

# IST 2002

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Partnerships for  
the Future



European Commission



Information Society  
Technologies



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# Foreword

Despite recent developments in ICT markets, the impact of information and knowledge technologies on our economies and societies continues to grow. This is central to the ambitious political goal set for Europe by EU leaders: to become, by 2010, the world's most competitive and dynamic knowledge-based economy, capable of sustainable economic growth with more and better jobs and greater social cohesion. Information society technologies (IST) provide the means to create, share and exploit knowledge: they underpin European policies for the knowledge society.

Over recent years European political efforts have focused on the eEurope 2002 Action Plan. Progress under eEurope 2002 has been rapid, with a series of measures being put in place to ensure a transition to an inclusive knowledge society. The Seville European Council endorsed in June 2002 a further initiative, eEurope 2005. This new action plan aims to provide a favourable environment for private investment and for the creation of new jobs, to boost productivity, to modernise public services, and to give everyone the opportunity to participate in the global information society. It comprises a set of focused actions to stimulate services, applications and content, covering both online public services and e-business and to address the underlying broadband infrastructure and security matters.

Today, IST offers many possibilities which remain to be exploited. The development and broader deployment of the knowledge society will be further boosted by reducing costs and complexity and by improving reliability. We need to respond first and foremost to people's needs. Instead of making people adapt to technologies, we need to design technologies for people. Progress towards this world of "ambient intelligence" has been the guiding vision of research under the IST Programme.

As part of the Community's Fifth Framework Programme for RTD, which is now drawing to a close, the IST Programme has made a major contribution to addressing emerging societal and business challenges. With over 2000 projects involving more than 15000 participants, including a strong representation of SMEs, the Programme provides comprehensive coverage of the issues necessary to realise its objectives. In the words of the 2001 Monitoring Panel of independent experts, it has become a "visible, world-class reference" on IST research and technological development issues.

Examples of the Programme's achievements are described throughout this book. In addition to many technological advances, they include contributions to the eEurope and eEurope+ Action Plans, support for interoperability and standards, demonstrations of best practice and take-up, and measures to help create a world-class research infrastructure, such as through the GÉANT high-speed network. The Programme has also helped to strengthen international co-operation in IST, to build skills and competencies, and to broaden the constituency for IST-related research.

There are notable achievements also in terms of programme management. For instance, the average time to contract has been reduced by 40% and the processing of payments is also much improved.

Much still remains to be done, however. A renewed RTD effort in IST is essential to ensure European leadership in the technologies at the heart of the knowledge society and to enable all European citizens and companies to benefit from their development. As a key instrument for realising the goal of a European Research Area (ERA), the Sixth Framework Programme offers the IST research community unprecedented opportunities. Continuing towards the ambient intelligence vision, it will allow European researchers to achieve critical mass and build competencies in technologies essential to the EU's long-term competitiveness and social well-being.

This book provides a further insight into the contributions and achievements of European projects support by the IST Programme in the drive towards an inclusive, knowledge-based society.



A handwritten signature in blue ink, appearing to read 'Erkki Liikanen'.

Erkki Liikanen  
Member of the European Commission  
Responsible for Enterprise and Information Society



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# Introduction

The ability to create, share and exploit knowledge is increasingly central to competitive advantage, wealth creation and better standards of living. We see the evidence for this at many levels. Investment in knowledge-intensive activities, such as research and development and software is rising. Investment in education and skills is underpinning the growth of a skilled workforce, while worker mobility supports the flow of knowledge across borders. International co-operation in science and technology is growing rapidly, and innovation increasingly relies on co-operation between firms and universities. As knowledge has grown in importance, so has the share of knowledge-intensive industries (such as ICT, biotechnology and high-technology manufacturing) and services (such as telecommunications, finance and business services). Thus, against a background of continued globalisation of trade and investment, in modern economies the race to be competitive is a race to knowledge.



Information society technologies (IST) are an intimate part of this equation. In a world where innovation relies increasingly on speed and collaboration, IST facilitates communication and the sharing of knowledge more rapidly and more openly than ever before. It is scarcely surprising then that the shift towards a knowledge-based economy and society has been accompanied by steady increases in investment in IST. In 2001, the total market for ICT-related<sup>1</sup> equipment and services accounted for 8% of the EU's GDP. Use of IST improves productivity and quality of life. It is becoming an intrinsic part of all products and services, and is creating new ways of working and new types of businesses. The IST industry itself is now one of the largest economic sectors, providing employment for more than 12 million people in Europe. IST is also opening up new solutions to major societal challenges in areas such

as health, education, environment, safety, mobility and inclusion. And IST plays an increasingly important role in all other fields of science and technology.

Europeans have been quick to grasp these opportunities. Today, almost 50% of the population over 15 years uses the internet either at home, at work, at school, in public access places or on the move<sup>2</sup>. Over 100 million Europeans go online at least once a week, and this is likely to rise to over 200 million by 2004. Over 70% use digital mobile phones, and these will become a second, and probably preferred, method of accessing internet services when 3G capabilities become widely available in 2003. In business, penetration of IST is even higher: almost 90% of enterprises with more than 10 employees have internet access, and more than 60% have a website. The impacts are being felt in societal areas too. Almost all schools are now connected, health professionals are increasingly using the internet to communicate with their patients, and many more government services are available online. Meanwhile, European researchers now benefit from the world's fastest research network.

## BOX 1: ABOUT THIS BOOK

This book shows how the IST Programme is working towards a vision of the future of IST that puts people first (**"ambient intelligence"**). It focuses on the use of IST within three key settings: by individuals and in the home (**digital spaces**); by enterprises and in the workplace (**the knowledge economy**); and by public services and society at large (**connecting communities**). A fourth section covers enabling technologies which underpin future services and applications across these scenarios (**enabling technologies**).

The book provides a snapshot of the IST Programme at the present time. The articles outline key technical challenges and policy issues relating to specific areas of the programme. They also summarise recent IST projects and describe results from completed projects. Each of the articles is referenced to relevant action lines under Work Programmes 2001 and 2002 (WVP 2001/2002).

<sup>1</sup> ICT is defined as hardware, software, telecommunications and other ICT services. Source: OECD Information Technology Outlook 2002

<sup>2</sup> Source: eEurope Benchmarking Report 2002, see [http://europa.eu.int/information\\_society/eeurope/benchmarking/index\\_en.htm](http://europa.eu.int/information_society/eeurope/benchmarking/index_en.htm)



But to create a knowledge society for all we need more than just connectivity. We have to capture the opportunities presented by the new digital technologies to increase productivity, to make growth sustainable, to improve quality of life and to promote inclusivity. These are the goals of the eEurope 2005 initiative, which was approved at the Seville Council in June. Building on the success of the eEurope 2002 Action Plan, eEurope 2005 aims to further exploit the possibilities of IST. It proposes a series of actions to stimulate services, applications and content in e-government, e-learning, e-health and e-business, and as enablers for these, a strong focus on underlying broadband and security matters.

Research and technological development (RTD) remains essential to these efforts. While policy initiatives such as eEurope promote the wide adoption of IST in all fields, a massive investment in longer-term research is also needed. A new generation of technologies is indeed emerging that will help build an all-inclusive knowledge society and economy. We can not afford to miss the unique opportunities here. Europe already enjoys technological and commercial leadership in important areas such as mobile and wireless communications, embedded software, nanotechnologies and computing grids, and has excellent potential in others. A sustained effort in IST research is essential to ensure European leadership in the technologies at the heart of the knowledge society and to enable all Europe's citizens and companies to benefit from their development.

## The IST Programme: A Partnership for Europe

The Information Society Technologies Programme seeks to ensure European leadership in the generic and applied technologies at the heart of the knowledge economy (Box 2). It is essentially a framework for an investment partnership with leading technology companies and actors in Europe. Uniquely for an IST activity of this size, it focuses not just on technology development but also has a strong emphasis on applications and deployment. As well as technologists and engineers, RTD involves social scientists, economists and various end-users so as to take full account of the human dimension in the changes IST facilitates.

The Programme is managed by DG Information Society of the European Commission with the assistance of the IST Committee (ISTC) comprising representatives of each Member State and associated state. The IST Advisory Group (ISTAG) provides the Commission with independent advice on the content and direction of RTD and on the exploitation of results.

The work programme is reviewed and updated on a yearly basis to reflect evolving circumstances and requirements. This is implemented through calls for proposals submitted by European consortia that assess, amongst other criteria, scientific and technical excellence and European added-value. Under FP5, eight calls for proposals have been made. From these over 2000 projects have been selected for support from an available budget of around €3.6 billion. Overall in FP5, there are some 15000 participants in IST projects comprising around 6000 separate organisations, including a strong representation of SMEs.

The IST Programme supports EU policies in a number of areas, notably in employment, social cohesion and competitiveness. In particular, it is a key component of the EU's strategy to become a sustainable, inclusive, knowledge-based economy and society.





## BOX 2: WHAT IS THE IST PROGRAMME?

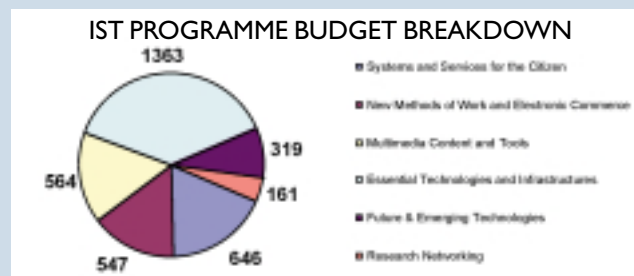
The Information Society Technologies Programme is part of the European Union's Fifth Framework Programme for research and technological development (RTD), covering the period 1998-2002.

The Programme is structured around four Key Actions, each focusing on a tightly interrelated set of technologies, issues and objectives of strategic importance for Europe. Each key action (KA) encompasses a range of research and development and take-up activities, from basic research through to demonstration projects.

- **KA I, Systems and Services for the Citizen**, focuses on the development of innovative applications and systems for services of general interest, in fields such as health, persons with special needs, administrations, environment, transport and tourism.
- **KA II, New Methods of Work and Electronic Commerce**, focuses on information society technologies to enable individuals, enterprises and other organisations to adapt and compete in the emerging digital economy.
- **KA III, Multimedia Content and Tools**, focuses on the functionality, usability and acceptability of future information products and services, particularly in the context of Europe's cultural and linguistic diversity.
- **KA IV, Essential Technologies and Infrastructures**, focuses on those technologies underpinning today's converging industries and infrastructures, and their integration within systems, applications and networks.

In addition, the IST Programme supports work on:

- **Future and Emerging Technologies**, covering research of a longer term nature or involving particularly high risks, typically either multidisciplinary or in an emerging discipline.
- **Research Networking**, covering the development of a world-class research network infrastructure for the European research community.



*Figures in euros, millions*

Research relevant to the entire Programme is co-ordinated through **Cross-Programme Themes**, which account for around 12% of the work undertaken.

Across the Programme, special emphasis is placed on measures to strengthen international co-operation; to promote innovation and the participation of SMEs; to improve human capital by developing IST-related skills; and to monitor and analyse the socio-economic trends and impacts of IST developments. The Programme is also contributing to policy developments in related areas.

For further information see: [www.cordis.lu/ist/overview.htm](http://www.cordis.lu/ist/overview.htm)



## Putting People First

Despite growing use of IST at home and at work, we are still far from taking full advantage of the possibilities that IST can offer. Current information and communication technologies can be costly, complex, unreliable and difficult to access. These “non user-friendly” aspects are preventing the further development and wider deployment of the knowledge society and the digital divide is widening.

But key success stories, such as mobile telephones and consumer electronics equipment, show it need not be this way. When it works for them and is easy to use, people like technology. They are not looking for technology per se but for the benefits that it brings, such as the ability to interact or to access knowledge in ways they could not do before. As we start to understand the advantages and limitations of current systems, we also begin to see new avenues for research that will extend the scope, functionality and efficiency of IST applications and services. Research should make IST available, in the most natural and trustful way, to people anywhere and anytime, whoever they are, and whatever their age or impairment. We need to put the users first: to design technologies for people rather than making people adapt to technologies.



This vision, which the Programme calls “ambient intelligence” (Aml), will gradually but surely emerge from IST research. In place of today’s PC-based systems, technology should be invisible, embedded in all kinds of objects and everyday environments. Our interactions with the technology should be simple and effortless. Instead of reading and typing we will be able to interact intuitively using all of our senses. Rather than limited, text-based searches we will be able to access and manipulate rich content in a way that is context-aware. Today’s discrete, low bandwidth networks will give way to interoperable networks with infinite bandwidth, while mobile voice telephony will be replaced by full multimedia mobile and wireless content. And the e-services that are now beginning to emerge will be widely deployed across society in ways that directly address users’ needs.

Some of this may sound like science fiction, but there is now a broad consensus both within Europe and further afield that this is the direction in which IST is headed. Furthermore, the building blocks for this Aml world are already apparent. Continuing the trend of the last 40 years, we need to push the limits of miniaturisation further and to minimise the costs and power consumption of microelectronic components. We need to explore new materials, such as organic and flexible materials for displays and sensors, so that they can be placed anywhere and take any shape.

Miniaturisation is only the start, however. Ambient intelligence involves much more than simply giving every object a microchip and an IP address. One consequence of making computing and communications ubiquitous is that the world becomes considerably more complex. So as well as progressing along established trajectories we need new paradigms, models and ways of thinking. A people-first approach requires, for example, radical progress in computing and communications networks, in the software technologies that run them, the knowledge technologies needed to access and manipulate “smart” objects and content, and in the user interface. These are not discrete developments but a continuum. Adaptation of generic developments to meet the highly specific requirements of particular end-user applications represents a further challenge.





## Emerging Impacts

This is the work in which the IST Programme has been engaged for the last four years. Through RTD projects, take-up actions, studies, networks, conferences and other activities it has been working to make the people-first vision a reality. As a single integrated programme covering all aspects of IST-related research, the Programme has been able to progress Aml technologies on many fronts. While the Programme's operational phase is drawing to a close, its work continues through the on-going projects many of which directly feed into related actions under the new Framework Programme.

With many of the projects having started within the last 12-18 months, in most cases it is still too early to point to definitive results or achievements. Nevertheless some clear patterns are emerging of how and where the Programme is beginning to make an impact. In addition to the many technological advances described here, this book illustrates a number of common characteristics and themes, as discussed below. A comprehensive impact study of the IST Programme and its predecessors is currently being launched and will help elucidate these further.

### *Support for e-Europe*

Projects resulting from calls under the IST Programme have made, and continue to make, significant contributions to the eEurope 2002 and eEurope+ Action Plans in a number of areas. In smart cards, for example, several RTD projects address issues relating to the Smart Card Charter; while the work on dependability of information infrastructures also relates to eEurope objectives. Socio-economic research on indicators helps inform the benchmarking of IST in eEurope priority areas. The Programme's work on high-speed research networks supports eEurope's aims on better network infrastructure. And eEurope's aims regarding access and take-up are supported through trials and best practice actions in areas such as intelligent transport systems, e-health, e-government, e-commerce and e-content.

### *Understanding the human dimension*

As IST permeates into every corner of the economy and society, we are beginning to realise that its impacts are far-reaching and can manifest themselves in unexpected ways. Across the Programme substantial efforts are devoted to socio-economic research to help us understand what these changes mean for individuals, enterprises, markets, and society as a whole. Examples, to name just a few, include: studies on gender and social inclusion issues in the Information Society; a series of measures to monitor and support the IS at regional level; investigations of technological and market trends in the media, cultural and creative sectors; and techno-economic assessments of emerging technologies such as open source software and all-IP networks. As well as informing existing initiatives such as eEurope, many of these actions feed directly into future policy development.

### *Broadening the constituency*

IST touches virtually every aspect of human activity and realising its advantages requires a broad coalition. The Programme and its predecessors have a long-standing involvement with key end-users for IST applications and services in areas such as health, education and training, culture, environment and business. Over recent years the Programme has made substantial efforts to broaden this community even further. For instance, there is an on-going engagement with: architects and interior designers (on workplaces of the future); economists, econometricians and statisticians (on socio-economic models and policies); social and behavioural scientists (on usability and interfaces); the voluntary sector (on social inclusion); and artists and creative industries (on digital content and expression). This inter-disciplinary collaboration will be especially valuable in view of the long-term, issues-oriented approach to be pursued under FP6.



### *Building consensus*

Standardisation and industrial consensus are essential to the rapid development and take-up of IST. The Programme reinforces the links to standardisation and industrial forums to ensure coherence in EU-wide technology deployment and in the creation of new open frameworks for fair competition and fast innovation. Examples are found across the Programme. They include working groups and task forces on issues such as IPv6, biometric security, and interoperability of business systems. Others are independent organisations sponsored by the Commission, that promote consensus in areas such as mobile communications, and transport information infrastructure. In addition, projects and project clusters provide European contributions to standardisation bodies (e.g. ETSI, CEN/CENELEC, ITU working groups), and to industry consensus frameworks (e.g. DAVIC, DVB, OMG, IEFT, W3C).

### *Demonstrating best practice*

While the take-up of IST products and services is accelerating, many businesses and organisations remain unconvinced of the benefits. Take-up actions play an important part in enabling novel IST solutions and systems to enter the mainstream. The Programme supports a wide variety of such measures, including best practice actions aimed at validating existing solutions; trials of leading edge technologies; and co-ordinated access to specific knowledge and expertise. For example, the Programme has a portfolio of around 70 projects that aim to support new business practices in SMEs (many linked to eEurope), making this one of the world's largest digital economy demonstrators. Trials have also been launched in e-health, e-education, e-culture, e-government, e-environment, and digital publishing. Other technology-specific take-up measures target areas such as embedded computing, real-time vision systems, software, microsystems, and microelectronics.



*A virtual meeting environment developed under project VIRTUE*

### *Creating world-class infrastructure*

High-speed networks will open up new possibilities for collaborative learning and research. In line with the eEurope 2002 Action Plan, the Programme has financed a major investment in infrastructure which has given Europe the world's fastest research network backbone. This not only provides a platform for the European research and education community but also improves connectivity between Europe and other regions. Further investments are foreseen under FP6.

### *Strengthening competences and skills*

In the face of growing evidence that the IST skills gap is a barrier to growth, the Programme has devoted increasing attention to improving human capital by developing IST-related skills. Examples include training and competence-building measures in microelectronics, microsystems, and multimedia.

### *Encouraging international co-operation*

Given the increasingly global nature of IST research, there are significant benefits to be gained for the EU through international co-operation in IST-related RTD activities. The Programme is involved in a diverse range of international activities. Some of these aim to promote awareness of and access to the IST Programme amongst Candidate Countries and Newly Associated States. The Programme also participates in a series of EU initiatives to promote the information society in other regions, notably the Mediterranean (EUMEDIS), Latin America (@LIS), and Asia (Asia IT&C). In addition, links with other frameworks (COST, EUREKA and Ten-Telecom) have been strengthened.





## IST in the Sixth Framework Programme

The Sixth Framework Programme (FP6), covering the period 2003-2006, brings new opportunities for IST research. Innovation cycles are shortening while development and production become ever more costly and knowledge-intensive. Furthermore, the people-first vision demands radically new technologies and approaches. Successes like those achieved in Europe in mobile communications and consumer electronics will not be repeated unless a real effort is made to achieve critical mass in key IST domains. We need to embrace the possibilities presented by IST to strengthen Europe's competitiveness and technology base and to build the information and knowledge society for all.

With €3.6 billion, the IST thematic priority ("Priority 2"- see Box 3) has the largest budget of all the priority areas, reflecting its major underpinning role in realising European policies for the knowledge society. As a tool for the European Research Area, FP6 will enable European IST research to maximise synergies between national and Community efforts and to increase impact of community funding by building critical mass. Actions will mobilise the community of IST researchers around medium to long-term objectives; they will facilitate the integration of public and private effort in IST on a European scale; and they will aim to build essential competencies and strengthen innovation. Activities will continue to be supported to further integrate the Newly Associated States within the EU's IST research effort and to link the EU effort to the international context, including co-operation with developing countries. While operating at different timescales, the IST Priority in FP6 will complement eEurope, with which its objectives are closely linked.

At a technological level, research will continue to focus on the "ambient intelligence" vision, placing the user, the individual, at the centre of future developments. This will involve high-risk and long-term RTD for the future generation of technologies in which computers and networks will be integrated into the everyday environment. It will also support underpinning research to investigate and experiment with future visions and emerging technologies at the frontier of knowledge in the IST field.

### BOX 3: THE SIXTH FRAMEWORK PROGRAMME

The Sixth Framework Programme (FP6) is the Union's main instrument for the funding of research in Europe. Proposed by the Commission and adopted by the Council and Parliament in co-decision, it is open to all public and private entities, large and small. Covering the period 2003-2006, FP6 has an overall budget of €17.5 billion, representing an increase of 17% from the Fifth Framework Programme. It makes up 3.9% of the Union's total budget (in 2001), and 6% of the Union's public (civilian) research budget.

FP6 is essential for the creation of a European Research Area (ERA) as a blueprint for the future of research in Europe. The ERA aims to move European research policy to a new level so as to maximise the value from each euro invested in RTD. It seeks to strengthen co-operation between national, regional and EU research activities, to improve links between national and EU policies and schemes, and to further prepare for EU enlargement. The ERA requires a new way of thinking, moving beyond simply funding projects towards a new, more strategic and integrating approach. It requires the development of Europe-wide networks, mobilising all of the relevant actors within a particular field.

Information society technologies is one of seven priority areas for research under FP6. The others are: genomics and biotechnology for health; nanotechnologies and nanosciences; aeronautics and space; food safety; sustainable development; and economic and social sciences. To complement efforts in the thematic priorities, specific horizontal research activities will address SMEs, innovation and international co-operation as well as respond to Community policy objectives and future and emerging research needs.

With broad support at the highest political, scientific and industrial levels, FP6 was approved on the 3<sup>rd</sup> June 2002 and the first calls for proposals are expected before the end of the year.



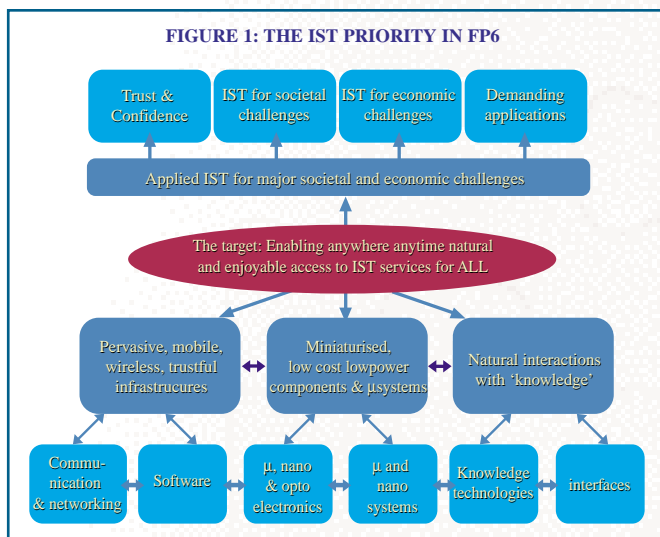
Research in IST will be structured around five key areas, each of which comprises a series of specific sub-areas. These areas are:

- i) **Applied IST research addressing major societal and economic challenges:** the objective is to extend the scope and efficiency of IST-based solutions, and to make them more accessible, in the most trusted and natural way, to citizens, businesses and organisations. Sub-areas are: **research on technologies for trust and security** to address key security challenges posed by the “all-digital” world and by the need to secure the rights of individuals and communities; **research addressing societal challenges** in areas such as health, e-inclusion, security, mobility, environment, leisure and cultural heritage; **research addressing work and business challenges** so as to fully realise the benefits of a knowledge-based economy; and **complex problem-solving for science, engineering, business and for society**, aiming to make use of large-scale, highly-distributed computing platforms in demanding applications.
- ii) **Communication, computing and software technologies:** the objective is to consolidate and further develop European strengths in areas such as mobile communications, consumer electronics and embedded software and systems, and to improve the performance, cost-efficiency, functionality and adaptive capabilities of communications and computing technologies. Sub-areas are: **communication and network technologies** aiming to develop new generations of mobile and wireless systems and networks, as well as all-optical networks, solutions to improve network interoperability and adaptability, and technologies for personalised access to networked audio-visual systems; and **software technologies, embedded systems and distributed systems** focusing on new software technologies, multifunctional service creation environments, as well as tools for the control of complex distributed systems, applications and services.
- iii) **Components and microsystems:** the objective is to push the limits of miniaturisation and develop new applications and functions for key components and systems. Sub-areas are: **micro-, nano- and opto-electronics** aiming to reduce the cost and improve the performance and functionality of components and systems-on-a-chip; and **micro- and nano-technologies, microsystems and displays**, aiming to improve their cost-efficiency, performance and functionality and to increase the level of integration and miniaturisation.
- iv) **Knowledge and interface technologies:** the objective is to improve usability of IST applications and services and access to the knowledge they embody in order to encourage wider adoption and faster deployment. Sub-areas are: **knowledge technologies and digital content** to provide automated solutions for creating and organising virtual knowledge spaces that are expected to stimulate radically new content and media services and applications; and **intelligent interfaces and surfaces** to provide more effective ways of accessing ubiquitous information, and easier and natural interaction modes.
- v) **IST future and emerging technologies:** in this area, the objective is to help IST-related science and technology fields and communities to emerge. Some of these will become strategic for economic and social development in the future and will feed into the mainstream future IST activities. To ensure openness to radically new ideas, a critical mass of research and seamless coverage of the IST frontier, two complementary approaches will be utilised, one receptive and open, the other proactive.





**FIGURE 1: THE IST PRIORITY IN FP6**



The promotion of partnering and collaboration is a central commitment under FP6. In its planning, the Commission has encouraged an unprecedented level of involvement among the European IST community. This has included an extensive series of consultations with stakeholders and an open invitation for expressions of interest (Eol) on research ideas and priorities. Following a call earlier this year, over 1500 Eols were received relating to IST domains and analysis of these is contributing to the elaboration of the future work programme.

In addition, FP6 preparatory measures were invited under VWP2002. A series of projects have subsequently been launched which are investigating future research challenges, roadmaps and associated implementation models in specific contexts. These involve networking or the creation of constituencies of relevant stakeholders. A series of preparatory actions have also been initiated at Programme level.

## New Programme, New Approach

FP6 is not business-as-usual. Although from a technological perspective the vision and goals of IST research remain unchanged, the means of achieving them will be radically different.

To help meet the objectives of the ERA, new support instruments have been introduced, principally integrated projects (IPs) and networks of excellence (NoEs) (see Box 4). These will give EU activities a bigger impact and bring about a stronger structuring effect on research conducted in Europe. They will make it possible to assemble genuine critical masses of resources, to better coordinate national research efforts, and to diversify support activities in key areas such as the mobility of researchers, research infrastructures and science and society issues.



*The exhibition hall at the EU-China Co-operation Forum, Beijing, April 2002*

The rules for participation have also been modified. In particular, funding mechanisms have been aligned with the purposes of the new instruments. The financing principle will no longer be on the basis of eligible costs but through a "grant to the overall budget" (for IPs) or a "grant to integration" (for NoEs). Candidate countries associated to the FP will participate under the same conditions as EU Member States, and European research organisations will be treated the same as any other legal entity. Changes in partnerships may be decided by partners with tacit agreement by the Commission. Rules on intellectual property rights have been simplified, though it is up to consortium partners to establish relevant agreements.



## BOX 4: FP6 INSTRUMENTS

In common with the other thematic priorities, the IST Priority will be implemented through a mix of “new” instruments, driven by the concepts of the European Research Area, and the more “traditional” instruments similar to those in FP5. As well as being a wider range of instruments, they are also more differentiated. Each has its own distinct character and its own distinct role to play in implementing the priority themes.

The “new” instruments are:

- 1) **Integrated Projects (IPs):** these will support objective-driven research where the primary deliverable is new knowledge. Each project should contain an integrated set of activities within a coherent management framework. Research activities may be complemented by demonstration, innovation and training activities, as appropriate. IPs will have a high level of management autonomy and will be implemented through overall financing plans, with budgets up to many tens of millions of euros.
- 2) **Networks of Excellence (NoEs):** these aim to tackle the fragmentation of European research by fostering a lasting integration of research capacities. As such, the main deliverable should be a durable structuring and shaping of the way that the relevant research is carried out. Research will focus on long-term and multidisciplinary objectives, implemented through a joint programme of activities. By networking European expertise in their respective fields, NoEs are expected to create genuine “virtual centres of excellence”, and will have a mission to spread this beyond the original partnership. They will enjoy a high level of management autonomy.
- 3) **Article 169:** this refers to an article in the Treaty that enables the Community to participate in research programmes undertaken jointly by several Member States, including participation in the structures created for the execution of those programmes. This is not strictly a new instrument, since it was available under previous framework programme, but is potentially of great significance for the ERA. Joint implementation of national/regional programmes might be achieved through harmonised work programmes and common, joint or co-ordinated calls for proposals.

Other instruments available under the IST Priority include:

- 4) **Specific targeted research or innovation projects (SRTPs):** an evolution from the shared-cost RTD projects in FP5, these support research, demonstration or innovation activities of more limited scope and ambition than Integrated Projects.
- 5) **Coordination actions:** similar to the current thematic networks, these are co-ordinated initiatives undertaken by a range of stakeholders involved in research and innovation.
- 6) **Specific support actions:** an evolved form of the accompanying measures of FP5, covering activities such as conferences, seminars, studies and analyses, expert groups, operational support, dissemination, and information and communication activities.

In addition, specific research projects for SMEs will be supported. These may be either co-operative research undertaken for the benefit of a number of SMEs on themes of common interest; or collective research carried out for industrial associations or industry groupings in sectors where SMEs are prominent.

*Further information on FP6, including the specific programmes, new instruments and information events, is available on the following websites:*

FP6: [http://europa.eu.int/comm/research/fp6/index\\_en.html](http://europa.eu.int/comm/research/fp6/index_en.html)

CORDIS: [www.cordis.lu/rtd2002](http://www.cordis.lu/rtd2002)

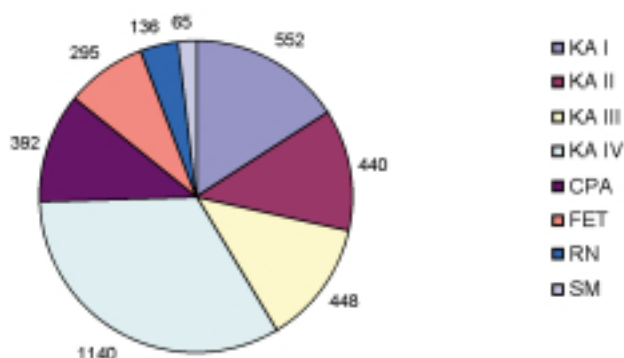
IST Priority, including Work Programme 2003: [www.cordis.lu/list](http://www.cordis.lu/list)



# IST in Figures

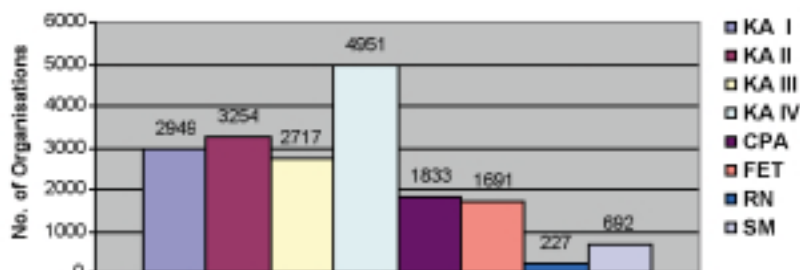
The following figures present the IST Programme from various perspectives. The data reflect the position at September 2002 (up to and including the Eighth Call for Proposals) and include retained proposals as well as those projects for which contracts have been signed.

**FIGURE 1: PROJECT FUNDING BY PROGRAMME AREA**



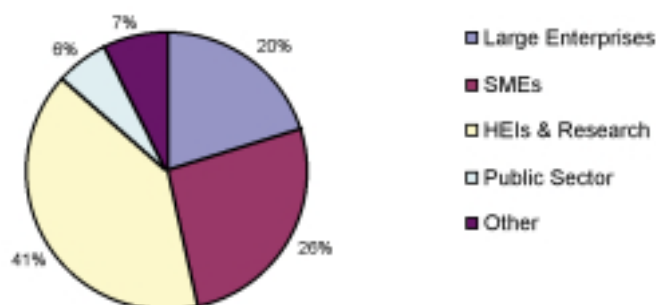
Figures are for total funding commitments for projects and retained proposals

**FIGURE 2: TOTAL PARTICIPATION BY PROGRAMME AREA**



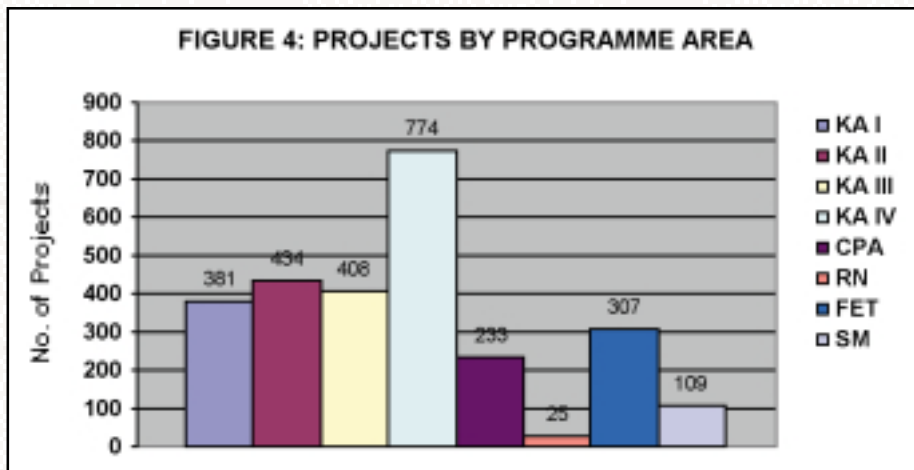
Figures are for total number of organisations participating in projects and retained proposals

**FIGURE 3: PROGRAMME PARTICIPATION BY TYPE OF ORGANISATION**

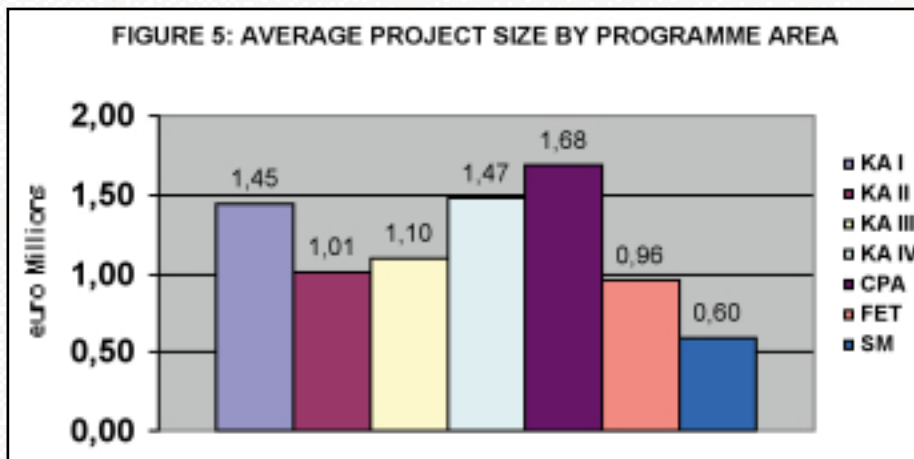


HEIs includes higher education establishments, the Joint Research Centre and other research institutes; Public Sector includes international organisations; Other includes voluntary sector and other non-research non-profit organisations





*Includes a small number of retained proposals*



*Excludes Research Networks for which average funding is € 5.4 million.  
IST Programme average = € 1.30 million*

#### LEGEND

KA I = Key Action I  
KA II = Key Action II  
KA III = Key Action III  
KA IV = Key Action IV

CPA = Cross Programme Actions  
FET = Future and Emerging Technologies  
RN = Research Networks  
SM = IST Supporting Measures



# Innovate to compete

**T**he IST Programme provides opportunities for organisations of all types and sizes to pursue leading-edge research. But research alone is not enough. To fully achieve the Programme's objectives – improving the competitiveness of the European economy and the quality of life of European citizens – research results need to be taken up and used. With many of the RTD projects now either concluded or reaching maturity, efforts to support the dissemination and exploitation of the Programme's results are being intensified.

Much activity to support the take-up of results is undertaken within individual Action Lines. To complement these, a series of Programme-wide services are being launched to ensure effective access to and exploitation of this information. These will provide a range of web-based services designed to extend the reach of innovations generated by the Programme to a much larger community of users. For instance, IST-TV is setting up an internet video portal providing central access to videos on IST results for broadcasters and journalists. A similar



*The IST Prize trophy*



text-based news service is also being launched. Key target groups include investors and the media, as well as intermediaries, and end-users in a variety of business sectors.

Several measures aim to broker partnerships between current or potential project participants and to improve awareness about the Programme and its results. Ideal-IST is a network of experts in 31 European countries (all EU Member States and Associated States) which provides help for companies wishing to participate in the IST Programme. The network disseminates information through workshops and conferences, complementing national awareness-raising efforts, and organises international partner brokerage events. An online partner search facility is also offered, targeted at specific calls and tasks. These search activities will be especially relevant under FP6,

since the new instruments (NoEs and IPs) will require participants to acquire more and new types of partners.

A related initiative, IST-Mentor, provides training for intermediaries, primarily consultants and national contact points, from certain candidate countries to help ensure they derive full benefit from their participation in the IST Programme. Aspects covered include proposal writing and exploitation of results.

Support for innovation-related activities will continue to be a key feature under FP6, both at project level (IPs, NoEs and TRPs) and through "horizontal" actions. Existing regional and interregional networks, such as Ideal-IST and the IRCs, are likely to play a key role here. Other organisations and mechanisms, such as private investors, the EIB/EIF funds and the Structural Funds, could also be mobilised.

### Rewarding IST innovation

*Now in its eighth year, the European IST Prize is an award for ground-breaking products that represent the best of European innovation in information technology. It provides public recognition and a highly visible profile to entrepreneurial teams that excel in generating novel ideas and R&D, and converting them into marketable products. The high standards of applicants and the competitive screening procedure for selecting the winners make this a distinguished prize for new IT-driven products.*

*Twenty Winner Prizes of €5,000 each are awarded. From these three Grand Prize Winners are selected, each receiving €200,000 and the European IST Prize Trophy. The prize scheme is organised by the European Council of Applied Sciences and Engineering (Euro-CASE), and awarded at the annual IST Conference.*

*Applications must be novel products with a high information technology content and evident market potential. The selection criteria are rigorous and include technical excellence, innovative content, strategic business planning, potential for improving competitiveness, and potential market value. "Softer" issues, such as capacity to generate employment by opening new markets or starting up new enterprises, contribution towards extending the acceptance and understanding of IT by society, and anticipated societal benefits are also considered.*

*In addition to the monetary awards, the European IST Prize Winners receive extensive promotion and media coverage. A nomination as European IST Prize Winner and the public recognition of excellence enhances the credibility, the visibility and prospects of the winning company. A recent survey of the 170-odd winners since 1995 confirmed this. While a few may have failed or been absorbed into other companies, a significant number have not only survived the dot-com bubble but have prospered through the bad times and continue to prosper now.*

IST Action Lines:	IST-2002 VIII.1.8	Dissemination and awareness of IST programme results
Commission Contacts:	Karl-Heinz Robrock Timo Hallantie	karl-heinz.robrock@cec.eu.int timo.hallantie@cec.eu.int
Project References:	IST-Mentor IST-TV	IST-2001-34841 IST-2001-32799
Web:	Ideal-IST: <a href="http://www.ideal-ist.net">www.ideal-ist.net</a> European IST Prize: <a href="http://www.it-prize.org">www.it-prize.org</a>	



# SMEs – your IST partners\_\_\_\_\_

**S**MEs are the lifeblood of the European economy, being the main source of growth and new jobs. They have much to gain from greater use of IST but first have to overcome key barriers, such as finding the right technology for their needs, protecting their IPR, and accessing suitable means of finance. Recognising the specific challenges for SMEs, the IST Programme places special emphasis on measures to make participation as easy and rewarding as possible.

Two such measures are SME Exploratory Awards (EAs) and SME Co-operative Research (CRAFT). EAs cover part of the cost of developing SME partnerships and RTD ideas which show great innovation potential. These could be the basis for future collaborative research (RTD) proposals or co-operative research (CRAFT) proposals. The latter allow SMEs with limited or no in-house R&D capability to entrust the necessary research to third parties.

An analysis of SMEs' participation in the IST Programme has recently been undertaken<sup>1</sup>. This shows that SMEs are deeply involved in IST, with almost two-thirds (63%) of funded projects having at least one SME contributor. Overall, one third of the participating organisations are SMEs, with over 2000 directly involved in the IST Programme. Almost a third of SMEs (31%) are involved in more than one IST project. Across the Programme as a whole, SMEs make up 24% of all the participation in signed contracts and they account for 24% of the IST budget.

SMEs are involved in all types of action, the most popular being shared-cost RTD projects where over 1800 have SME participants (representing around 20% of total participation). They have a significantly higher than average participation in best practice actions (60%) and trials (41%), suggesting that these actions



SMEs are key participants in the IST Programme

meet a particular SME need. National participation broadly reflects the position for the FP as a whole.

Analysis of the firms themselves shows that around two-thirds are small enterprises (<50 employees), and around two-thirds are technology suppliers (rather than users). Participants tend to be the more RTD-intensive SMEs, with a high proportion (85%) having significant own in-house RTD capacity. Compared to their respective participation, the role of SMEs as contractors is similar to the other types of IST participants. They are coordinators in around 10% of cases, almost equally often as any other organisation.

Under FP6, the aim is to keep SME participation at least at the same level as under FP5. Take-up type actions will be available within integrated projects. In addition, specific measures to assist SMEs, similar to the current CRAFT scheme, will be offered through the Co-operative Research and Collective Research activities within the Specific SME action under Priority 8.

<sup>1</sup> The statistical analysis presented here is based on mandatory contractual information, although the data are often incomplete in terms of participating companies' organisational status. For these purposes, the term "SME" applies to companies with fewer than 250 total employees. Of these, companies have been excluded from the analysis where the available data renders them incompatible with the EU's legal definition of an SME, i.e. where the total annual turnover or balance sheet are beyond €40m and €27m respectively, and/or where these partners declared themselves as dependent.

IST Action Lines:	IST-2002 5.2	Innovation and special measures for SMEs
Commission Contacts:	Karl-Heinz Robrock Peter Katz	karl-heinz.robrock@cec.eu.int peter.katz@cec.eu.int
Web:	SMEs: <a href="http://www.cordis.lu/innovation-smes/home.html">www.cordis.lu/innovation-smes/home.html</a> Report on SME participation to IST Programme: <a href="http://ftp.cordis.lu/pub/ist/docs/sme_report.pdf">ftp://ftp.cordis.lu/pub/ist/docs/sme_report.pdf</a>	



# The skills dimension

**T**he future success of the European Information Society depends not only on having the best technological solutions but also on having appropriately qualified people to design and implement them. There is already a significant deficit in key ICT skills in Europe, to the extent that skill shortages are emerging as a potential barrier to future progress.

The quality of, and ease of access to, ICT-related training within the ICT industries themselves are a significant factor. In such a rapidly moving field even experienced professionals have to continuously update their skill sets to ensure they stay on top of new developments. Young graduates often need specific training to help them make the transition from study to work. And with new knowledge emerging all the time, there is a need for specific measures to transfer knowledge and skills between academia and industry, and between one academic discipline and another.

The IST Programme helps fight this knowledge gap. A series of measures concerned with continuous professional development aim to maintain and enhance the skill sets of graduate personnel in research, industry and other organisations. The establishment or development of training infrastructure is supported, together with multiplier initiatives such as training of trainers. On-the-job learning for experienced and young professionals in teams or networks is also emphasised. Other activities aim at the exchange of knowledge through the mobility of graduates and academics. EU research can also act as a catalyst for better industry-academic links, promoting collaborations and exchanges through which transfers take place.

Marie Curie Industry Host Fellowships provide training for young postgraduate and/or post-doctoral researchers, in particular those without any previous industrial research experience, in an industrial or commercial environment. These aim to build up competences in multidisciplinary areas. Nearly 60 IST-related fellowships have been funded under FP5. They cover a wide range of areas: examples include object-oriented approaches for software development (DOOLTIN) and innovative electronic components based on magnetic and polymeric materials (POLYMAG). Several have already trained or have under training four or more fellows.

A series of accompanying measures have also been launched. These cover issues such as: legal aspects of ICT (ECLIP II); training in entrepreneurship for IST projects (TRAIN-IT); and the development of training materials on computer vision (PCCV). Two recent projects, BESTNET and IKEMSATT, focus on total quality management.

For the future, high quality, industry-relevant training in IST will be essential for realising the European Research Area. Under FP6, training activities will be addressed both at project level (through NoEs and IPs) and centrally through actions to promote mobility and enrich the pool of European researchers.

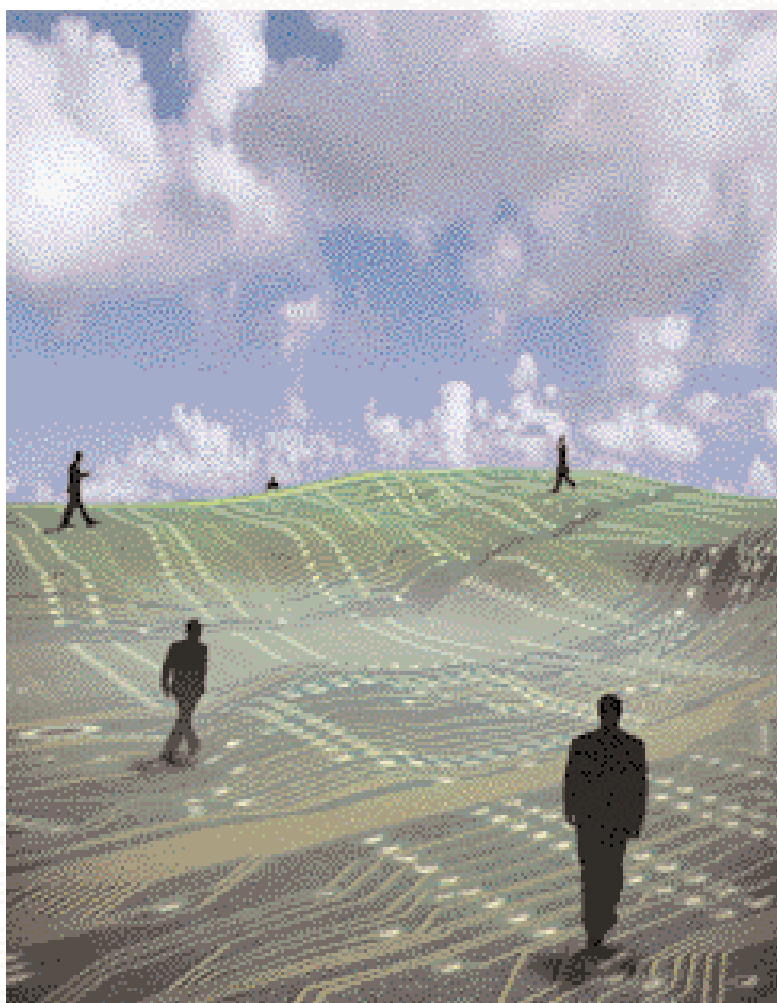
IST Action Lines:	IST-2002 VIII.1.4	Improving human capital in IT by competence building
Project References:	BESTNET DOOLTIN ECLIP II IKEMSATT PCCV POLYMAG TRAIN-IT	IST-2001-33242 IST-1999-19995 IST-1999-12278 IST-2001-32018 IST-1999-14159 IST-1999-19992 IST-1999-29055
Commission Contacts:	David Cornwell	<a href="http://www.train-it.org">www.train-it.org</a> <a href="mailto:david.cornwell@cec.eu.int">david.cornwell@cec.eu.int</a>



# Pushing back the frontier

**T**he socio-economic impacts of publicly-funded RTD are now widely recognised. Academic and basic research underpin industrial innovation in many science-based industries and help raise business productivity. One only has to consider the effect on the economy of the biotechnology and information technology industries to appreciate the tremendous benefits arising from basic research expenditures. Studies show that the private rate of return to public-funded research range between 20%-60%: inclusion of more general societal returns would push the figure higher still. Similarly, results from publicly-funded basic research have also been shown to be strongly reflected in patents. There is a wealth of evidence, therefore, to show that the case for publicly-funded long-term RTD is a strong one.

In basic research, the knowledge obtained is usually openly available and exchangeable, and breakthroughs come through many parallel research efforts. Of course, basic research results are very often unexpected: planning would stifle them, if not kill them outright. Community building, on the other hand, is an essential means for stimulating the exchange of knowledge. Appropriate targeting of research funding provides focus in a desired area, resulting in a more rapid innovation cycle. Furthermore, researchers in these areas tend to avoid programmes that are unduly bureaucratic and go instead for those with the simplest procedures. Simplification and trust, therefore, are essential to an effective engagement.



*FET is the IST Programme's pathfinder*

The EU Framework Programmes have a strong tradition of support for research of a basic and long-term nature. For example, the Esprit Programmes' actions on Basic Research (FP3) and Long-Term Research (FP4) aimed to lay the foundations for "next wave" technologies to underpin the future development of European information technology R&D. Many of the activities launched under these actions have since passed into the "mainstream" RTD under subsequent framework programmes. Examples are to be found in the early work on distributed systems and networks, computer vision, intelligent interfaces, language and speech technology, multifunctional microsystems, and nanotechnology, to name just a few. These schemes were open and responsive, and focused on community building and developing skills and infrastructure as well as on research.



### Proactive initiatives in FP6

*Potential topics for FET support under FP6 have been the subject of a wide-ranging consultation. These identified a number of areas and research challenges of key importance in the physical, biological and computing worlds – mostly at the interfaces between disciplines. The leading candidates for proactive initiatives in 2003, budget permitting, are:*

- *Beyond robotics: Aiming towards new approaches for incorporating IT into robotic entities. Potential research interests include ecologies of interacting robots, robotic servants, and hybrid bionic systems.*
- *Complex systems: Aiming towards a new generation of technologies for building scalable, self-organising and self-regulating information artefacts (whether physical or software) and computer models, based on new concepts and methods from complex systems analysis.*
- *Disappearing computer: A reorientation of the existing initiative towards a universal and open architecture to support smart everyday objects and stand-alone objects.*

The Future and Emerging Technologies (FET) action continues this tradition. FET is the IST Programme's pathfinder: its purpose is to help new IST-related science and technology fields to emerge and mature. It balances the targeted approach of the Key Actions with a more visionary and exploratory perspective that will ensure the emergence of new ideas and new research activities for tomorrow. The research typically supported is of a longer-term nature and involves high risks (but also potentially high industrial or social impact). By opening new possibilities and setting the agenda for future research programmes, FET aims to push back the frontiers. Two complementary approaches are employed: one strategic and proactive, the other receptive and open.

Under FP5, FET has launched a portfolio of some 200 projects and had an annual budget of around €80 million. The impact of this work is visible at many levels. In addition to specific scientific and technological achievements produced by the projects, FET's proactive initiatives have succeeded in placing Europe at a world-leading position in emerging research domains such as nanotechnology, information interfaces, neuro/bio-IT, and quantum computing. At the level of the IST or Framework Programme as a whole, FET's original ideas about project clustering in

proactive initiatives, an "open" research area, and community building, have now proved their value and provide important lessons for the "new" approach proposed under FP6.

While FET's research horizon is long-term, its economic impacts are already being felt. A recent analysis has shown that in the first two years of FP5 at least one start-up company was created every 3 months as a result of the work undertaken within FET projects.

The FET activity will continue under the Sixth Framework Programme, retaining the core values which have characterised its success to date. Thus, it will continue to support visionary, high-risk, high return research, to be long-term in nature, to encourage interdisciplinarity, and to apply "light touch" administration. As currently, a combination of proactive and open funding schemes will be utilised. Proactive initiatives are expected to comprise one or more integrated projects and, in some cases, networks of excellence. The FET-Open scheme will be implemented mainly through specific targeted projects. The scheme will be open throughout FP6 and will follow a two-step application procedure.

IST Action Lines:

IST-2002 VI  
IST-2002 VI.1.1

Future and emerging technologies  
Open domain

Commission Contacts:

Kostas Glinos

konstantinos.glinos@cec.eu.int

Web:

[www.cordis.lu/ist/fethome.htm](http://www.cordis.lu/ist/fethome.htm)



# IST in a larger Europe

**T**he transition to the new information-based economy represents a major challenge for the countries of Central, Eastern and South-Eastern Europe. In these countries both R&D expenditure and average productivity are still lower than the EU average. IST infrastructure and skills will be essential in enabling them to take full advantage of the existing strong science base, increase the competitiveness of their industry, and improve access to global technology markets. Thus, for these countries international collaboration in RTD is of strategic importance.

The candidate countries have been associated to the EU Framework Programme for some years now. Others, notably in the Western Balkans and the newly independent states of the former Soviet Union, have been linked to the Framework Programme more loosely. Common problems such as lack of familiarity with RTD projects, the high cost of proposal writing, and limited knowledge of the EU have deterred many high quality organisations from applying. Over recent years various actions have been supported to help overcome these obstacles by raising awareness of the IST Programme and providing support for participation.

Partly as a result of these efforts, the participation of organisations from the Newly Associated States (NAS) in new IST proposals is steadily increasing. Over the Programme as a whole, 44% of proposals included NAS partners, and in the most recent calls the success rate of candidate countries reached the same level as the EU (around 26%). Since 2001 existing IST projects have been able to apply for extensions to admit new partners from the NAS. To date around 75 projects have made use of this facility, linking with around 220 further organisations from the NAS. Overall, these measures show that the NAS are gradually becoming integrated into the mainstream of the IST Programme.

One area where concerted sub-regional support is still required is in the Balkans. The South Eastern Europe Information Society Measure (SEEISM) is a set of co-ordinated activities to support the IS in the Balkan region. InterBIT has helped to establish networks of IS actors across the region and led to a cross-programme platform upon which to plug more specialised thematic actions. Around a dozen projects and domain-specific networks and accompanying measures are currently supported under SEEISM tackling issues within the Balkan context.

Among the most recent projects, E-MuniS focuses on e-government in the Balkans. It aims to adapt and improve IT applications and working practices from EU municipalities and to transfer the results to municipalities within the Balkan region. In so doing, it will help to integrate them into the EU municipal network, thus contributing to the objectives of the e-Europe and e-Europe+ initiatives. ISIS is creating an influential forum for IS spanning not just the Balkans but also other countries of South East Europe (see box).

The huge strides being made by candidate countries in applying IST were evident at the e-Government Conference, From Policy to Practice, held in Brussels in November 2001. For instance, Romania's national system for managing secondary school examinations, called ADLIC, was awarded a "Best Practice" label at the e-Government conference. RIIK, an Estonian e-government portal (which includes English and Russian translations) was also commended.

Two new initiatives, IST-MENTOR and TRISTAN EAST, aim to ensure that organisations from the NAS and NIS derive full benefit from their participation in the IST Programme. Various intermediaries, primarily consultants and national contact points, will be provided with training on aspects such as proposal writing and exploitation of research results.



### **Bringing the benefits of IST to South East Europe**

*The deployment of innovative IST applications and services is becoming a key factor for growth and welfare in all parts of Europe. This is especially true in South East Europe (SEE) - Greece, Turkey, Bulgaria, Romania and others - where many problems remain to be resolved. ISIS is a major effort to develop awareness about IST, facilitate the formation of project consortia and promote co-operation between partners in South Eastern Europe and the EU.*

*The project aims to build awareness about IST and, in particular, about e-Europe initiatives in SEE countries and to assess their situation with respect to their participation in the IST Programme. It will mobilise SME managers and universities and help them to participate successfully in IST R&D initiatives. This will be achieved through conferences, workshops, information days and a website. Key parts of the workplan include the assessment of policy priorities and coordinated actions aimed at promoting IS best practices.*



*Associated countries stand to benefit from IST*

IST Action Lines:  
Project References:

IST-2002 VIII.1.6

E-MUNIS

ISIS

IST-MENTOR

TRISTAN EAST

Commission Contacts:

Michel Bosco

Jean-Yves Roger

Erik Habers

Web:

[www.cordis.lu/ist/int/home.html](http://www.cordis.lu/ist/int/home.html)

Enabling RTD co-operation with Newly Associated States

IST-2001-33037

[www.emunis-ist.org](http://www.emunis-ist.org)

IST-2001-33537

[www.isisnet.org](http://www.isisnet.org)

IST-2001-34841

IST-2001-37676

[michel.bosco@cec.eu.int](mailto:michel.bosco@cec.eu.int)

[jean-yves.roger@cec.eu.int](mailto:jean-yves.roger@cec.eu.int)

[erik.habers@cec.eu.int](mailto:erik.habers@cec.eu.int)



# COST – a model for the ERA

**T**he IST Programme is an important feature of the European research landscape for information and communication technologies. Nevertheless, it still accounts for only a tiny proportion of ICT-related RTD investments within the Member States and Associated States. One of the key objectives of the Sixth Framework Programme (FP6) is to help build the European Research Area (ERA). This will help maximise synergy between national, regional and Community efforts and increase the impact of Community funding by building critical mass in key areas of IST research.



*COST is helping to build Europe-wide networks*

The implications of the ERA will be far-reaching, requiring new implementation mechanisms and new ways of working. COST, a highly successful international initiative with EU participation, provides a useful model for how future co-operation in relation to the ERA might be organised and managed.

COST is a framework for international co-operation between nationally-funded RTD activities, for which the RTD Framework Programmes play a supporting role. In COST each participant obtains their own research funding, in most cases from national RTD programmes and from industry. EU funds are used to cover the additional costs associated with co-

ordination according to an agreed set of common objectives. On average, the COST FP5 funding constitutes about 5% of the overall RTD budget for COST Actions. These co-ordination costs cover aspects such as a secretariat, meetings, seminars and workshops, short-term scientific missions, and publications.

COST now covers 35 European countries and 17 scientific and technical domains, one of them being Telecommunications, Information Science and Technology (COST TIST). COST TIST Actions

address basic research issues and typically combine European centres of excellence with related industrial actors in a framework with common research objectives, activities and timescale. Overall, 28 Actions are currently operational, grouped in 8 Research Domains. More than 2000 leading scientists are involved in these Actions within COST and non-COST countries.

Offering a unique and flexible framework, COST is popular with researchers and industry alike. Industry, in particular, appreciates the flexible IPR scheme which does not oblige participants to vest sensitive IPR information into the co-operation. COST research networks contribute to the education of young scientists, and allow European researchers to build crucial expertise through short-term scientific missions and exchanges. In addition, COST TIST has made significant contributions to relevant European and international standards bodies (CEN/CENELEC, ETSI and ITU), in areas such as radio propagation, network management, mobile communications (GSM, UMTS) and the future of the internet (IETF and IRTF).



### Health implications of mobile phones

*The health implications of mobile phones are of major concern to the public but progress is limited by a lack of reliable data. The issue is complex requiring multidisciplinary scientific investigations, replication of experimental data and a sound appreciation of policy and regulatory aspects.*

*COST Action 281 aims to gain a better understanding of the possible health impacts of mobile communication systems. The four-year project will undertake a detailed analysis of available data on risks from electromagnetic fields from scientific and risk communication perspectives, and draw conclusions in relation to technical development and public health. With participants from 19 European countries, it will provide independent information on matters of public concern and advice to the relevant authorities at national and European level.*

Under FP6 COST will be funded through the Specific Programme on Integrating and Strengthening the ERA. Its management will be streamlined, possibly through the setting up of an external management unit, and links to the Framework Programme will be strengthened. Experience shows that collaboration works best when based on existing networks or groupings. With its highly-focused, well-established networks, COST is very complementary to the Framework Programme and COST Actions could provide a basis for emerging Networks of Excellence in FP6, addressing specific IST issues. A COST-type approach could also be used to build new networks where there are currently gaps between research disciplines and national research teams.

Another key mechanism within FP6 will be the ERA-NET scheme, which aims to step up the co-operation and co-ordination of research activities carried out at national or regional level. This will be achieved through networking of national and regional research activities, including the mutual opening of national and

regional research programmes. The participants in ERA-NETs will be principally public agencies, research associations or other bodies responsible for financing or managing research activities. International organisations involved in coordinating national RTD as part of their mission may also participate. Both networking and mutual opening require a progressive approach. Therefore the ERA-NET scheme has a long-term perspective that allows for the different ways that research is organised in different Member States.

In the IST Programme a series of ERA preparatory actions have been launched. These include a network on forecasting in IST research, a benchmarking study to establish statistical indicators for IST in national contexts, and a feasibility study for an information portal on IST-related national programmes across Europe. This will be followed up by specific initiatives to be launched as part of FP6.

IST Action Lines:

IST-2002 VIII.1.10

Strengthening the European Research Area in IST domains

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COST TIST: [www.cordis.lu/cost/src/tisthome.htm](http://www.cordis.lu/cost/src/tisthome.htm)

COST 281: [www.cost281.org](http://www.cost281.org)



# The global information society

**G**iven the increasingly global nature of information and communication technologies, there are significant benefits to be gained for the EU through international co-operation in IST-related RTD activities. Collaboration with researchers from outside the EU can help achieve global consensus on interoperability and standards. International co-operation promotes the exchange of scientific information and technological know-how worldwide and can strengthen the European presence in fast-growing global markets. It also helps accelerate the take-up of innovative IST in Europe and strengthens industrial co-operation, in particular with neighbouring regions.

Like other Fifth Framework programmes, the IST Programme is open to researchers from across Europe under association agreements between the EU and the individual countries concerned. Researchers from each of the “associated” countries can submit proposals for IST research projects and receive funding under the Programme on essentially the same basis as EU participants. In addition, a number of other countries around the world have science and technology co-operation agreements with the EU. These also allow researchers from other countries to participate in the IST Programme, although each must bring their own funding. Likewise, EU researchers may participate in corresponding research activities funded by those countries but must fund themselves.

Up to Call 6, organisations established in non-EU non-associated states participated in over 800 proposals. They represent about 2.5% of the partners involved in the IST Programme’s activities and participate in

around 15% of projects. Most of these organisations are in industrialised countries, including over 100 in the USA and 30 in Canada. They are participating in projects that pave the way to future standards or where their world-leading expertise contributes to the development of new technologies. Others represent the emerging economies in projects that accelerate technology transfer to these regions.

The EU-MEDIS Programme promotes IST-related co-operation within the Euro-Mediterranean region, and is currently the Commission's largest international IS initiative. Following a call in 2001, a series of 16 regional IS projects have been launched, spread across five application areas: education, e-commerce, health, tourism and culture, and innovation. Network infrastructure within the Mediterranean partner countries is also being enhanced through connection to the GÉANT European high-speed network. Collectively the EU-MEDIS projects will provide attractive demonstrations to promote IST to local decision-makers around the Mediterranean region.

Latin America is a high growth region with strong links with the EU. Building on the EUROLAT-IS initiative, in 2002 the Commission launched a new programme, @LIS, as a basis for Euro-Latin American collaboration. @LIS includes demonstration and take-up projects to be monitored within the IST Programme, in priority areas such as health, tourism, transport, urban development, and e-governance. Projects will be launched in early 2003 following a call earlier this year. @LIS will also finance the interconnection between GÉANT and Latin American research networks.

## Success for EuroChina 2002

*China is experiencing a rapid increase in demand for IST products and services, and the IT industry is one of the key driving forces of national growth. To explore these opportunities and help build linkages between the European and Chinese markets, the China-EU Co-operation Forum was held in Beijing on 16th-20th April 2002.*

*This major conference and exhibition, which was co-sponsored by the European Commission and Chinese government, attracted around 800 European delegates with around 170 European organisations exhibiting. Altogether around 12000 people attended and the event had excellent media visibility. European firms were able to showcase their offerings at a series of seminars, networking events and business meetings organised alongside the main programme. The event received a high level of political support on both sides, including meetings between Commissioner Liikanen and senior members of the Chinese government.*

*Two follow-up initiatives have subsequently been launched. ABCHINA will help 50 European SMEs to access the Chinese market, and FACTS will create an EU-China Working Group to support the use of IST in the Beijing Olympics in 2008.*





*The official dinner at  
the Euro-China 2002 Forum*

For Asia, the main co-operation mechanism is the Asia IT&C Programme. This aims to create Europe-Asia IST partnerships by improving links between the two regions. Around 40 projects have been launched to date covering eight IST application areas: agriculture, education, health, transport, society, tourism, manufacturing, and e-commerce.

Co-operation with other industrialised countries is also encouraged, with an emphasis on joint initiatives that enable a pooling of expertise. A new project, IST-EC, provides a portal to promote closer RTD contacts between the EU and Canada, mirroring the success of USAnet, a similar brokering service for the US. Both projects provide information on technology transfer opportunities, RTD funding and databases of potential project partners.

Support for international co-operation in IST will continue to be supported under the Sixth Framework Programme, with the available budgets expected to be significantly higher than under FP5. The new instruments (NoEs and IPs) provide important new opportunities for European researchers to build links with the best IST teams around the world and to work towards global consensus on interoperability and standards.

IST Action Lines:	IST-2002 VIII.1.7	Enabling RTD co-operation with third countries
Project References:	ABCHINA	IST-2001-38616
	FACTS	IST-2001-38481
	IST-EC	IST-2001-33029
	USAnet	CT-2000-50003
		<a href="http://www.ist-ec.org">www.ist-ec.org</a>
		<a href="http://www.usanet-online.com">www.usanet-online.com</a>
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	Erik Habers	<a href="mailto:erik.habers@cec.eu.int">erik.habers@cec.eu.int</a>
Web:	<a href="http://www.cordis.lu/ist/int">www.cordis.lu/ist/int</a> @LIS: <a href="http://europa.eu.int/information_society/topics/international/latin/alis/index_en.htm">europa.eu.int/information_society/topics/international/latin/alis/index_en.htm</a> ASIA IT&C: <a href="http://europa.eu.int/comm/europeaid/projects/asia-itc">europa.eu.int/comm/europeaid/projects/asia-itc</a> EUMEDIS: <a href="http://europa.eu.int/information_society/international/mediterranean/index_en.htm">europa.eu.int/information_society/international/mediterranean/index_en.htm</a> EuroChina 2002: <a href="http://www.eurochina2002.com">www.eurochina2002.com</a>	



# Digital Spaces



**Citizen-centric IST  
applications and  
services**



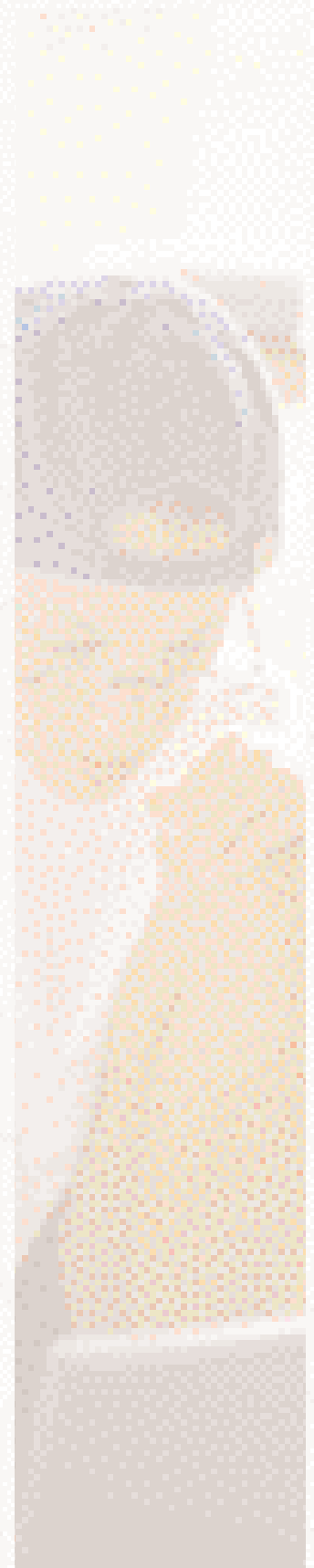
The Information Society presents many opportunities for individuals to enhance their quality of life through new IST applications and services. The personal spaces which we occupy everyday, such as the home and the car, are becoming more intelligent and user-friendly. No longer just passive environments, these digital spaces are our interface to a whole new world of interactive services to help us live, work and play.

New IST applications enable people to access services such as education and health directly from their own homes. They are able to use these services where they want, when they want, in ways which they find more convenient, more flexible, and more secure. IST offers particular benefits for the young, the elderly and those with special needs. As the trend towards home-based services becomes more marked, the nature of our homes and their role in our lives will change substantially.

Our personal spaces are increasingly interconnected. Both the home and the car, for example, are emerging as highly networked environments, in which individual devices and appliances are able to communicate with each other and with the wider world. This raises the need for open platforms and standards that enable equipment to be linked together within their own information space.

Another key feature is that access is no longer confined to the desktop. Increasingly, information and other services are accessible through a new generation of digital appliances, such as laptop computers, mobile phones, PDAs, and digital TV. This opens major new delivery channels in, for example, transport, tourism and e-commerce. In the longer term, even everyday objects such as pens, paper and clothes are likely to acquire communication abilities.

The new services are not only mobile but also more interactive and personalised. Through secure and user-friendly platforms such as broadband internet and digital TV, people will be able to use IST to support personal choices on aspects such as health prevention, lifelong learning, independent living and cultural expression.





# Digital TV – the service gateway

Today's television viewer has no shortage of choice. Over recent years developments in satellite and cable have brought hundreds of channels into the home. Further developments are just around the corner. The introduction of interactive digital video complying with the DVB-MHP specifications will bring a much greater level of interactivity to programmes and allow access to new types of services direct from the home.

User acceptance of these new services will depend on the quality of the interactive support available. Faced with hundreds of channels and thousands of services accessible through set-top boxes, web-PCs and other devices, users will need new tools to guide them through the maze of information. Social and ethical issues also arise, such as the need for safeguards for rated content (i.e. that requiring parental consent), and the use of users' profiles for highly personalised advertising and promotion.

The development of digital television and other AV systems is addressed under the IST Programme from various aspects including the network infrastructure itself, the user interface, service provision, and content delivery. Many of the projects have now either finished or are nearing completion. They represent the latest phase in a major research investment going back to the early 90's. In September 2001 relevant projects came together to exhibit their results at the IBC2001 in Amsterdam, the annual global exhibition and conference for television technologies. They showed applications for interactive television based on and generating contributions to the major standards in the field, such as DVB-MHP, MPEG-4 and -7, and TV-Anytime.

The MyTV project contributed to TV-Anytime by demonstrating a consumer platform with built-in local storage for personalised services in digital broadcasting and broadband communication. New services exploiting this platform were also developed, such as the ability to turn local storage into a personalised TV channel for non-linear browsing of TV content. The system provides true interoperability both between service providers and between different consumer terminal manufacturers.

SAMBITS linked digital TV services, delivered via DVB, with internet services to provide consumers with easier and personalised access to applications such as e-commerce, training and multimedia information. Multimedia services are accessible through a consumer terminal that is able to access both broadcast and internet services interactively. Use of the existing internet and DVB broadcast infrastructures and a new scheme for the management of audio-visual objects, MPEG4, makes this a cost-effective solution which should lead to early commercial take-up.

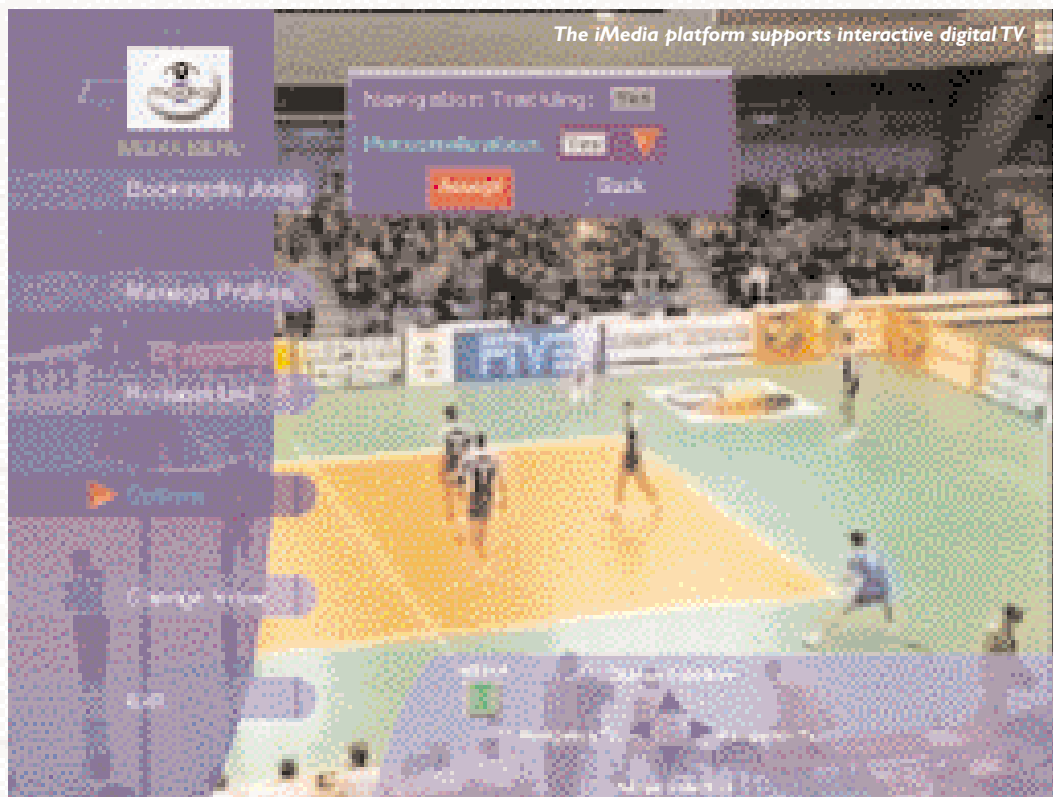
New business models for interactive digital television that incorporate the MPEG-2 and MPEG-4 standards were investigated by NexTV. In order to understand real iTV services, it has developed mock-ups of several interactive services. One of the most successful is a children's programme in which the children can determine the storyline and even include their own drawings in rendering the story.

Projects in Key Action II have addressed the use of the DTV platform for e-commerce. For instance, iMEDIA has developed an end-to-end solution that leverages the DTV platform to deliver customised advertising. The system enables the broadcasting of adverts

## A future for MHP

*The Multimedia Home Platform (MHP) is a technological success but has yet to realise its full market potential. Studies suggest that the greatest market opportunities lie with users who remain sceptical of PCs and/or the internet. The TPMHP project is exploring future prospects for the MHP. From a technical point of view, the resource model of MHP-compliant set-top boxes, or personal workstations, limits the design freedom in specific, yet undefined, ways. From a social perspective, the important factor is the consumer. The everyday consumer requires a different approach than, for instance, a typical PC-user. The project is addressing the implications both for the design spaces and the interface design giving special consideration to usability aspects.*





containing video and other interactive content. Viewers are able to control which adverts they receive based on their personal profile (e.g. income level, children, pets etc.). Broadcasters can use the system to analyse their ratings and set pricing policies, and advertisers can gain a better understanding of consumers' behaviour. Access is through a special TV set-top box which has storage facilities and a modem.

LIVE@WEB has developed an innovative solution for e-commerce over the DTV platform. Advanced image processing algorithms allow still and moving images to be extracted from DTV broadcasts and matched to images in a product database. Consumers can search

for products by clicking on brand names, product samples etc as they appear on screen. Links are then made to the relevant sites to finalise purchases online in the normal way.

New challenges and opportunities for networked audio-visual services continue to emerge, and further research in this area will be supported under FP6. Key topics will include: open networked consumer platforms based on standardised appliances and interfaces; trusted environments to support access to advanced content and services; and the representation, identification and description of rich media objects.

IST Action Lines:	IST-2001 II.3 IST-2002 IV.6.1	Management systems for suppliers and consumers Networked audio-visual systems and services
Project References:	IMEDIA LIVE@WEB MyTV NexTV SAMBITS TPMHP	IST-1999-11038 IST-1999-12277 IST-1999-11702 IST-1999-11288 IST-1999-12605 IST-2000-30114
Commission Contacts:	Costas Paleologos (KA II) Carlos Morais Pires (KA IV) Leon van Noorden (KA IV)	imedia.intranet.gr www.liveatweb.org www.extra.research.philips.com/euprojects/mytv/ www.extra.research.philips.com/euprojects/nexTV www.irt.de/sambits/
Web:	www.cordis.lu/ist/ka2 www.cordis.lu/ist/ka4/vision	constantin.paleologos@cec.eu.int carlos.morais-pires@cec.eu.int leo.van-noorden@cec.eu.int



# Patient care in the home

A revolution is underway in healthcare. Faced with an ageing population and rapid innovation in medical treatments, healthcare providers are looking for cheaper and more responsive ways of delivering services than through large, centralised institutions. After four centuries of delivering healthcare in hospitals, industrialised countries are now shifting towards treating patients at the point of need. Healthcare services have to be accessible to everyone, wherever and whenever they need them. In many cases this is best achieved through home-based healthcare, which can be both more comfortable and convenient for patients and less costly for healthcare providers.

*Much routine monitoring could soon be done remotely*



At a technological level, homecare requires new telematics environments for monitoring and exchanging information. Personal health systems are also an important feature. These include systems for personal health monitoring, and fixed or portable prevention systems (such as advanced sensors, transducers and microsystems). Other possibilities are personal medical advisors able to supervise prevention and treatment, and certified information systems to support health education and awareness.

The evolution of home-based and remote patient healthcare raises legal issues and is hindered by lack of legal clarity and certainty. Key concerns in clinical and commercial aspects of e-health applications are responsibility, data protection, the legality of online medical opinions and online pharmaceutical information and product supply. These matters are addressed in the Commission's recent Communication on Legal Issues in eHealth.

Within the IST Programme, homecare is addressed under RTD supporting continuity of care. The aim is to enable patients who are not confined to hospital to participate actively, in close collaboration with their healthcare provider, in their on-going care. More specifically, the cluster on home care is concerned with research on a new generation of biosensors, home receivers and transmitters, and middle-ware for handling medical information. Particular emphasis is given to the protection of privacy, to usability and reliability, and to respecting multilingual and multicultural approaches.



### Under observation...and at home

*The objective of U-R-SAFE is a personal healthcare system, allowing convalescent and elderly persons to live a near-normal life, yet guaranteeing the same security and continuous monitoring as in hospital. Portable sensors will be accommodated on the patient's body, for example ECG. A wireless personal area network based on emerging ultra-wideband technology will be used between devices on the patient and base station equipment in the home. Speech recognition is being investigated as a means of dialogue between the system and the patient, while satellite communication will ensure that the system can operate anywhere. A field trial will be organised.*

Among recent projects, H-CAD will define a set of exercises to be used as a standard for home rehabilitation in the fields of occupational therapy, physiotherapy and neurological rehabilitation (for stroke and multiple sclerosis patients, for example). The definition of these standards will provide input to the development of a low-cost, user-friendly activity desk that can be used at home. DIAFOOT targets a remote monitoring system for patients with diabetes mellitus, able to measure pressures, temperatures and humidity in the feet. It sends data to the hospital for further analysis and, if necessary, action. Procedures and techniques will be benchmarked, allowing a re-definition of the protocol for the treatment of diabetic feet.

TELECARE is aiming towards a new concept for the continuous monitoring of people subject to health risks. The system involves miniature, easily wearable "vital signs" monitoring sensors, which transfer real-

time data to supervisory systems, doctors and other medical experts regardless of their or the patient's locations. This system uses GPRS/WAP mobile internet technology and low-power, short-distance RF transmission technologies. The sensors are in the form of a simple finger-ring pulse oximeter, and a single pad and cap ECG monitor.

The use of micro- and nano-technologies presents a major opportunity for portable healthcare systems and intelligent medical implants. Patient care systems employing these technologies will be addressed under Sixth Framework research. These will provide health status monitoring and personalised support. They are likely to interlink with terrestrial and space-based telemedicine and e-health systems, to improve quality of care and access to care at the point of need.

### Support systems for long-term care

*Children with brain injuries need continuous long-term care. Their families face the assistance problems on their own, with minimal or no guarantee of continuity of support from the health and social care services. KARMA2 is defining an organisational model to efficiently manage and deliver home-care services to these patients. It will produce a system to co-ordinate and manage all the persons involved in care activities performed in the patients' home, through an easily accessible, networked infrastructure.*

IST Action Lines:	IST-2002 I.I.I	Intelligent systems for the monitoring of health status	
Project References:	DIAFOOT	IST-2001-33281	
	H-CAD	IST-2001-33235	<a href="http://www.signomotus.it/hcaden.htm">www.signomotus.it/hcaden.htm</a>
	KARMA2	IST-2001-32320	<a href="http://www.karma-project.net">www.karma-project.net</a>
	TELECARE	IST-2001-33299	<a href="http://www.uninova.pt/~telecare">www.uninova.pt/~telecare</a>
	U-R-SAFE	IST-2001-33352	
Commission Contacts:	Luciano Beolchi	<a href="mailto:luciano.beolchi@cec.eu.int">luciano.beolchi@cec.eu.int</a>	
Web:	<a href="http://www.cordis.lu/ist/ka1/health">www.cordis.lu/ist/ka1/health</a>		



# Lifelong learning for all

Learning today is no longer confined to institutions such as schools, colleges, universities, companies or training centres. New technologies and tools offer learners greater flexibility, easier access to information and the opportunity to match learning to their specific needs, circumstances and learning profile. The home is increasingly important as a learning environment. Disadvantaged groups such as the unemployed or people with special needs, and those in remote or isolated locations particularly stand to benefit. Learning is becoming significant in other contexts too, from prisons and community centres to care homes.

support for the assessment and recognition of acquired skills also need to be considered.

A key feature of lifelong learning technology and infrastructure is access. Learning tools and products should be available to people ubiquitously regardless of geographical location. They must be accessible at many different types of terminals, including mobile terminals. Such universality of access will help lower the technological barriers, and so put the opportunities to learn within everyone's reach. Although systems will use standardised learning objects, these must be based on metadata foundations that permit customisation to



*IST can be a gateway to life-changing learning experiences*

Technology has a key role to play in facilitating access to lifelong learning for all. The challenge is to develop solutions that offer high quality learning services to adults in a motivating and encouraging way. Such services should support the learner's continuous personal development in both their private and professional lives. This means, for instance, helping them to define their personal learning goals and to manage the learning process. Services should also enable the easy and widest possible remote access to innovative learning environments, including help in accessing content and direct support from a human tutor. Brokerage of relevant learning services, and

the needs of individuals whatever their existing knowledge or educational attainment. Personalisation also allows learning products to be tailored to the needs of socially, physically and technologically disadvantaged groups.

Within the IST Programme, new ICT-based approaches to lifelong learning are addressed within the Learning Citizen cluster. This initiative embraces new systems and services to support lifelong learning for individuals outside formal education and training settings. The research aims towards intelligent, user-friendly solutions with innovative integration of emerging



### Looking for the right course?

*METACAMPUS is setting up a brokerage and online marketplace which brings together those offering and those looking for flexible learning and personalised training. The heart of the system will be its sets of catalogues, obviously for aspiring users and for training products, but also for payment mechanisms and for guidelines and instructions for providers. The solution will record user preferences, histories and profiles. A learning consultant will help seekers find the right course, and a financial operations centre will handle payment. The specification phase will examine the business models that do (or should) apply in this industry.*

technologies. The 10 projects within the cluster address varied topics including specially disadvantaged groups, such as mothers at home, marginalised young people, immigrants and illiterates, youth categories and offenders in prison. They are supported by the clustering project LCCN.

ELEARNTN is a new thematic network on distance learning in higher education. Bringing together key European institutions in distance learning, the network will create a research map for knowledge services based on distance learning approaches. Specifically, it will define new collaboration schemas that allow the study and creation of a wide-ranging set of technologies from different perspectives, and the definition of the necessary pedagogic models for their effective application in teaching. The work is expected to provide a basis for a future international research group in this area. Its results will be disseminated by means of workshops, benchmarking studies, and an international conference.

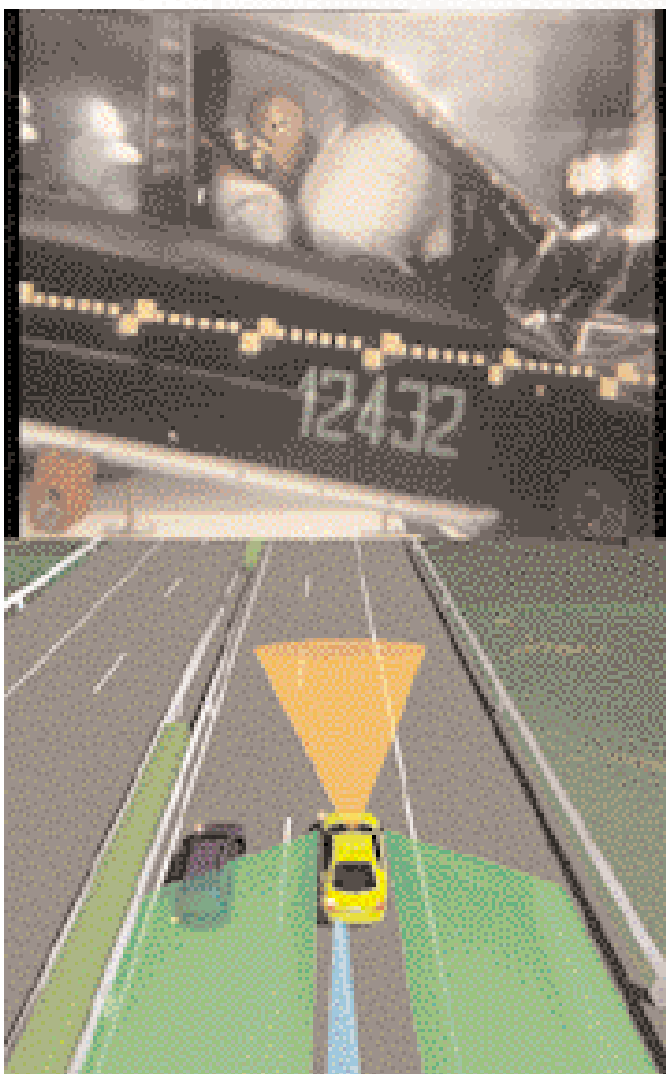
The strategy for the Sixth Framework Programme will stress new learning and knowledge paradigms for personalised ubiquitous learning. The lowering of technological barriers in the learning path and the unlocking of the potential of computers and networks should enable individuals, groups and organisations to learn anywhere, anytime, consistent with the concept of "ambient intelligence". Attention is expected to be devoted to the dynamic construction and exchange of knowledge in the intertwined learning process between individuals and organisations. The enabling technological platforms will feature computer-supported collaborative learning (CSCL), interoperable and widely accessible knowledge pools, personal support systems and e-commerce technologies to support e-business within education and training. Novel learning management systems are expected to emerge using broadband systems, including 3G mobile platforms, in order to improve the accessibility of services. Research will also continue to address individuals and organisations with special needs.

IST Action Lines:	IST-2001 III.2	Education and training	
Project References:	ELEARNTN	IST-2001-37440	
	LCCN	IST-2001-33539	<a href="http://www.learningcitizen.org">www.learningcitizen.org</a>
	METACAMPUS	IST-2000-26314	<a href="http://www.metacampus-project.com">www.metacampus-project.com</a>
Commission Contacts:	Jens P Christensen	<a href="mailto:jens.christensen@cec.eu.int">jens.christensen@cec.eu.int</a>	
Web:	<a href="http://www.cordis.lu/ist/ka3/education">www.cordis.lu/ist/ka3/education</a>		
	<a href="http://www.learningcitizen.org">www.learningcitizen.org</a>		
	<a href="http://www.proacte.com">www.proacte.com</a>		



# Driving for safety

Road accidents continue to carry a huge toll in Europe. Every year there are more than 1.6 million road accidents in the EU, involving over 1 million injuries and 40 000 deaths. Around 95% of road accidents involve some form of human error and in about three-quarters of cases the driver is solely to blame, for example through excessive speed or by misjudging road or weather conditions.



Active safety systems make driving safer (Photo: CHAMELEON project)

Increased road safety is a key EU policy objective. The 2001 Transport White Paper, *European Transport Policy for 2010*, set a target of reducing road fatalities by 50% by 2010. Safety is also a key feature of the eEurope 2002 Action Plan, which requires all new road vehicles sold in the EU to be equipped with active safety systems by the end of 2002. Achieving these goals requires extensive RTD efforts by the Community and industry, co-operation with all stakeholders and also regulatory and policy actions by the Commission and Member States.

eSafety is a joint industry–public sector initiative for improving road safety through the use of new ICT. The initiative aims to accelerate the development, deployment and use of intelligent integrated safety systems to increase road safety and reduce the number of accidents on Europe's roads. An eSafety Action Plan is being prepared and a series of working groups set up to look at key issues. In addition to further RTD, the Action Plan identifies the need for joint actions on deployment, regulation and standardisation of active safety systems.

Advanced driver assistance systems (ADAS) take into account not just the driver and the vehicle, but also the environment around the vehicle. They include applications such as adaptive cruise control, collision-avoidance, lane departure warning, and emergency braking. By receiving information from outside of the vehicle, such systems are able to assess the risk of an accident occurring and can either warn the driver, so that he can take appropriate action, or initiate the appropriate action automatically. The focus is on the pre-crash

## European markets for active safety

EU RTD projects in relation to active safety are coordinated by the cluster project ADASE II. With the participation of the European Council for Automotive R&D (EUCAR), the project is mobilising a wide range of industrial actors and other stakeholders so as to ensure early take-up of ADAS research within the European automotive market. Activities include surveys and roadmaps to monitor status and trends in ADAS technologies, expert workshops on technology and related socio-legal issues, and leading EU actions in relation to harmonisation and standards. Results are widely disseminated through newsletters, reports, workshops and web services.



phase when the accident can still be avoided. In the event that an accident becomes unavoidable, the systems could also use that same information to optimise the passive safety systems (such as airbags), and to initiate an emergency call.

The on-going IST projects mainly cover two areas, the development of integrated ADAS safety systems and the development of common platforms and technologies. The integrated safety area covers systems for driver status detection, collision warning and mitigation, autonomous driving and co-operative driving. The common platforms and technologies area covers research into legal and social aspects of market introduction of ADAS, HMI, digital maps for ADAS, and new generation sensorial systems.

realistic driving conditions. EDEL is investigating a vision enhancement system for night driving. Based on a novel illumination system and near-infrared sensors, the system will detect potential dangers and obstructions. Since drivers take little notice of simple images, image processing will be used to highlight obstacles, showing speed and trajectory.

Safety research under FP6 is likely to concentrate on integrated and global approaches, where the interaction between driver, vehicle and road environment are addressed together. A focus of the research will be on-board ADAS that help the driver but leave him or her in overall control. Research on co-operative systems, where the vehicle and the surrounding environment interact for improved road

### **Pedestrian and cyclist safety**

*Unprotected road users, i.e. pedestrians and cyclists, are especially vulnerable to accidents. SAVE-U is developing a new detection system to help. Vehicle-borne radar sensors operating at 24 GHz should detect them at up to 30 metres distance in urban areas. The system will employ closed-loop tracking and prediction algorithms for two purposes, firstly to trigger an effective warning interface and secondly to support active impact minimisation should a collision prove inevitable. Its performance will be evaluated in trials on two cars.*

A vehicle's tyres are safety-critical components that are in constant contact with road conditions. A new project, APOLLO is developing a multi-functional tyre-embedded sensor that can send tyre and road-condition information to vehicle control systems. The system, which will be powered without a battery and transmit its data by radio, will be tried on a test car in

safety, is also likely to be a priority. It is possible to envisage systems that will take over the control of the car in certain situations, whether for essential safety or for driver convenience reasons.

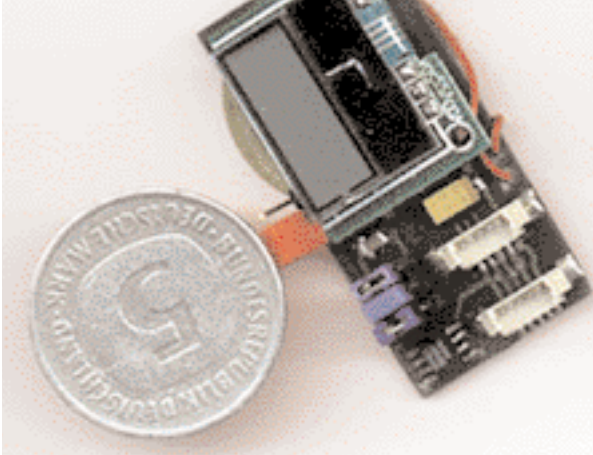
IST Action Lines:	IST-2001 I.5.1 IST-2002 I.5.1	Intelligent transport systems Systems for mobility: take-up and clustering activities	
Project References:	ADASE II APOLLO EDEL SAVE-U	IST-2000-28010 IST-2001-34372 IST-2001-34076 IST-2001-34040	<a href="http://www.adase2.net">www.adase2.net</a> <a href="http://www.vtt.fi/tuo/projects/apollo">www.vtt.fi/tuo/projects/apollo</a> <a href="http://www.edel-eu.org">www.edel-eu.org</a> <a href="http://www.save-u.org">www.save-u.org</a>
Commission Contacts:	Juhani Jaaskelainen	<a href="mailto:juhani.jaaskelainen@cec.eu.int">juhani.jaaskelainen@cec.eu.int</a>	
Web:	<a href="http://www.cordis.lu/ist/ka1/trans_tourism/home.html">www.cordis.lu/ist/ka1/trans_tourism/home.html</a> <a href="http://europa.eu.int/information_society/programmes/esafety/index_en.htm">http://europa.eu.int/information_society/programmes/esafety/index_en.htm</a>		



# Accessible artefacts

**P**ersonal computers are extremely powerful but they can hardly be called user-friendly. Despite major advances in software and hardware, they remain difficult to set up and use – a real deterrent to

*A prototype high-resolution temperature sensor developed under SMART-ITS*



an “Information Society for all”. Things are changing however. A new generation of smart objects (“artefacts”) is emerging that will make IST quicker and easier to use and less costly. Soon a whole host of everyday objects could have communication abilities, from pens and paper, to café tables, school desks, park benches and billboards. Even the clothes we wear will be “intelligent”. Together, these artefacts will form new people-friendly environments in which the computer-as-we-know-it has no role.

This is the vision being addressed under the Disappearing Computer initiative, part of the IST Programme’s Future and Emerging Technologies action. The initiative is looking at how information technology can be diffused into everyday objects and settings, and at how we could use interactions between these smart artefacts to enhance our everyday lives.

Following a call in 2000, 16 research projects were selected. The investigations are of a long-term nature, looking further than simply embedding computers into desks and tables. For instance, one group of projects focuses on how to make information artefacts, particularly ones that are open and connectable within a wider system. A second set of projects is looking at communication between artefacts, while the third grouping mainly addresses how people might interact in such environments.

The work partly builds on activities started under I3, FET’s initiative on intelligent information interfaces. Launched in 1996, I3 has evolved into a closely-knit community of more than 300 researchers across Europe. The outcomes of over 20 I3 projects were featured at the Orbit Comdex Europe 2001 exhibition and conference in Basel, Switzerland. A range of interactive human-centred prototype technologies were displayed within a specially designed i3 village.

## Smart little friends

*SMART-ITS is investigating context-sensitive devices - “Smart-Its” - with low-level perception and communication capabilities, that can be attached to everyday objects and thereby create “on the spot” networks. Collections of such devices could include scattered personal belongings, toys in the playroom, and objects in collaborative interactive experiences.*

*A range of Smart-Its is being developed, varying in processing power, sensory capabilities, and energy consumption, together with an open architecture to support collective context-awareness. Novel applications and user experiences enabled by Smart-Its technology are also being explored.*

*The first device prototypes are based on two different microcontroller platforms, Atmel and PIC, as a basis for Bluetooth integration and RFM communication respectively. The overall device architecture is modular so that different sensor boards can be connected to either microcontroller platform.*

IST Action Lines:	IST-2000 VI.2.1	The disappearing computer	
Project References:	SMART-ITS	IST-2000-25428	<a href="http://www.smart-its.org">www.smart-its.org</a>
Commission Contacts:	Jakub Wejchert	<a href="mailto:jakub.wejchert@cec.eu.int">jakub.wejchert@cec.eu.int</a>	
Web	<a href="http://www.cordis.lu/ist/fetdc.htm">www.cordis.lu/ist/fetdc.htm</a>	<a href="http://www.disappearing-computer.net">www.disappearing-computer.net</a>	<a href="http://www.i3net.org">www.i3net.org</a>



# Prevention is better than cure

**H**ealth is one of the most important aspects of our lives. One has only to look at the number of magazine features on health and well-being, the best-selling books on health and lifestyle, and the wealth of health information on the internet, to appreciate that people have a genuine interest in looking after their health. Still, three out of four Europeans die as a result of either cardiovascular diseases or cancer, however. Many of these deaths could be prevented if people paid greater attention to lifestyle-related factors such as smoking, nutrition, physical exercise, social relationships and their environment.

IST has a key part to play in encouraging citizens to adopt appropriate lifestyle changes. A new generation of innovative, secure and portable health systems will be able to provide people with personalised information and guidance at home, work, school or on the sports field. Health lifestyle-related products and services in areas such as nutrition and physical exercise, will facilitate information flows between individuals, medics and paramedics. Such systems should allow individuals, especially those predisposed to diseases, to respond to risk factors (such as high cholesterol level or high blood pressure) by actively supporting lifestyle changes.

Continuing activities begun under eEurope 2002, the eEurope 2005 programme includes a policy action regarding online health services. This proposes the provision of online health services to all EU citizens by the end of 2005. These are to include information for healthy living and illness prevention, electronic health records, teleconsultation and e-reimbursement. The Commission has also proposed a new Communication on "Quality Criteria for Health-related Websites".

ACTIVE-HEALTH is a platform common to several IST projects dealing with intelligent systems for healthy lifestyles to ensure that information delivered to citizens is supported by medical evidence e.g. by involving nutrition institutes. Another objective is to ensure interoperability of the products developed in the different projects.

Several projects participate to this platform. HEALTHY MARKET will build a web-based virtual marketplace to support citizens with nutritional advice and healthy eating practices. It will initially address specific categories of citizens at risk, like sports people and those with risk factors. H-LIFE will develop a certified health knowledge base for a proper monitoring and follow-up of healthy lifestyle. The environment offered by INFOGENE aims at a proper personalised genetic information and WRAPIN, led by the Health-On-Net (HON) Foundation, works on systems and code of conduct to provide reliable and trustworthy online medical information.

Security and confidentiality of medical information are essential. Projects such as PRIDEH address this need through solutions based on trusted third-party provision of privacy services.

Research in the Sixth Framework Programme is likely to affirm citizens' requirements for user-friendly technologies such as interactive television, portable or wearable personal monitoring and information systems. These may be expected to support the management of health determinants at individual, family, work and community levels.

## IST Action Lines:

### Project References:

### Commission Contacts:

### Web:

## IST-2002 I.I.I

ACTIVE-HEALTH  
H-LIFE  
HEALTHY MARKET  
INFOGENE  
PRIDEH  
WRAPIN

Ilias Iakovidis

[www.cordis.lu/ist/ka1/health](http://www.cordis.lu/ist/ka1/health)

## Intelligent systems for the monitoring of health status

IST-2001-37857

IST-2000-26353

IST-2001-33204

IST-2001-33402

IST-2001-32647

IST-2001-33260

[ilias.iakovidis@cec.eu.int](mailto:ilias.iakovidis@cec.eu.int)

[www.h-life.org](http://www.h-life.org)

[www.healthy-market.org](http://www.healthy-market.org)

[www.prideh.custodix.com](http://www.prideh.custodix.com)

[www.hon.ch](http://www.hon.ch)



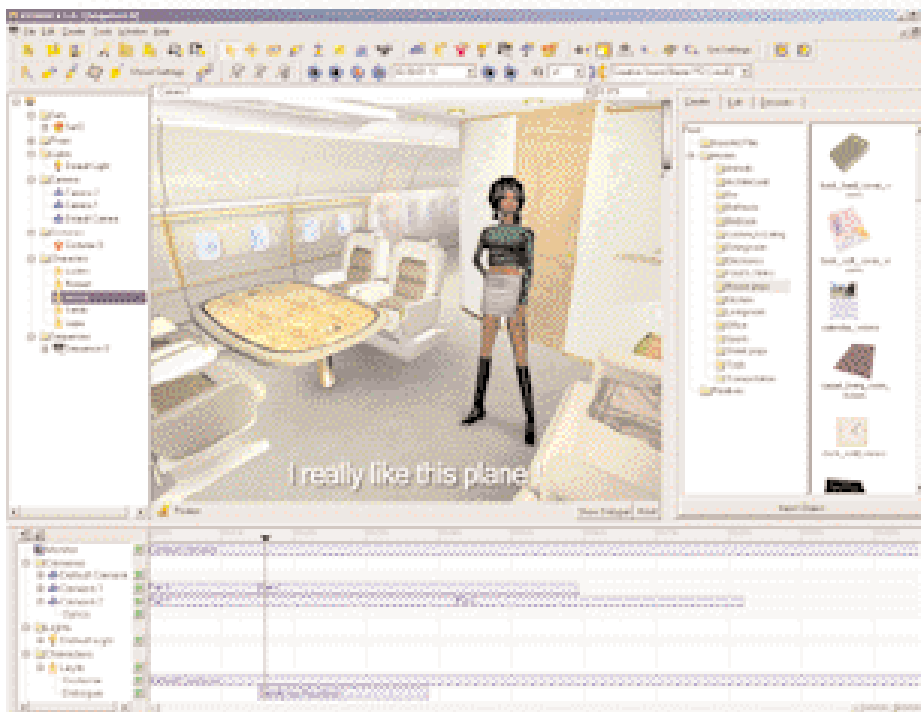
# Tools for digital expression

Having long been overlooked, the economic and social significance of the creative arts is now widely recognised. The creative industries have a key role in preserving Europe's linguistic and cultural diversity. As well as being vehicles for social and artistic expression, the creative arts are also major drivers for tourism and regional economic development. At a time when multimedia digital content is a major growth market, harnessing the creativity of artists, creative enterprises and cultural media centres is of prime importance for Europe.

IST can be a key part of the creative process. A growing array of applications and tools is now available for creative professionals, and increasingly many artists

choose to work primarily, or even exclusively, in digital media. Besides making the creative process more "efficient", tools provide vital support to artists in their business models and their routes to market. They can assist them in presenting ideas, prototypes and storyboards, and developing these with customers and partners before significant creative effort is invested in production. Nonetheless, the creative community is currently under-represented in the R&D process. A series of projects under the IST Programme aim to foster closer collaboration between the creative, academic and R&D communities.

In VISIONS researchers have developed an interactive 3D system for the virtual prototyping of drama



The 3D drama system developed under project VISIONS

## Multimedia programmes for museums, exhibitions and education

SCALEX is a digital authoring tool targeting the needs of museums, exhibitions and education. The system will be interactive and customisable, allowing a different show for different audiences depending on their age group, language or special interests.

The main modules are an editor, a storyliner, player and synchroniser. The editor allows information either to be input directly or imported from an existing database, such as a collection management system. Based on this data, the storyliner generates a collection of linear transversals (storylines) through the material in the exhibition or museum. This can later be refined and edited. The player allows material to be displayed via monitors, projectors or on the web.

SCALEX will be trialled in a static museum exhibition, a purely virtual museum exhibition, and a virtual exhibition for schools.



productions covering the whole lifecycle, from authoring, planning, production through to post-production. Aimed at those working in film, TV, animation, publicity, theatre and events, it is designed for use by people with modest design and computer skills after a brief learning curve. Authors conceive stories visually and make a dynamic virtual mock-up of their work. The 3D story can be shown to potential backers, or shared with production people to allow them to plan their input. Cost estimators, location finders and publicists can get a good feel for the material. The prototype software was shown at the MILIA 2002 exhibition in Cannes in February 2002.

VISTA is building on the VISIONS product by customising it for the special needs of advertising. In this market there is a requirement for rapid iteration of ideas with large numbers of players, while image creation effects with lighting, rendering and sounds are both sophisticated and subtle. Multiple versions of the same basic material are often demanded. VISTA will capture users' requirements and test the software on two real-world assignments.

### **A future for music technology**

*MUSICNETWORK is a thematic network on music interests across Europe. The project brings together composers, publishers, distributors and others within the European music industry to promote interactive multimedia. A roadmap on future research needs in this area is being defined as a basis for relevant activities under FP6. Special attention will be devoted to interactive coded music, focusing on issues such as standards, representation, distribution, protection and image conversion etc.*

An environment to support the construction of 3D virtual communities is targeted by WORLDS STUDIO. An integrated production system is being developed for use by teams involved in building compelling 3D virtual worlds for films, computer games or internet TV. 3D content production tools will offer high productivity, while the integrated working environment will allow people of different backgrounds, and different levels of computing and artistic skills, to work together. The system will contain extensions to support other activities in the production process, such as purchasing, engineering, training and education, and will be demonstrated in a real-world production unit.

Also concerned with 3D animation, V-MAN is developing a simple-to-use authoring system that will enable non-specialists to create and populate 3D virtual worlds. Drawing on state-of-the-art technologies from video games and industrial R&D, the system will allow realistic simulation of body and clothes, facial expressions, and real-time motion. Whereas current systems require a great deal of expert artwork and puppetry to simulate human motion in virtual reality, V-MAN has built-in functions enabling animated characters to walk, go up and down stairs, cross any kind of terrain, avoid obstacles or interact with the environment. A V-MAN character can follow high-level commands such as "Go there", or execute user-defined functions such as firing a gun.

Within the Sixth Framework Programme, research in creative technology is likely to stress capture and display technologies, high quality images, image treatment and conceptual navigation, and creating new forms of artistic experience.

IST Action Lines:	IST-2001 III.1.1 IST-2002 V.1.15	Publishing digital content CPA15:Technology platforms for cultural and arts creative expressions	
Project References:	SCALEX V-MAN VISION VISTA WORLDS STUDIO	IST-2001-35103 IST-2000-28094 IST-1999-11556 IST-2001-34482 IST-2000-28702	<a href="http://www.scalex.info">www.scalex.info</a> <a href="http://www.vr.c-s.fr/vman">www.vr.c-s.fr/vman</a> <a href="http://www.visions4d.com">www.visions4d.com</a> <a href="http://www.visions4d.com">www.visions4d.com</a> <a href="http://www.worlds-studio.com">www.worlds-studio.com</a>
Commission Contacts:	Pascal Jacques Bernard Smith	pascal.jacques@cec.eu.int bernard.smith@cec.eu.int	
Web:	<a href="http://www.cordis.lu/ist/ka3/iep">www.cordis.lu/ist/ka3/iep</a> <a href="http://www.cordis.lu/ist/ka3/digicult">www.cordis.lu/ist/ka3/digicult</a> <a href="http://www.elpub.org">www.elpub.org</a>		



# Empowering special needs

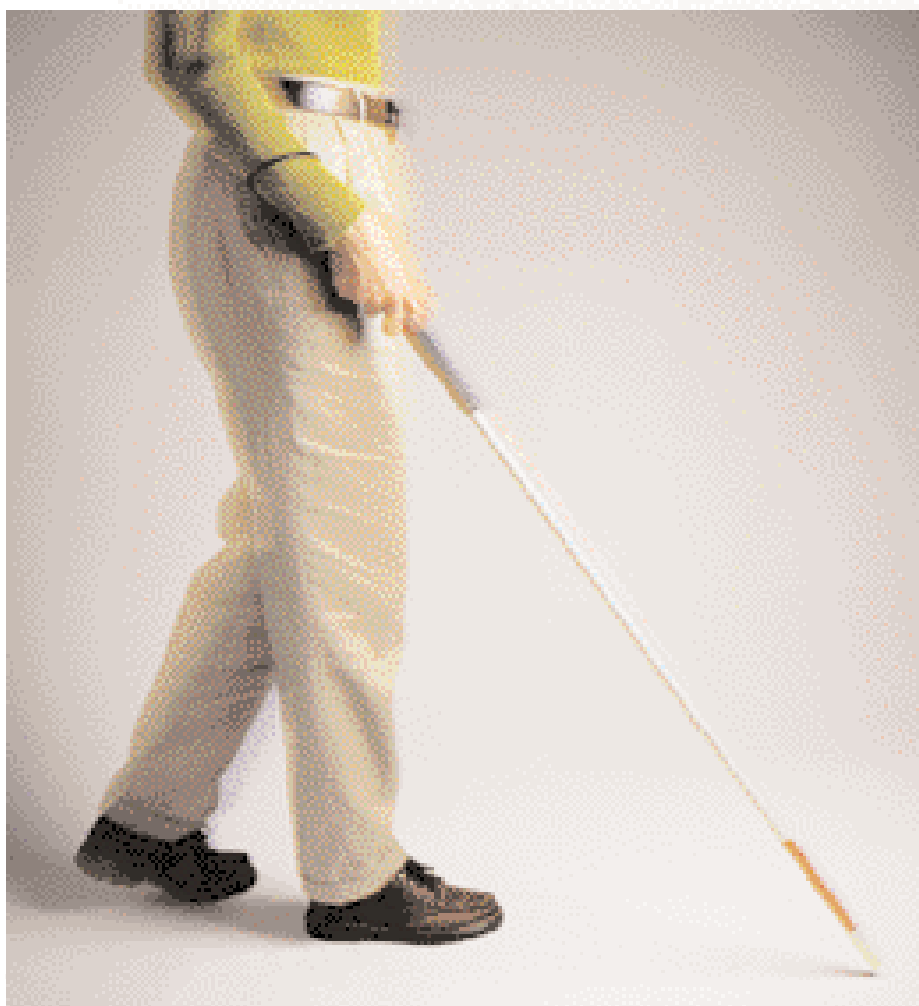
**A**s IST becomes pervasive throughout our everyday lives, users will be able to interact with systems and applications in ways that are easier and more natural than ever before. This prospect is particularly significant for individuals with special needs. It opens the way to systems that are more interactive and adaptable to the user's specific circumstances and that significantly improve the individual's quality of life.

While empowering technologies may bring many benefits, often their full potential can only be realised when they are integrated with other, barrier-free societal systems. For example, public information kiosks and public telephone terminals cannot be fully accessible until they allow users of hearing aids and Braille displays to connect their devices. An important aspect in the integration of technologies and systems is the development and adaptation of open source software products. Because the requirements for e-

a c c e s s i b i l i t y technologies are specialised and the markets relatively small and fragmented, the case for research in open source software is particularly strong.

Within the IST Programme, work is underway on a wide range of technologies that empower people with disabilities to live more independent lives. These include aspects such as advanced rehabilitation robotics, nano-miniaturisation and bio-chips, new lightweight and flexible materials for prosthetics, mobile power sources, wheelchair interface devices, hearing aids, sign language systems, visual enhancement systems, and Braille and other tactile/haptic communication

devices and systems. Other areas are vocabulary learning systems, technologies for independent living, systems compensating for impaired cognitive performance, speech technologies, optical recognition technologies, sensors, personal area networks, and advanced information and knowledge systems.



*IST can help overcome functional limitations*

In the area of empowering technology (technologies which help to compensate for functional limitation), a new generation of intelligent assistive systems and devices is emerging that are easily adaptable to the individual's needs. Such systems aim to support, enhance, augment or replace the individual's functional capabilities, including cognitive and sensory abilities.



In these areas of research, user-friendliness plays a key part. Projects typically capitalise on recent advances in non-invasive, intelligent and adaptive user interfaces and personal devices capable of self-adaptation. The development of mobile interfaces, technologies and systems is also covered, as well as long-term research on the improvement of impaired human functionality.

Flexible user interfaces should in general embody a design and engineering methodology supporting self-adapting interfaces. These must be user-aware, i.e. the interface automatically selects a user-adapted behaviour or interaction pattern appropriate to the particular user. They must also be context-aware, i.e. the interface automatically determines a context-adapted behaviour suited to the particular physical and technological environment.

Among recent projects, IPCA aims at an intelligent interaction mechanism that will enable people with severe motor and speech disabilities to control standard, and especially web-based, applications. The system will be based on a flexible combination of

existing non-invasive sensors and encoders able to discern and measure different physiological parameters. Accompanying these will be a set of software tools to allow the user to interact with existing computer applications. IPCA will develop a Smart Web Browser, running on top of existing web clients, that will facilitate the user interaction with different internet applications and services by tapping into their semantics and optimising the interaction to the user's preferred mode.

RTD on empowering technologies will be a key part of FP6 activities on e-inclusion. Work is likely to focus on technologies and systems for promoting personal autonomy, and for enabling disabled and elderly persons to live independently. It will also concentrate on improving the holistic relations between users, social modelling, and industry. A greater level of international and cross-boundary standardisation of technologies and systems would be a worthwhile target objective.

### Monitoring the progress of amputees

*MAPS is developing a system to monitor the progress and rehabilitation of amputees. Data from the stump will be collected and sent using telecommunication methods to rehab doctors for evaluation. The concept is called the Sensor Socket (SES) and aims to incorporate relevant sensors into sockets that are used as the interface between the stump and the prosthesis. The system includes communications equipment needed for sending and receiving data from the SES remotely. The SES approach is a vehicle to assist amputees to be integrated into society and to maximise the comfort and use of their prosthesis. It should also help to gather statistical medical information about amputees, leading to improved treatment.*

IST Action Lines:	IST-2002 I.2.1	Systems for independent living
Project References:	I-MATCH	IST-2001-37280
	IPCA	IST-2001-37370
	LAMBDA	IST-2001-37139
	MAPS	IST-2000-27519
Commission Contacts:	Francois Junique	francois.junique@cec.eu.int
Web:	www.cordis.lu/ist/ka1/special_needs/home.html	
		www.ossur.com/maps



# E-services on the move

**T**he advantages of mobile information services will be apparent in many daily life situations. With the synergy of cellular and broadcast networks, people will be able to use interactive broadband services in an affordable way while on the move, just as they can via the fixed network. Cars, trains, planes, airport lounges, street kiosks etc, will all permit access to new mobile applications and services, as of course will a new generation of personal devices, such as mobile phones and PDAs.

Mobile wireless technology continues to advance in leaps and bounds. The success of GSM is now well established, while WAP and SMS are making their mark. New technologies, 2.5G (GPRS) and 3G (UMTS), bring further opportunities, although the scope of the services and applications is still not fully recognised. For consumers to fully benefit from these exciting technologies, it is necessary to put in place the platforms, standards and business models to enable suppliers of new products and services to enter the market.

Building on its earlier Cross-Programme Action on "info-mobility", in late 2001 the IST Programme launched a new initiative on "2.5-3G Mobile Applications and Services" to further stimulate new service provision. This encouraged sector players (mobile operators, service providers, terminal makers, application developers and content generators) to work on a series of short-term developments. These will be trials of location-based, m-commerce and m-infotainment services, designed especially to address interoperability, billing and standards issues.

Several of the projects focus on entertainment. For instance, a common software basis for video applications is the goal of INMOVE. A flexible toolkit

is being developed that is compatible with 2.5-3G, Bluetooth and wireless LAN platforms, and makes use of IP version 6 addressing. Sport will be a fruitful source of mobile entertainment services and MELISA aims to enhance the value of the services offered. End-to-end authoring tools will allow the management of content in real-time, including added value data such as statistics, history and biography. Transaction and e-commerce services will add gaming, advertising and purchasing to the sports experience. TU AMO targets a common platform for m-entertainment accessible through a variety of devices (PDAs, mobile phones, laptops etc.). The project will establish two testbeds based on an information search application, and a multi-user, virtual community game application.

If people are going to pay for applications, we need to find the right profiles. MGAIN is a social and business study that will address demographic and cultural trends to find the right genre for mobile gaming and entertainment services. This will lead to an analysis of the value chain and the players in it. A Mobile Entertainment Interest Group is being formed to bring together participants in this new market.

In the transport arena, research is investigating the use of in-vehicle telematics as a platform for mobile information services. DELTA focused on enhancing standards for short-range vehicle communication (see box), and PISTA is demonstrating a pan-European service for electronic fee collection, focusing on interoperability, transparency and security. A common approach to in-vehicle telematics that supports service roaming is targeted by 3GT. The project will finalise and test specifications based on OSGI, an emerging open standard for in-vehicle information systems.

The evolution towards the mobile information society will be a key theme under the Sixth Framework

## Get it from the radio

*Radio has a large following, and there is a big opportunity for the medium to capture interest in advanced mobile entertainment and commerce services. XAUDIO is creating a system to enable listeners to a radio programme to directly access a website from a mobile terminal through encoded URLs in the audio signal. Application areas include interactive advertising ("listen then buy"), interactive music or news services, local or traffic information, and audience voting. The XAUDIO trial will bring together broadcasters, mobile operators and XAUDIO service providers. It will address issues of presentation, m-commerce, roaming and billing, and the linkage of applications and services to broadcast programming.*





DELTA's in-car travel information system

Programme. In particular, efforts will focus on the creation of virtual mobile environments (VMEs) – information spaces that integrate a wide range of physical and information objects. In such spaces, people and goods on the move are intelligent, location-aware and able to communicate with each other. In the

service area, the changes in system architecture and business chains resulting from the convergence of broadcast and network services will also be explored. Further work is likely to focus on content, with new approaches needed for digitisation (creation), integration and exchange between users.

### Services through the windscreen

Electronic fee collection (EFC) based on dedicated short-range communications (DSRC) is becoming the most widespread means of motorway tolling practised in Europe. IST's DELTA project aimed to integrate this DSRC link as basic equipment in all vehicles, as a basis for a range of travel and other mobile services. The project defined common specifications for the interface and developed prototypes for the DSRC link and in-vehicle electronics. Special emphasis was placed in ensuring the correct functioning of transponders operating behind metallic or heated windows. The prototypes were implemented in test cars and validated in connection with EFC and travel & traffic information services under operational conditions on a private motorway network. The interface developed by DELTA is currently being considered by CEN as the basis for a possible standard.

IST Action Lines:	IST-2001 I.5.3 IST-2002 V.1.14	Ambient intelligence application systems for mobile users and travel/tourism CPA14: Mobile applications and services
Project References:	3GT DELTA INMOVE MELISA mGAIN PISTA TU AMO XAUDIO	IST-2001-36080 IST-1999-12087 IST-2001-37422 IST-2001-34755 IST-2001-38846 IST-2000-28597 IST-2001-37895 IST-2001-36022  <a href="http://www.ertico.com/activiti/projects/delta/delta.htm">www.ertico.com/activiti/projects/delta/delta.htm</a>  <a href="http://www.mgain.org">www.mgain.org</a>  <a href="http://www.projectxaudio.com">www.projectxaudio.com</a>
Commission Contacts:	Juhani Jaaskelainen (KA I) Pascal Jacques (CPA14)	<a href="mailto:juhani.jaaskelainen@cec.eu.int">juhani.jaaskelainen@cec.eu.int</a> <a href="mailto:pascal.jacques@cec.eu.int">pascal.jacques@cec.eu.int</a>
Web:	<a href="http://www.cordis.lu/ist/3g_initiative">www.cordis.lu/ist/3g_initiative</a> <a href="http://www.cordis.lu/ist/ka3/iep/home.html">www.cordis.lu/ist/ka3/iep/home.html</a>	



# The networked home

**B**efore long householders could return home to find the oven preheated, the video set and the washing machine going thanks to home automation systems. The inclusion of microprocessors in home and office devices enables them to communicate with each other and, via the internet, to exchange information with the wider world. Everything from the PC, TV and VCR to lighting, central heating and air conditioning, dishwashers and washing machines, answering machines and security alarms will be capable of being remotely monitored and controlled.



*Future homes will be highly networked*

With home devices becoming increasingly “smart”, there is a need for open platforms and standards that enable equipment to be linked together within home networks. Traditional local area networks are too complex and expensive for this. Alternative solutions are needed that meet the specific requirements of the

home environment. The two main contenders are wired connections, including mains electricity, and wireless networks provided by radio and/or infrared technologies.

The future success of home networking will depend on the availability of easy-to-install home networks, together with a gateway that provides a secure demarcation between public and private domains. The challenge here is to develop open and general gateways with multiple interfaces to different access networks, home networks and protocols. In addition, the

availability of new bundled home services that take advantage of this infrastructure will be crucially important.

Within the IST Programme the integration of applications and services within the home is addressed under the Cross-Programme Action on Home Environments. This aims to extend home systems and platforms to better support the needs of users. Potential applications include independent living for the elderly and disabled, home

healthcare, e-work at home, entertainment, as well as multimedia and interactive home environments for learning, education and training.

The scope of RTD covers not only the home network but the complete chain of a “smart home”, starting

## Secure home services

*The introduction of IPv6 and mobile IP into wireless home networks is being addressed under FUTURE HOME. It aims to produce a communications platform capable of automatically configuring connections between different devices and terminals to provide ubiquitous access throughout the home. With a strong emphasis on usability, the system will interface with both high-speed media traffic (audio, video etc.) and low-speed control and automation flow (i.e. interconnections between various home appliances). Open and scalable “base stations” for home networks and generic device interfaces are being developed. Detailed usage scenarios are also being researched based on families’ real life living patterns.*



from the content or service provider to the core/access network and then entering the home via a residential gateway. As well as the interconnection and interoperability of household and consumer devices and networked appliances, work focuses on the convergence of broadcasting and interactive services within the home. Aspects covered include compatibility between home networking technologies, embedding of networked devices in everyday appliances, in-home content management, and the integration of home and public networks. Test beds demonstrating services in key application areas are also supported.

e-HERO is one of several projects dealing with the development, integration and/or testing of residential gateways and access networks. A point-to-point broadband radio access network is being developed for private and professional use within the extended home environment. The system will provide two-way communications at 10 and 100Mbps between the service provider and multi-dwelling residential buildings.

HomeTalk aims to create a truly intelligent, user-friendly residential environment connected to a broadband network. Advanced domestic appliances will be controlled via powerline by a multifunctional residential gateway/controller and will be capable of communicating with the residents via natural voice interface (recognition and synthesis). In @HOM a new concept for an IP-based broadband home network is being defined.

In the area of audiovisual systems and services, SHARE-IT! focuses on an end-to-end system for easy access to and transfer of personal content between local storage devices using home-to-home networks. While SPATION is concerned with the storage and transfer of data between different home devices such as PCs, set-top boxes, TVs and VCRs. INSPIRE uses spoken dialogue as an interface to home infotainment devices for use by the elderly, disabled and those not-technically inclined.

With solutions in this area reaching technological maturity, there is a need to raise their visibility among both suppliers and consumers. A new support action, SMARTER, aims to raise the profile and international impact of projects within IST's Home Environments cluster. An exhibition stand has been produced as a showcase for projects' results. This has been shown at several exhibitions, including Net-atHome, the leading annual European conference for home environments, EuroChina 2002, and Connections 2002 in the US.

For FP6 activities will aim towards extended home AV platforms for private and/or professional applications. Work will focus on home server portals, home AV portals, and interoperability between home networking technologies and their integration with global networks. The target is for low-cost and user-friendly home AV platforms that are reconfigurable to the users' requirements.

IST Action Lines: IST-2001 V.I.I  
Project References: @HOM  
e-HERO  
FUTURE HOME  
HOMETALK  
INSPIRE  
IST@HOME  
SHARE-IT!  
SMARTER  
SPATION

Commission Contacts: Carlos Morais Pires  
Web: [www.smarter-homes.org](http://www.smarter-homes.org)

CPAI: Home environments  
IST-2000-28186  
IST-2000-28279  
IST-2000-28133  
IST-2001-32562  
IST-2001-32746  
IST-2000-28406  
IST-2000-28703  
IST-2001-33103  
IST-2000-28304  
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# Lowering the barriers

**U**nder the Amsterdam Treaty, all European citizens have the right to participate fully and without discrimination in society. As the knowledge-based economy develops, the uptake of leading-edge technologies in all areas of life may present major challenges for many users and introduce new threats to sustained growth and social stability. In order to reach the goal of a knowledgeable and sustainable society for all, it is essential to make new technologies and systems accessible to all, and to apply technology to the task of genuinely empowering citizens to play a full role in society.

Today, access to technology and the services which technology can deliver is unequally distributed. Disabled and elderly persons, in particular, are at great risk of being digitally marginalised. Demographic trends show that by the year 2010, about 25% of the European population will be aged over 60, rising to 30% by 2020. Correspondingly, the proportion of persons with disabilities will rise from about 11% today (a conservative estimate) to around 18% by 2020. Potentially, increasing numbers of citizens may suffer discrimination as the digital age progresses.

Assistive technologies and sophisticated information technology can together improve the quality of life of older people with impairments. Similarly, technology can help people with disabilities to live more independent lives. This not only makes a difference to

the well-being of the elderly and disabled, but also improves their economic circumstances. Research in IST will play a crucial role in permitting access to education, employment and leisure activities and in enlarging the possibilities for social participation and inclusion.

The so-called “digital divide” between those who can and cannot access and use information technologies arises from a combination of factors. Firstly, new technologies may be unavailable to certain groups due to high cost or the relative geographical isolation of communities. Secondly, lack of educational and training opportunities may hinder the development of IT skills among specific groups. Language can also be a barrier. A further aspect of the digital divide is the lack of accessibility of the technologies themselves, especially with respect to the needs of people with physical, sensory or cognitive disabilities. Hardware, interfaces and software systems can present a complex challenge to the abilities of any first-time user, but for persons with disabilities the access barriers of mainstream ICT systems may be insurmountable.

*New technologies can enable access for all*





### **A friendly face for the hearing-impaired**

*Visible face movements are an effective means of enhancing speech intelligibility especially for persons with reduced hearing. SYNFACE is developing multilingual technology for a speech-derived synthetic face that gives essential visual clues to hearing-impaired users of telephone and other voice services. The development will be assisted by the rapid development of multi-modal speech technology and signal processing power, while existing multilingual speech databases will be used.*

Current work being undertaken by the IST Programme addresses a variety of principles, methods and tools which aim to make the use of technology barrier-free. Principal application areas are personal care, mobility and communication, improved access to a wide range of services, and greater participation in social and community activities, including extended employment and learning opportunities. Barrier-free technology subjects include: systems for e-business and e-work, security and privacy technologies, miniaturisation and nanotechnologies, mobile communication technologies, interface and terminal design, speech and language technologies, smart cards, virtual reality, home systems networks, environmental control systems, internet technologies, web accessibility and on-line interactive systems.

Today, the web is an essential medium for communication. Several IST projects focus on the widening of access to web technology, either for people with a disability or for those with specific needs such as cognitive or language impairment who may find the use of symbol systems useful. Improved telecommunications and mobile telephony is also an area of major importance in reducing much of the discrimination experienced by people who are deaf or hard-of-hearing. The convergence between telecommunications (including mobile), information technologies and more conventional electronic products such as radio and TV will continue to have a major impact on European society. This includes people with disabilities and the elderly.

### **Computer and web applications by touch**

*ITACTI is developing a peripheral with an interactive tactile interface to improve the access of visually impaired persons to modern computer and internet applications. The peripheral will display tactile diagrams and multi-line Braille, and will employ touch-sensitive feedback for the presentation of interactive documents. Advances in smart materials and their applications will be exploited to produce an array of multiple actuators. Software tools will be created to allow conversion of information to a form suitable for tactile display.*

IST Action Lines: IST-2002 I.2.1

Project References:

ITACTI  
SYNFACE  
TEDUB  
VICKIE  
VISUAL

Commission Contacts:

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Web:

[www.cordis.lu/ist/ka1/special\\_needs/home.html](http://www.cordis.lu/ist/ka1/special_needs/home.html)

Systems for independent living

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[www.itacti.com](http://www.itacti.com)

[www.tzi.de/bv/projects/tedub/](http://www.tzi.de/bv/projects/tedub/)

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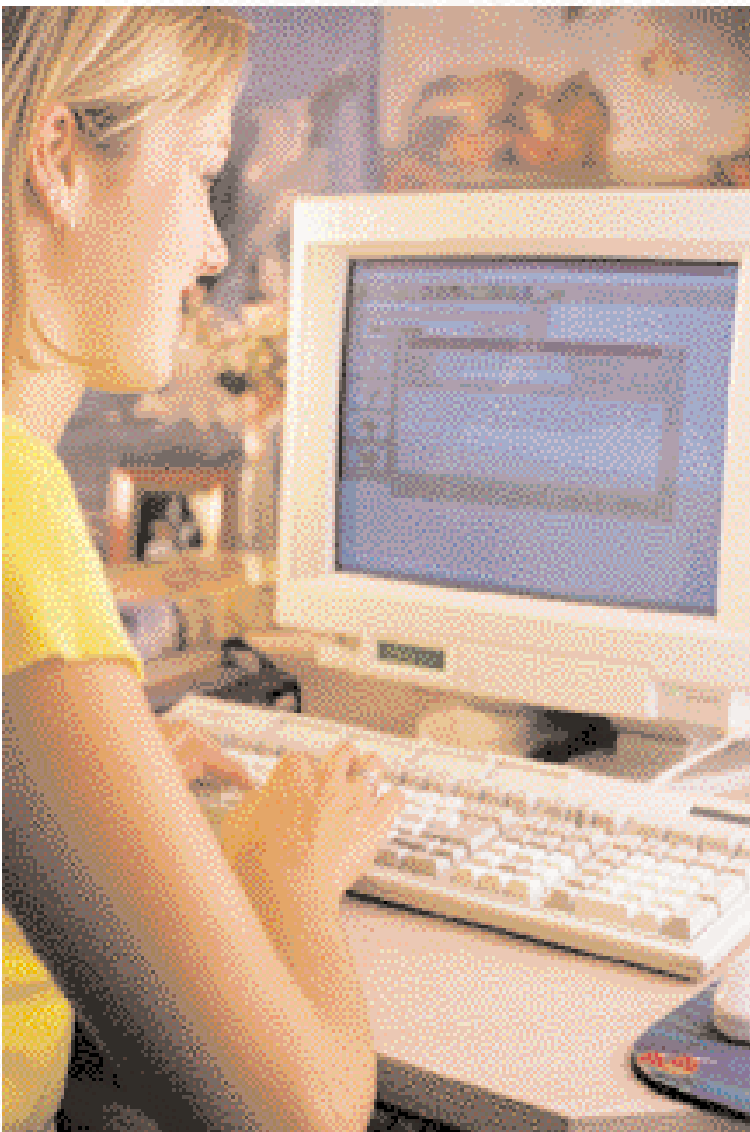
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# Tomorrow's learning experience

**T**he boundaries of learning are changing all the time. On the one hand technological developments, such as the internet, mobile communications and virtual environments, create possibilities to support learning in new ways. In addition, our definitions of learning are changing, as we gain new insights into how people learn and what they need to learn to adapt to changing economic and social conditions. Research into human learning and cognitive processes is required and how these can be enhanced through ICT.

The IST Programme's initiatives on E-Learning Futures and Pioneering Research aim towards a fundamental re-think on the future of education and training. They support experimental, longer-term research into next generation e-learning systems and services which enhance human learning and cognitive processes and anticipate future needs of individual learners. The research is expected to contribute to an overall advancement of the state of the art and should help build a multidisciplinary community of European researchers. A total of 10 projects are supported.



*Educational IST must reflect learners' needs*

## **Learning on the move**

*How can people access knowledge effectively using mobile devices? MOBILEARN aims to find out through a series of three trials. The first targets the world of work, giving managers online access to MBA course databases. Another targets the citizen in a cultural and tourist context, helping him or her obtain information about the artistic treasures of Florence. The third is aimed at the family, giving urgent access to medical knowledge and information.*

*To develop these trials, the project is seeking deeper understanding of the social processes involved in interacting with a learning system. This will allow it to develop pedagogical models and a mobile learning reference architecture. The expected outcomes include roadmaps and guidelines for best practice in tutoring in the mobile environment. A commercial realisation is likely to be based upon XML and a learning content management system, using reusable objects and content-aware tools. Inputs to various technical standards-making bodies are anticipated.*



ELENA is addressing “smart learning spaces”. These are personalised environments that allow an individual’s learning needs and progress to be matched with the learning services being offered. A “space” needs – dynamically – to capture the learning profile, and to use assessment tools and learning management systems that drive live delivery systems accessing repositories of available learning material. A trial “space” will test the applicability and feasibility of these ideas.

Infotainment applications already let people interact with virtual characters. VICTEC will develop 3D environments that employ emotional play and improvisational interaction in the social education of 8-12 year-olds. The project will develop characters that are warm and recognisable, rather than the cold mechanical beings sometimes found in virtual reality. WEBLABS is dealing with active learning through model construction in the domain of mathematics and physics, while FLIC, a CRAFT project, is developing a new system for language training.

It is vital to be able to evaluate the effectiveness of a learning technology, and E-TRACKING aims at a framework to do that. It will give test learners a pre- and a post-learning questionnaire, and monitor eye-movements and computer strokes during interaction with an e-learning application. Analysis of the data,

after filtering external effects, should lead to guidelines for usability and acceptability of electronic learning systems.

Under the Sixth Framework Programme, the approach to educational IST will continue to emphasise the use of ICT to enhance the learning experience. Key challenges here are the need to enable ubiquitous access, personalisation and the removal of learning from institutional contexts such as school, college and university. Open source approaches and interoperability will be key issues. Individual development and organisational development are interwoven aspects of the learning process and may be considered together in new projects. Key tools will be new devices, interfaces and broadband networks, including computing grids.

For the latter, LEGE-WG is a preparatory action investigating the application of grid computing for e-learning. It is creating a network of national centres of excellence in distributed, co-operative learning environments. Forging links between established actors, it will create pedagogical models and technical innovations. These are expected to lead to RTD projects, learning strategies, and an understanding of necessary legislative and regulatory developments.

### Learn to play the recorder

*IMUTUS plans to teach pupils to play the recorder (a simple type of flute). The application will capture audio from the pupil’s playing, and convert it into musical notation (a score), comparing it with the score the pupil is trying to play. Recordings of reference performances by professional trainers will show the pupil what is required, while a virtual reality application will take any musical score and show the correct fingering on the screen. The learning application will deliver via the web new exercise scores, which are devised to match the current level of attainment.*

IST Action Lines:	IST-2001 III.2.2 IST-2002 III.5.2 IST-2002 III.5.3	E-learning futures Preparing for future research activities Pioneering research
Project References:	E-TRACKING ELENA IMUTUS LEGE-WG MOBILEARN VICTEC WEBLABS	IST-2001-32323 IST-2001-37264 IST-2001-32270 IST-2001-38763 IST-2001-37187 IST-2001-33310 IST-2001-32200  www.e-tracking.unipv.it
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