

DADOS GERAIS :::::

IDENTIFICAÇÃO DO PROJECTO DE INVESTIGAÇÃO

TÍTULO DO PROJECTO : Kit Vestível de Colaboração
PROJECT TITLE : WrCK - Wearable Collaboration Kit
ÁREA DISCIPLINAR PRINCIPAL : Engenharia Electrotécnica e Informática
PALAVRAS-CHAVE : Colaboração Móvel Remota; Colaboração Síncrona; Trabalho Cooperativo Suportado em Computador; Computação Vestível.
KEYWORDS : Remote Mobile Collaboration; Synchronous Collaboration; Computer Supported Collaborative Work; Wearable Computing.
OBJECTIVOS SÓCIO-ECONÓMICOS : INDÚSTRIA - Outros tipos de instrumentos
DURAÇÃO : 24 Meses

INVESTIGADOR RESPONSÁVEL

NOME : Pedro Alexandre de Mourão Antunes
MORADA INSTITUCIONAL : Departamento de Informática, FCUL, Edifício C5, Piso 1, Campo Grande
CÓDIGO-POSTAL/CIDADE : 1749-016 - Lisboa
TELEFONE PROFISSIONAL : 217500605
FAX : 217500084
EMAIL : paa@di.fc.ul.pt
Nº DE DOCUMENTO DE IDENTIFICAÇÃO : 5665723

INSTITUIÇÕES DE INVESTIGAÇÃO :

1 LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

DESCRIÇÃO DO PROGRAMA DE INVESTIGAÇÃO ::::

RESUMO/ABSTRACT

Esta proposta destina-se a criar um laboratório móvel, onde utilizadores dispersos e movendo-se no espaço colaboram sincronamente, não só entre si como também com utilizadores em locais fixos. O laboratório móvel é adequado para:

- Situações de trabalho móvel e conhecimento intensivo
- Tarefas onde o tempo é crítico
- Tarefas onde é preciso lidar com a última informação
- Situações onde é necessária informação pericial remota
- Situações de decisão requerendo colaboração informal

RESUMO(PT) :

A infraestrutura proposta combina componentes fixos e vestíveis. Os componentes vestíveis são na verdade mochilas com computadores vestíveis, telefones GPRS, ecrãs HMD, dispositivos audio, teclados vestíveis, Palm Pilots, câmaras de vídeo e GPS. Cada mochila tem uma PAN (Personal Area Network) utilizando tecnologia USB, 802.11b e Bluetooth. As mochilas são interligadas utilizando telefones GPRS.

A infraestrutura proposta contribui para investigação avançada nas áreas de CSCW (Computer Supported Cooperative Work), HCI (Human-Computer Interaction) e MobiComp (Mobile Computing).

The objective of this proposal is to set up a mobile laboratory where people dispersed in space and moving around, are able to collaborate synchronously with each other, as well as with other people at fixed sites. The mobile laboratory is adequate to:

- Knowledge intensive and mobile work situations
- Tasks where time is critical
- Tasks where people must deal with the latest information
- Situations where remote expert information is needed
- Decision-making situations requiring informal collaboration

ABSTRACT(ENG) :

The proposed infrastructure combines fixed and wearable components. The wearable components are in fact backpacks with wearable computers, GPRS phones, Head Mounted Displays, audio devices, wearable keyboards, Palm Pilots, Video Cameras and GPS. Each backpack has a Personal Area Network (PAN) using USB, 802.11b and Bluetooth technologies. The backpacks are networked together using GPRS phones.

The proposed infrastructure contributes to advanced research in the CSCW (Computer Supported Cooperative Work), HCI (Human-Computer Interaction) and MobiComp (Mobile Computing) fields.

OBJECTIVOS / REPERCUSSÕES

The major objective of the proposed infrastructure – WrCK, Wearable Collaboration Kit – is to provide a sharable mobile collaboratory. The system has two major components. One puts together in a backpack several computing and interaction devices, so that a person is able to walk and simultaneously interact with remote information, services and people. The second component brings together computing tools and systems at a fixed site on the network, so that groups of people are able to find and manage information, assist or guide mobile users and make decisions according to timely information obtained on the field.

The proposed infrastructure is designed to be mobile, synchronous and interactive. The major application scenarios include missions where time is critical and groups of experts must deal with the latest information to make decisions, as well as missions where location awareness and access to remote information and experts are paramount. Examples of the former scenarios include monitoring and action planning in crisis situations such as environmental accidents. Examples of the later scenarios include fieldwork involving geo-referencing or biological surveys.

In a broader context, the proposed infrastructure could also be applied to tele-assistance scenarios, such as aircraft repairing.

Research Programme

The research programme for the next five years is organized in two major conceptual frameworks. The first one, to be developed in the first 2 years, is the exploratory framework. The exploratory framework is concerned with engineering and design of the infrastructure. In that context, three research areas will be developed:

OBJECTIVOS :

- Computer Supported Cooperative Work (CSCW) – Synchronous interaction, remote group work support
- Human-Computer Interaction (HCI) – Wearable computing, ubiquitous computing, usability, augmented interactions
- Mobile Computing (MC) – Remote information services, information integration, context aware applications, multimedia

The second framework is dedicated to assess the infrastructure usage and build evidence, with a time span of 3 years. Two research areas will be set up:

- Remote mobile collaboration – Remote decision making, time critical and information intensive work, grounding
- Computers in context – Spatial awareness, location awareness, mobility, remote access to information and experts

Original Contributions

The infrastructure will contribute to:

- Support internal and external research projects in the CSCW, HCI and MC fields
- Develop information integration mechanisms for wearable computing
- Support remote mobile cooperation mechanisms, in particular those requiring interaction with multiple remote sites
- Study the requirements for effective remote collaboration support, considering the limitations in bandwidth, awareness and interactivity
- Understand how mobile and fixed groups make decisions, and the impact of time and space contexts in decision-making
- Study tele-assistance, assessing learning, tutoring and repairing tasks

On the state of the art research

The proposed infrastructure will enable to conduct research on several topics that significantly expand the scope of traditional information systems. It also outlines the convergence of several separate research fields, namely, bringing together mobile systems, human computer interaction and computer supported cooperative work.

More specifically, the proposed infrastructure will impact three research topics: (1) Cooperative synchronous systems; (2) Mobile computing, and (3) Wearable computing.

The research agenda that will be attached to this infrastructure includes the proposal of several research projects in the immediate future:

- Remote mobile collaboration – Collaboration with organizations working on geo-referencing (the Geological and Mining Institute of Portugal is an example of an organization that does such kind of work)
- Support to time-critical decision-making – Projects in this area will seek collaboration with crisis management organizations (e.g. fire fighting or rescue teams)
- Tele-cooperation – Collaboration will be seek with organizations that perform intensive and costly repair and maintenance tasks (for instance, aeronautical maintenance)
- New mobile services requiring high bandwidth – The opportunity for developing new high bandwidth services may attract interest from the major players in the next generation mobile networks
- Wearable computers and usability – The complexity associated to coping with multiple interactive devices, limited input/output capabilities and feedback requirements may also interest other research teams. The proposed infrastructure will be available for this purpose

REPERCUSSÕES :

On the shared usage of the equipment

The WrCK infrastructure will be shared within LASIGE and externally to the laboratory. Within the Faculty of Sciences, the infrastructure may be of interest to several research units, for instance: (1) the Centre for Environmental Biology conducts field work like collecting biological samples and demographic analysis; (2) the Centre for Environmental and Applied Geology uses geo-referencing systems to study the Portuguese coast and evaluate environmental risks; (3) the Laboratory of Tectonophysics and Experimental Tectonics conducts research in the area of remote sensing; (4) the Institute of Oceanography works in the area of real-time anti-pollution techniques, including field interventions.

Concerning other external organizations, the proposed infrastructure will be available to crisis management organizations, initially with the purpose of demonstrating the technology, and later with the objective of developing reliable and dependable solutions that may effectively be evaluated on the field.

DESCRIÇÃO DO PROGRAMA

DESCRIÇÃO :

General description

Remote collaboration concerns the support of distant workers that need to communicate, coordinate and collaborate to accomplish their tasks. Many limitations in network availability, reliability and bandwidth lead in the past to situations where collaboration must be spawned in time – asynchronous collaboration.

The recent advances in communications infrastructures are generating interest for synchronous collaborations – situations where people are interacting on-line. This is a much more rich collaborative work environment, allowing people to build shared contexts, be aware of what others are doing and able to mutually adjust their actions. Thus, we can expect that with synchronous collaborations work teams be able to perform more complex tasks, like group judgements and decisions, rather than simply sharing information or coordinating.

Unfortunately, most of synchronous collaborative systems tie people to the desk (Luff & Heat, 1998) or within a restricted environment (Davies et al., 2001). The introduction of mobile communications infrastructures into this equation brings one new scenario: people dispersed in space, moving around, and able to collaborate synchronously.

WrCK is an infrastructure intended to address the above scenario. WrCK is particularly focussed on the support to:

- Knowledge intensive and mobile work situations
- Tasks where time is critical
- Tasks where people must deal with the latest information
- Situations where expert information is needed and experts must be found and contacted remotely
- Decision making situations requiring informal collaboration

The WrCK infrastructure is composed of two major components, the fixed and mobile systems. The mobile system comprises a backpack with several computing and communications devices (wearable computer, Palm Pilot, GPRS mobile phones, GPS device) plus a set of other wearable interaction devices (Head Mounted Displays, headphones, microphones, digital cameras, video cameras). The remote system should be designed to be portable, comfortable,

easy to use, interactive and flexible. The aim is to afford users' mobility while at the same time provide a high degree of interaction with the users at the fixed sites.

The fixed sites are composed of a set of computing systems designed to support a high degree of interaction with remote sites and, at the same time, decision-making. Thus, beyond the several devices necessary to support interaction with remote sites, the fixed site comprises: group decision support software (gathering, organizing and displaying group information), access to organizational information databases and public displays (such as the Smart Board or the mimio) to focus group work.

Functionality and services

The proposed infrastructure is intended to cover a wide range of remote collaborations. Our emphasis, however, is to provide adequate support to the most demanding situations requiring convergence of on-site information and group decision-making. One illustrative scenario of this convergence is the civil protection operations in crisis situations such as major earthquakes, water floods or forest fires.

In the above situations it is critical to obtain timely information, which has to be obtained on site, so that resources planning and deployment be effective. The interaction between highly mobile units on the terrain and decision making groups able to access and manage organizational knowledge is crucial. Besides empowering decision-making groups at fixed sites, the proposed infrastructure is also designed to empower the mobile units in two major ways: (1) access to remote expertise; and (2) interaction with other units on the terrain. In fact, the real advantage of this kind of infrastructure emerges from the coupling of both types of units.

Technically, this scenario is very demanding. In the one hand, this level of coupling requires a high degree of interaction between the units, which may be limited by the technological infrastructure. On the second hand, the technology must not be intrusive in the interaction process, which requires usability tests in the field.

Besides the scenario delineated above, we envisage other scenarios that may profit from remote collaboration and mobility. One such scenario is geo-referencing. Geo-referencing deals with experts on the field (geologists, palaeontologists, biologists) collecting and verifying data on-site, referencing that data with remote databases and discussing with other remote experts.

Contrary to the former scenario, which highlights interaction and interactivity, this one stresses integration between local and remote information and access to remote databases and experts.

Technical details

The WrCK infrastructure is composed of five layers (Dix et al., 2000): (1) network layer; (2) computational infrastructure; (3) computational system; (4) application domain; and (5) physical environment.

The network layer will encompass two fundamental components. The first one is intended to connect the mobile and fixed sites and uses mobile phones with GPRS and PPP (Point-to-Point Protocol) technology. The UMTS technology will be considered when available. The second component of the network layer is a Personal Area Network (PAN) connecting all the different devices in a backpack, including mobile phones. Three alternative technologies will be used to set up the PAN: USB, wireless LAN (802.11b) and Bluetooth. The wireless LAN and Bluetooth present the advantage of reducing the number of cables (and weight) in the backpack, although the USB technology currently supports more devices. This network layer allows exchanging voice, low-resolution video and data between the mobile and fixed sites, as well as between multiple mobile devices. In order to support simultaneous voice and data transmissions, two mobile phones will be used for each backpack.

The computational infrastructure consists of desktop computers, located at fixed sites, wearable computers, serving fundamentally as information hubs, and several computing and interaction devices interconnected with the wearable computers: Palm Pilot, head mounted displays (occupying totally or partially the field of view), wearable displays, headphones and microphones, digital cameras, video cameras, GPS or D-GPS, wearable pointing devices and keyboards. This infrastructure supports information exchange between the mobile user and the wearable computer and, indirectly, between the mobile user and other system users.

The computational system deals with the support to information exchange and integration between the different

devices and computers.

The application domain is a fundamental layer of this infrastructure, since it is responsible for providing the following collaborative services:

- Grounding, i.e. the interactive mechanism, based on audio and video communication, by which users exchange evidence about what they do or do not understand (Fussell et al., 2000)
- Collective memory, integrating information repositories and people, as well as mechanisms to find and contact people
- Context and location awareness, based on devices such as video cameras and GPS

The final layer concerns the physical limitations of the environment. Two different issues are addressed in this context: (1) the limitations of the interaction devices, such as display limitations and ergonomics; and (2) the operational restrictions of the infrastructure, like energy consumption, availability, reliability and dependability.

Related work

The WrCK infrastructure provides a generic platform to support collaborative mobile applications (Dix et al., 2000). In that context, it has several affinities with several systems and technologies, for instance:

- The CyberGuide developed at Georgia Tech (Long et al., 1996). This work explored the effects of context (place) on mobile applications. The developed scenario consisted of an information device that visitors could move around the research laboratory to get information about projects being developed in each room. The Lancaster Guide, developed at Lancaster University (Davies et al., 1999, 2001), follows the same aims although using a different technological infrastructure. Both systems explore the wireless network support to mobility, although not using GSM/GPRS/UMTS. Unlike WrCK, none of these systems explore collaboration between several users.
- The Limbo system, developed at the Lancaster University (Dix et al., 2000), is a distributed platform that allows multiple geographically distributed devices to share information with each other, making a community of devices. This community of devices operates as a single collaboration system. The major focus of this system is modelling distributed information and providing basic support to location and mobility in space. The aims of WrCK do not lie at this application development level but, instead, converge to the user level, concerning information integration, multi-user interaction and decision-making support.
- The various research groups working on ubiquitous computing, wearable computers and augmented reality also provide significant background to WrCK. In particular, we should mention two works from MIT. One is the StartleCam system (Healey & Picard, 1998), consisting of a wearable computer plus several devices like a digital camera and a skin sensor capable to control the digital camera based on measures of skin conductivity. The other one is Tangible Bits (Ullmer & Ishii, 1997), which links information with physical objects. Unlike WrCK, both these systems are primarily concerned with user interface augmentation.
- In the CSCW field, the SharedNotes prototype from the University of Calgary (Greenberg et al., 1999) aims at supporting public and private artefacts including mobile devices such as PDA and addressing issues such as feedback and awareness. The scenario of use, however, is particularly oriented towards face-to-face interactions rather than remote collaboration.
- The Answer Garden 2 system, developed at the University of California, Irvine (Ackerman & McDonald, 1996) provides a collaborative help service allowing people seeking help to resolve an individual problem to find and contact appropriate experts. FieldWise, developed at the Victoria Institute, Sweden, is similar to Answer Garden 2, offering a knowledge management architecture that supports mobile workers finding help (Fagrell et al., 2000). These systems bound their support to the issue of information/expert seeking.

Besides technology, the scenarios proposed for the WrCK infrastructure have also found prior interest in research literature. Davies (2000, 1999) explored the collaborative access to safety critical information by a group of field engineers, focussing on the aspects of network failures and disconnected operation. Fussell et al. (2000) experimented remote collaboration in the context of repair tasks, more precisely bicycle repair. Ackerman and McDonald (1996) illustrate a remote collaboration scenario with astrophysics having to contact experts to obtain timely information. Fagrell et al. (2000) experimented mobile collaboration in a newspaper context, where journalists may contact co-workers who published some particular articles. Siegel et al. (1995) studied aircraft maintenance workers using wearable visual interfaces and a collaborative system for troubleshooting and repair work. Najjar et al. (1999) experimented wearable computers in the context of on the job training.

Thus, the WrCK infrastructure is intended to tackle scenarios that other researchers have also explored. However, it positions itself at an innovative edge at the technology arena. The salient aspects are: (1) support to remote collaboration and, notably, collaboration between remote users; (2) focus on the user level and support to decision making; (3) integration of both communication and information sharing services.

References

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RESULTADOS ESPERADOS

DESCRIÇÃO :

The proposed infrastructure will specifically contribute to:

- Bootstrap research projects in the CSCW (Computer Supported Cooperative Work), HCI (Human-Computer Interaction), and MC (Mobile Computing) fields
- Develop information integration mechanisms for wearable computing
- Support remote mobile collaboration mechanisms, in particular those requiring interaction with multiple remote sites
- Study the requirements for effective remote collaboration support, considering the limitations in bandwidth, awareness and interactivity
- Understand how mobile and fixed groups make decisions, and the impact of time and space contexts in decision-making
- Study tele-assistance, assessing learning, tutoring and repairing tasks

The research results will be submitted to adequate journals, conferences and workshops.

The infrastructure will also be intensively used by Ph.D. and Ms. students doing their research studies at LASIGE. Currently, two Ph.D. and one Ms. students will get immediate benefits using the infrastructure to accomplish their research works. The number of students involved in research work with this infrastructure will be multiplied by 5 in a period of three years.

Furthermore, LASIGE will interact with other research units associated to the Faculty of Sciences and interested in doing fieldwork with the proposed infrastructure. LASIGE will bootstrap projects with other national organizations that have interest in using the infrastructure and have employees doing post-graduate research studies at the Department of Informatics. Finally, LASIGE will also seek research projects with international organizations, at the European level and Latin-America as well.

The LASIGE researchers have experience with setting up and operating such a kind of infrastructure on the long term. For instance, ISCTE still operates an electronic meeting room that was set up in the context of a research project financed by FCT with the participation of several LASIGE members. The project finished in 1999 but the electronic meeting room is still in operation, supporting research work, thesis and publications. The long-term perspective, level of commitment and results, will be preserved in the current proposal.

In concrete terms, this proposal specifies the following evaluation criteria and goals (3 years period):

- 15 Ph.D. and Ms. students enrolled
- 5 national projects
- 3 international projects
- 15 publications in international journals, conferences and workshops
- 3 external organizations using the infrastructure

EQUIPA DE INVESTIGAÇÃO :::::

MEMBROS DOUTORADOS

MEMBRO DOUTORADO (1) - Página 1

NOME : Pedro Alexandre de Mourão Antunes
LOCAL DE NASCIMENTO : Lisboa, Portugal
DATA DE NASCIMENTO : 17-05-1964
NACIONALIDADE : Portuguesa
MORADA INSTITUCIONAL : Departamento de Informática
Faculdade de Ciência da Universidade de Lisboa
Edifício C5, Piso 1, Campo Grande, Lisboa
TELEFONE : 217500605
FAX : 217500084
E-MAIL : paa@di.fc.ul.pt
Nº DOCUMENTO DE IDENTIFICAÇÃO : 5665723
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Doutorado
CATEGORIA PROFISSIONAL : Professor Auxiliar
TEMPO NO PROJECTO : 20 %

MEMBRO DOUTORADO (1) - Página 2

ÁREA DE INVESTIGAÇÃO PRINCIPAL : Engenharia Electrotécnica e Informática
OUTRAS ÁREAS DE INVESTIGAÇÃO : His current research interests include Group Decision Support Systems, Computer Supported Cooperative Work and Organizational Computing.
GRAUS ACADÉMICOS : He has a Ph.D. (1997), M.Sc. (1991) and Degree (1987) in Computer Engineering by Instituto Superior Técnico (IST), Technical University of Lisboa, Portugal.
CARGO ACTUAL : Assistant Professor at the Department of Informatics, Faculty of Sciences, University of Lisboa, since 1999
From 1998 to 1999 he was Assistant Professor at the Department of Informatic Engineering, IST. From 1997 to 1998 he was Assistant Professor at the Department of Electrical and Computer Engineering, IST. From 1990 to 1996 he was Teaching Assistant at the Department of Electrical and Computer Engineering, IST. From 1987 to 1996 he was a Researcher at INESC.
CARGOS ANTERIORES :
PRÉMIOS : n.a.

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PUBLICAÇÕES :

MEMBRO DOUTORADO (2) - Página 1

NOME : Luís Manuel Pinto da Rocha Afonso Carriço
LOCAL DE NASCIMENTO : Lisboa
DATA DE NASCIMENTO : 04-03-1963
NACIONALIDADE : Portuguesa
MORADA INSTITUCIONAL : Departamento de Informática, FCUL, Edifício C5, Piso 1, Campo Grande
TELEFONE : 217500152
FAX : 217500084
E-MAIL : lmc@di.fc.ul.pt
Nº DOCUMENTO DE IDENTIFICAÇÃO : 6027662
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Doutorado

CATEGORIA PROFISSIONAL : Professor Auxiliar
TEMPO NO PROJECTO : 20 %

MEMBRO DOUTORADO (2) - Página 2

ÁREA DE INVESTIGAÇÃO PRINCIPAL :

Engenharia Electrotécnica e Informática

OUTRAS ÁREAS DE INVESTIGAÇÃO :

Computational support for interactive tools on organizational cognition and human diagnostic processes. Visual languages as an exploration paradigm. Direct manipulation and visualization techniques. Intelligent and multi-modal interfaces. Evaluation of User Interfaces.

GRAUS ACADÉMICOS :

PhD in Computer Engineering, Instituto Superior Técnico, Technical University of Lisbon. 2000
MSc in Electrotechnical and Computer Engineering, IST, TUL, 1991.
Degree in Electrotechnical and Computer Engineering, IST, TUL, 1986.

CARGO ACTUAL :

Assistant Professor at Faculdade de Ciências da Universidade de Lisboa since 2000.

CARGOS ANTERIORES :

Teaching Assistant at Faculdade de Ciências da Universidade de Lisboa, from 1998 to 2000.
Teaching Assistant at Instituto Superior Técnico, Technical University of Lisbon from 1989 to 1998.
Researcher at INESC from 1989 to 1997.
Engineer under contract at INESC between 1986 and 1987.

PRÉMIOS :

n.a.
L. Carriço. Cognitive Maps in Organizations: Tools and Techniques for Interactive and Visual Exploration. PhD dissertation, 2000 (in Portuguese).

L. Carriço, P. Antunes, N. Guimarães. Visual Reflection: Language, Action and Feedback. Proceedings of the IEEE Symposium on Visual Languages, VL'99, IEEE Press. Tokyo, Japan, September 1999.

L. Carriço, N. Guimarães. Integrated Multi-Views. Journal of Visual Languages and Computing, Special Issue on Visual Navigation: Methods and Tools, Vol. 9, nº 3, Academic Press. 1998.

PUBLICAÇÕES :

L. Carriço, N. Guimarães. Manipulating Concept Maps with Constrained Regions. Proceedings of the Advanced Visual Interfaces Conference, AVI'98, ACM Press. L'Aquila, Italy, May 1998.

L. Carriço, N. Guimarães. Facilitation of Analysis and Diagnosis of Organisations. Proceedings of the 9th International Conference on Advanced Information Systems Engineering, CAISE '97, Springer. Barcelona, Spain, June 1997.

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MEMBRO DOUTORADO (3) - Página 1

NOME : Mário Jorge Costa Gaspar da Silva
LOCAL DE NASCIMENTO : Albergaria-dos-Doze, Pombal
DATA DE NASCIMENTO : 30-03-1961
NACIONALIDADE : Portuguesa
MORADA INSTITUCIONAL : Departamento de Informática
Faculdade de Ciências da Universidade de Lisboa
Edifício C5, Piso 1, Campo Grande, Lisboa
TELEFONE : 217500128
FAX : 217500084
E-MAIL : mjs@di.fc.ul.pt

Nº DOCUMENTO DE IDENTIFICAÇÃO : 5222427
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Doutorado
CATEGORIA PROFISSIONAL : Professor Associado
TEMPO NO PROJECTO : 10 %

MEMBRO DOUTORADO (3) - Página 2

ÁREA DE INVESTIGAÇÃO PRINCIPAL : Engenharia Electrotécnica e Informática

OUTRAS ÁREAS DE INVESTIGAÇÃO : Mobile Computing, Ubiquitous Computing, Large-Scale Information Systems
Ph.D., University of California, Berkeley, 1994.
Masters in Computer Engineering, Instituto Superior Técnico, Lisboa, 1987.
Degree in Electrical Engineering, Instituto Superior Técnico, Lisboa, 1983.

GRAUS ACADÉMICOS : Associate Professor, Faculdade de Ciências da Universidade de Lisboa, since August 2001
1996 - 2001 Assistant Professor, Faculdade de Ciências da Universidade de Lisboa
1995 - 1996 Assistant Professor, Instituto Superior Técnico
1994 - 1995 Senior Software Engineer, EIT - Enterprise Integration Technologies, CA, USA
1990 - 1994 Research Assistant, University of California, Berkeley
1988 - 1990 Lecturer, Instituto Superior Técnico and Researcher at INESC

CARGO ACTUAL : Prémio ANIMEE Inovação e Criatividade, 1985
Ana Paula Afonso, Mário J. Silva, Dynamic Information Dissemination to Mobile Users, accepted for publication on ACM & Baltzer MONET review (Mobile Networks and Applications) 1999.

CARGOS ANTERIORES : Mário J. Silva, Ana Paula Afonso, Designing Information Appliances using a Resource Replication Model, in Proceedings of International Symposium on Handheld and Ubiquitous Computing, HUC'99, September 1999.
Ana Paula Afonso, Mário J. Silva, João P. Campos, Francisco S. Regateiro, The Design and Implementation of the Ubidata Information Dissemination Framework, in Proceedings of International Symposium on Handheld and Ubiquitous Computing, HUC'99, September 1999.
Ana Paula Afonso, Francisco S. Regateiro, Mário J. Silva, Dynamic Data Delivery to Mobile Users, in Proceedings of DEXA'99 2nd International Workshop "Mobility in Databases and Distributed Systems" - MDDS'99, September 1999.

PUBLICAÇÕES : Rui F. Pereira, Mário J. Silva, Descoberta de Serviços em Ambientes Móveis, in Actas do EPCM'99 - Encontro Português de Computação Móvel, Novembro de 1999.
Francisco Regateiro, Mario J. Silva, Ana Paula Afonso, Canais de Informação baseados em XML, in Actas do Encontro Português de Computação Móvel - EPCM'99, Novembro de 1999.
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Mário Gaspar da Silva, Mobilidade na Internet, capítulo do livro O Futuro da Internet, José Augusto Alves, Pedro Campos, Pedro Brito (eds.), Centro Atlântico, 1999.
Ana Paula Afonso, Francisco S. Regateiro, and Mário J. Silva, UbiData: An Adaptable Framework for Information Dissemination to Mobile Users, in S. Demeyer e J. Bosch, editores, Object-Oriented Technology, ECOOP'98 Workshop on Mobile Computing and Replication, Brussels, volume 1543 de Lecture Notes in Computer Science, Springer-Verlag, July 1998.

MEMBROS NÃO DOUTORADOS

MEMBRO NÃO DOUTORADO (1)

NOME : Ana Paula Pereira Afonso
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Mestre
% TEMPO DEDICADO AO PROJECTO : 30 %
CATEGORIA PROFISSIONAL : Assistente
Nº DO DOCUMENTO DE IDENTIFICAÇÃO : 7040151
E-MAIL : apa@di.fc.ul.pt

MEMBRO NÃO DOUTORADO (1)

NOME : Carlos Alberto Pacheco dos Anjos Duarte
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Mestre
% TEMPO DEDICADO AO PROJECTO : 40 %
CATEGORIA PROFISSIONAL : Assistente
Nº DO DOCUMENTO DE IDENTIFICAÇÃO : 9554747
E-MAIL : cad@di.fc.ul.pt

MEMBRO NÃO DOUTORADO (1)

NOME : Maria Paula Bento Santos André
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
GRAU ACADÉMICO : Licenciado
% TEMPO DEDICADO AO PROJECTO : 30 %
CATEGORIA PROFISSIONAL : Outra
Nº DO DOCUMENTO DE IDENTIFICAÇÃO : 5222427
E-MAIL : paula.andre@igm.pt

EQUIPAMENTO :::::

EQUIPAMENTO A ADQUIRIR

ITEM (2)

TIPO DE EQUIPAMENTO : 8 mobile phones with support to GPRS, USB and Bluetooth

FABRICANTE E MODELO : Motorola V.66

PREÇO : 5700

INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO : 8 mobile phones are needed, two for each backpack and two more for the fixed site. In the backpack, one phone is dedicated to audio and the other phone is dedicated to data communications. At the fixed site, one phone is dedicated to support audio conferencing and the other is dedicated to support private communications with one mobile user. The selected model supports GPRS, USB and Bluetooth.

ITEM (3)

TIPO DE EQUIPAMENTO : 3 phone connection kits

FABRICANTE E MODELO : Motorola USB Connection Kit

PREÇO : 500

INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO : 3 Connection Kits are needed, one for each backpack. These kits connect the Motorola mobile phones to the PAN.

ITEM (4)

TIPO DE EQUIPAMENTO : 3 Remote Speaker/Mic Kits (Bluetooth)

FABRICANTE E MODELO : Motorola Remote Speaker Mic

PREÇO : 500

INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO : 3 of these devices are needed, one for each backpack. These are audio headsets that connect to mobile phones using Bluetooth technology.

ITEM (5)

TIPO DE EQUIPAMENTO : 3 CharmIT Developer Kits (wearable PCs)

FABRICANTE E MODELO : Charmed Technology - CharmIT Developer Kit 400 Mhz, 128 M RAM

PREÇO : 18150

INSTITUIÇÃO DE INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 CharmIT kits are needed, one for each backpack. These devices make up the computing core of the backpack. These devices are Windows compatible wearable computer kits. Options required to operate the CharmIT include: power board, cable connector, battery and Windows 2000 Multiboot.

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ITEM (6)

TIPO DE EQUIPAMENTO :
FABRICANTE E MODELO :

3 M2 Personal Viewers (headmount displays)
Tek Gear - M2 Personal Viewer (800x600 pixels)

PREÇO :

14850

INSTITUIÇÃO DE INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 of these devices are needed, one for each backpack. The M1 is a headmount field of view display. The M1 is directly connected to the wearable computer. The M1 device will be used when flexible viewing is required, since it allows users to view results in real time without obstructing their direct field of view.

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ITEM (7)

TIPO DE EQUIPAMENTO :
FABRICANTE E MODELO :

3 Clip-on Monitors
MicroOptical - Model CO-3, VGA Clip-on Monitor (640x480 pixels)

PREÇO :

11550

INSTITUIÇÃO DE INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 CO-3 are needed, one for each backpack. These are small-size wearable display devices used in situations where limited display resolution is acceptable.

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ITEM (8)

TIPO DE EQUIPAMENTO :
FABRICANTE E MODELO :

3 Cy-visors (headmount displays)
Cy-visor - DH 4400VP SVGA 800x600

PREÇO :

8250

INSTITUIÇÃO DE INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 of these devices are needed, one for each backpack. The Cy-visor is a mobile personal display that occupies the whole field of view. It is necessary in situations where high display resolution is needed, such as viewing maps.

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ITEM (9)

TIPO DE EQUIPAMENTO :
FABRICANTE E MODELO :

3 USB Twiddler 2 (wearable keyboard/mouse)
Handykey Corporation - Twiddler 2 USB

PREÇO :

800

INSTITUIÇÃO DE INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 of these devices are needed. The Twiddler 2 is an unconventional wearable device that combines a mouse and keyboard and fits in one hand.

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ITEM (10)

TIPO DE EQUIPAMENTO : 3 USB Wrist PCs (wearable keyboards)
FABRICANTE E MODELO : TekGear - USB WristPC Rugged Keyboard with Backlit Keys
PREÇO : 2150
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : 3 of these devices are needed, one for each backpack. These are traditional keyboards that can be attached to the arm.

ITEM (11)

TIPO DE EQUIPAMENTO : 3 USB Web Cams
FABRICANTE E MODELO : Creative Labs - USB Creative PC-CAM 600
PREÇO : 650
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : 3 of these devices are needed, one for each backpack. Each one of these devices is dedicated to support video and image capture.

ITEM (12)

TIPO DE EQUIPAMENTO : 3 USB GPS (Global Positioning Systems)
FABRICANTE E MODELO : Pharos - USB iGPS
PREÇO : 1650
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : 3 of these devices are needed, one for each backpack. They are GPS devices offering precise time and location data.

ITEM (13)

TIPO DE EQUIPAMENTO : 3 USB-Bluetooth Adaptors
FABRICANTE E MODELO : TDK - Bluetooth USB Adaptor
PREÇO : 760
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : 3 of these devices are needed, one for each backpack. They extend the PAN with the Bluetooth technology.

ITEM (14)

TIPO DE EQUIPAMENTO : 3 USB-802.11b Adaptors
FABRICANTE E MODELO : D-Link Systems Inc. - D-Link DWL-120 USB Wireless Kit
PREÇO : 500

INSTITUIÇÃO DE
INVESTIGAÇÃO :
JUSTIFICAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

3 of these devices are needed, one for each backpack. They extend the PAN with the 802.11b technology.

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ITEM (15)

TIPO DE
EQUIPAMENTO :
FABRICANTE E
MODELO :

6 USB Hubs

TekGear - Mini USB Hub

PREÇO :

1000

INSTITUIÇÃO DE
INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

6 of these devices are needed, two for each backpack. These hubs allow setting up a PAN with multiple USB devices, including the wearable computer and mobile phones.

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ITEM (16)

TIPO DE
EQUIPAMENTO :
FABRICANTE E
MODELO :

3 Palm Pilots

Palm Inc. - Palm Pilot m505 with USB Adapter

PREÇO :

2000

INSTITUIÇÃO DE
INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 of these devices are needed, one for each backpack. These devices support complex interactions with the users and mobility at the same time.

.....

ITEM (17)

TIPO DE
EQUIPAMENTO :
FABRICANTE E
MODELO :

3 802.11b Modules for Palm

Xircom - Wireless LAN Module for Palm m505

PREÇO :

1000

INSTITUIÇÃO DE
INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

3 of these devices are needed, one for each backpack. These devices set up a wireless link (802.11b) from the Palm Pilot to the PAN, increasing the flexibility since no cables must be attached to the Palm Pilots.

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ITEM (18)

TIPO DE
EQUIPAMENTO :
FABRICANTE E
MODELO :

1 Rear Projection SMART Board

Smart Tech Inc. - Rear Projection SMART Board 3000i

PREÇO :

16500

INSTITUIÇÃO DE
INVESTIGAÇÃO :

LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

JUSTIFICAÇÃO :

The rear SmartBoard offers a large interactive display suitable for group information management and decision-making. The model 3000i comes with an integrated video projector.

.....

ITEM (19)

TIPO DE EQUIPAMENTO : 1 Rack Mounted PC
FABRICANTE E MODELO : Compaq - TaskSmart W2200 Rack Mounted PC
PREÇO : 2750
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : This device will support the WrCK Web site.

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ITEM (20)

TIPO DE EQUIPAMENTO : 1 spare backpack
FABRICANTE E MODELO : See list of equipment
PREÇO : 23000
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : Maintenance is a critical issue in an infrastructure as the one described in this proposal, characterized by mobility, interactivity and operation in possible rough conditions. Most of the devices that set up the backpack are vulnerable to damage caused by user manipulation and transportation, environmental roughness and weather conditions. Thus, it is proposed that one complete backpack be available to be used as a spare.

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ITEM (21)

TIPO DE EQUIPAMENTO : Miscellaneous materials
FABRICANTE E MODELO : Unspecified
PREÇO : 2000
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
JUSTIFICAÇÃO : The installation of the backpacks requires miscellaneous materials, such as bags, batteries, cables, etc. It is expected that these materials will cost about 2000 EUR.

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EQUIPAMENTO EXISTENTE

ITEM (2)

TIPO DE EQUIPAMENTO : GroupSystems (group decision software)
FABRICANTE E MODELO : Ventana Corp. - GroupSystems
ANO DE AQUISIÇÃO : 1998
PROGRAMA DE FINANCIAMENTO : PRAXIS XXI 2/21/CSH/675/95
PREÇO : 5000
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

The project, entitled Decision and Creativity in Electronic and Natural Groups, was a multidisciplinary project that joined teams from the Management and Social Sciences, and the Computer Science fields. Its main objective was to bootstrap the study of computer supported groups in Portugal.

PROJECTOS E
RESULTADOS DE
INVESTIGAÇÃO obtidos
com este Item :

In practical terms, the project created an infrastructure for electronic meetings, with direct application in the teaching of Management Sciences and in Professional Training. This infrastructure is still operational at ISCTE.

The project resulted in more than 100 meeting sessions, with more than 200 users, encompassing experimental studies, training and demonstrations. The project produced 1 Ph.D., 2 Ms. and 1 graduation thesis. The project also produced 31 publications, including journals, conferences and workshops.

ITEM (3)

TIPO DE EQUIPAMENTO : Group Explorer (group decision software)

FABRICANTE E MODELO : Banxia - Group Explorer/Decision Explorer

ANO DE AQUISIÇÃO : 1998

PROGRAMA DE FINANCIAMENTO : PRAXIS/PCSH/P/PSI/77/96

PREÇO : 2000

INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

PROJECTOS E
RESULTADOS DE
INVESTIGAÇÃO obtidos
com este Item :

The objective of the project Cognitive Mapping of the Negotiations Processes was the study of the cognitive aspects involved in negotiations in organisations, using the theory and methodology of cognitive maps, supported by dedicated computational tools. It was an interdisciplinary project combining teams from Social and Computer Sciences. The project produced 1 Ph.D. and 2 Ms. thesis, as well as several publications in journals, conferences and workshops.

ITEM (4)

TIPO DE EQUIPAMENTO : Microsoft Data Analyser (decision software)

FABRICANTE E MODELO : Microsoft - MDA

ANO DE AQUISIÇÃO : 2001

PROGRAMA DE FINANCIAMENTO : -

PREÇO : 0

INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA

PROJECTOS E
RESULTADOS DE
INVESTIGAÇÃO obtidos
com este Item :

ITEM (5)

TIPO DE EQUIPAMENTO : mimio flipChart Meeting Assistant

FABRICANTE E MODELO : Virtual Ink Corp. - mimio flipChart Meeting Assistant for Windows

ANO DE AQUISIÇÃO : 2001

PROGRAMA DE FINANCIAMENTO : -
PREÇO : 500
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
PROJECTOS E RESULTADOS DE INVESTIGAÇÃO obtidos com este Item : -



ITEM (6)

TIPO DE EQUIPAMENTO : Housing and networking infrastructure
FABRICANTE E MODELO : -
ANO DE AQUISIÇÃO : 2001
PROGRAMA DE FINANCIAMENTO : FCT - Pluri-annual
PREÇO : 40000
INSTITUIÇÃO DE INVESTIGAÇÃO : LABORATÓRIO DE SISTEMAS INFORMÁTICOS DE GRANDE-ESCALA
PROJECTOS E RESULTADOS DE INVESTIGAÇÃO obtidos com este Item : See LASIGE annual report.



CONDIÇÕES NECESSÁRIAS :::::

INSTALAÇÃO

DESCRIÇÃO : The installation of the backpacks requires setting a group account with a mobile network provider capable to support GPRS. A minimum of 60 hours of voice traffic is needed to install and calibrate the voice communication service (1350 EUR). The cost of the data communication service depends on the volume of information. It is expected that a minimum of 500 Mbytes are needed to install and calibrate the data communication service (1500 EUR).

**CUSTO DE
INSTALAÇÃO :
FORMAÇÃO** € 2850

DESCRIÇÃO : n.a.

CUSTO DE FORMAÇÃO : € 0

ESTUDOS, PARECERES, PROJECTOS, CONSULTORIAS

DESCRIÇÃO : A software project will set up the Web site that collects and disseminates information about the infrastructure, explains the terms and conditions of external usage and manages booking arrangements.

**CUSTO DE
ESTUDOS,PROJECTOS
[...] :** € 5000

REMUNERAÇÃO DE TÉCNICOS

DESCRIÇÃO : -

**CUSTO DE
REMUNERAÇÃO DE
TÉCNICOS :
MANUTENÇÃO** € 0

DESCRIÇÃO :

Maintenance is a critical issue in an infrastructure as the one described in this proposal, characterized by mobility, interactivity and operation in possible rough conditions. The operation of the backpacks must be periodically verified. This maintenance task includes verifying the individual operation of the devices in the backpack, verifying the operation of the PAN, communications between the backpacks and the fixed site, and configuration of the software installed in the backpacks and fixed site. This task must be accomplished prior to each field operation. It is expected that a minimum of 3 maintenance hours are needed per field operation (50 EUR/hour). Considering a minimum of 24 field operations per year and a timeframe of 3 years, the periodical verification of the backpacks may cost 3600 EUR.

**CUSTO DE
MANUTENÇÃO :**

€ 3600

CONDIÇÕES DE DISPONIBILIZAÇÃO :::::

DESCRIÇÃO DAS CONDIÇÕES DE DISPONIBILIZAÇÃO

Medidas previstas para a Racionalização, Optimização e Partilha dos Equipamentos :	A Web site will be set up providing detailed information about the infrastructure components, their functionality and limitations, manuals, set up procedures and operation instructions. The Web site will also include software to manage equipment availability and allocation.
Condições de Acesso aos Equipamentos por Investigadores das Instituições Participantes :	The members of LASIGE will have access to the infrastructure in the same terms and conditions of the external organizations. The costs associated to mobile communications will be charged to the corresponding projects.
Condições de Disponibilização a Investigadores de Outras Entidades :	<p>The infrastructure will be available to any organization wishing to conduct short/medium term experiments or fieldwork with the backpacks. The organization requesting this infrastructure must agree on paying the costs associated to mobile communications, since these costs are not granted by any financing programme. The infrastructure will be provided to requesting organizations without the mobile phones' SIM cards. The requesting organizations will have to use their own SIM cards to plug in the mobile phones.</p> <p>LASIGE will verify and assure that the backpack is properly configured and operational. LASIGE will also verify that the returned equipment is operational. LASIGE will grant access to the fixed site of the infrastructure.</p>

ORÇAMENTOS :::::

INSTITUIÇÃO PROPONENTE PRINCIPAL

INSTITUIÇÃO : UNIVERSIDADE DE LISBOA-FUNDAÇÃO DA FACULDADE DE CIÊNCIAS

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Instalação de Equipamento :	2000	850	0	2850
Formação de Técnicos :	0	0	0	0
Estudos,Pareceres,Projectos e Consultorias :	0	5000	0	5000
Remuneração de Técnicos :	0	0	0	0
Manutenção de Equipamento :	1800	1800	0	3600
Total de Despesas Correntes :	3800	7650	0	11450

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Aquisição de Equipamento :	91260	23000	0	114260
Obras de Adaptação / Construção :	0	0	0	0
Total de Despesas de Capital :	91260	23000	0	114260

Total Geral : 95060 30650 0 125710

OUTRAS INSTITUIÇÕES PROPONENTES

INSTITUIÇÃO PROPONENTE (1): UNIVERSIDADE DE LISBOA-FUNDAÇÃO DA FACULDADE DE CIÊNCIAS

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Instalação de Equipamento :	0	0	0	0
Formação de Técnicos :	0	0	0	0
Estudos,Pareceres,Projectos e Consultorias :	0	0	0	0
Remuneração de Técnicos :	0	0	0	0
Manutenção de Equipamento :	0	0	0	0
Total de Despesas Correntes :	0	0	0	0

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Aquisição de Equipamento :	0	0	0	0
Obras de Adaptação / Construção :	0	0	0	0
Total de Despesas de Capital :	0	0	0	0

Total Geral : 0 0 0 0

ORÇAMENTO GLOBAL

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Instalação de Equipamento :	2000	850	0	2850
Formação de Técnicos :	0	0	0	0
Estudos,Pareceres,Projectos e Consultorias :	0	5000	0	5000
Remuneração de Técnicos :	0	0	0	0
Manutenção de Equipamento :	1800	1800	0	3600
Total de Despesas Correntes :	3800	7650	0	11450

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Aquisição de Equipamento :	91260	23000	0	114260
Obras de Adaptação / Construção :	0	0	0	0
Total de Despesas de Capital :	91260	23000	0	114260

Total Geral : 95060 30650 0 125710

PLANO DE FINANCIAMENTO

DESCRIÇÃO :	ANO 1	ANO 2	ANO 3	TOTAL
Solicitado à FCT :	95060	30650	0	125710
Próprio :	0	0	0	0
Outro(Público) :	0	0	0	0
Outro (Privado) :	0	0	0	0
Total do Projecto :	95060	30650	0	125710