee

The Steering Committee in charge of overseeing the Fraunhofer – Portugal cooperation will include six elements, as follows:

1. The President of the Portuguese *Science and Technology Foundation,* FCT, **João Sentieiro**, joao.sentieiro@fct.mctes.pt, Professor;
2. The President of the Portuguese *Knowledge Society Agency,* UMIC, **Luis Magalhães**, luis.magalhaes@umic.pt, Professor;
3. **Pedro Guedes de Oliveira**, pgo@inescporto.pt, Professor at the School of Engineering of University of Porto and researcher at INESC Porto, as nominated by the Portuguese Minister of Science, Technology and Higher Education;
4. **Ulrich Buller**, ulrich.buller@zv.fraunhofer.de, Professor, Senior Vice-President Research Planning and responsible for Europe in the Fraunhofer Executive Board, as nominated by Fraunhofer-Gesellschaft, FhG;
5. **Dieter Rombach**, dieter.rombach@iese.fraunhofer.de, Professor, Chairman of the Fraunhofer ICT Cluster and Member of the Fraunhofer-Gesellschaft Presidential Council, as nominated by Fraunhofer-Gesellschaft, FhG;
6. **Jose L. Encarnação,** jle@inigraphics.net, Professor, Chairman of INI-GraphicsNet Foundation and Professor of Computer Graphics and Computer Science, TU Darmstadt, as nominated by Fraunhofer-Gesellschaft, FhG;

The committee will be chaired by the President of FCT and its vice-chairman will be designated by FhG.