

Digital Media

Digital means cross-media: Whether television, cinema or Internet - digital media has quickly become an essential part in the information society. Enormous synergy effects can be achieved using digital contents across different media. Integrated concepts give companies competitive advantages on the market.

The Future is Digital

In the house where Beethoven was born, visitors can enjoy his cultural legacy using the latest media technology. At the heart of this innovative discovery centre are the Digital Archive, the Internet presence, and the stage for musical visualisation – just one example of the trend towards digitalisation. More and more broadcasting corporations, film production companies, training and development companies, media archives, music producers, mobile phone providers and games manufacturers are making use of the possibilities of new media.



The Fraunhofer Information and Communication Technology Group (ICT) is developing innovative applications in this area. No matter which form the digital contents are represented in or which media they are conveyed with - interdisciplinary concepts

ensure cross-media utilization, thereby creating the greatest possible synergy effect. For there is a demand in almost every area of the media industry: production, distribution, presentation, archiving and admini-

nistration. The latest security technologies such as digital rights management also support this trend towards digitalisation.

ICT Trends: A New Way to Experience your Surroundings

Thanks to new media technologies, television can now be used interactively. Contents can be searched for »by feel«, and the widest variety of information services can be used in any location when you are on the move. Electronics, computers and communication merge into one perfectly coordinated unit. The games industry in particular will create new forms of application using innovative technologies. In the medium term, for example, edutainment robots are being developed, which thanks to the most advanced digital technology are useful both for entertainment and for learning applications. As it becomes increasingly difficult for many people to tell the difference between reality and the virtual world, appropriate protective mechanisms are also playing an increasingly important role.

Applications, Reference Projects and Research Trends in the Field of Digital Media

Managing Contents, Protecting Rights

The Fraunhofer ICT Group is developing techniques for storing the widest range of picture, sound, video and other contents with only a minimum memory requirement and causing no, or only slight, loss. To protect copyrights we offer copy protection and labelling techniques. ICT solutions for the management of media archives can evaluate and describe contents automatically, making it much easier to locate them later on. Our intuitive search procedures further simplify this search.

Interactive Programme

For the creation and transfer of interactive contents we offer production environments and standardised transfer techniques enabling even complex, non-linear contents to be developed and distributed quickly. Another challenge is the digital cinema chain - from the film location, through to editing, and finally to the cinema screen.

For advice on this and other research in the area of Digital Media, please contact our ICT Group office.



Leading the Way in the Third Dimension

The various display techniques developed within the ICT Group enable each content to be presented in the appropriate form. Applications range from the immersive 3D dome cinema, to mixed-reality applications where reality and the virtual world merge, through to presentation on mobile terminal units.

Examples from Applied Research

The Perfect Illusion

The HEyeWall, a modular presentation system with extremely high resolution, enables brilliant pictures to be made to create the perfect illusion in the third dimension. Products and highly complex processes and methods can be visualised quickly and easily in real time, right down to the finest detail (stereoscopically).

Search for Music by Humming the Tune

»Query by Humming« technology, based on MPEG-7, recognises and characterises audio data automatically: the user hums a melody into the microphone and the software supplies the appropriate title. This technology is used, for example, in a music search machine in CD stores.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

E-Business

What is the use of comprehensive data if it is never used? How can the different locations of a company be connected smoothly? New e-business technologies enable available knowledge to be utilised and channels of information to be linked more efficiently. Companies that invest in solutions such as these gain an important competitive edge - investments that pay off over the long term.

Profiting from Knowledge

Almost all areas of companies and organisations profit from electronic business transactions. The E-Business area of the Fraunhofer Information and Communication Technology Group (ICT) offers integrated solutions for the media and telecommunications sector, production and service companies, public administration, and financial service providers. This ranges from working partnerships between companies and telework, the integration of inter-firm business processes and networked activity, through to virtual organisations.



Automating online ordering, status requests and catalogue entries, and bringing together data from distributed, heterogeneous systems are other ways in which modern e-business can be applied.

The aim is to make working processes more efficient, and knowledge plays a key role here. If companies put their business intelligence to the right use, they will be assured of a competitive advantage.

ICT Trends: Knowledge is the Future

The flood of data is set to increase over the next few years. To be able to control and analyse business processes effectively, companies and organisations need infrastructures that are coordinated with each other along with new procedures for workflow control. By standardising information and services (keyword: »Semantic Web«), information can be interpreted automatically. Thanks to information and communication technologies, ubiquitous and flexible innovative terminal units can be used when you are on the move. The latest customer information systems, knowledge management and e-learning are other extremely important fields of innovation.

Applications, Reference Projects and Research Trends in the Field of E-Business

Exchanging Information

The ICT Group realizes solutions for networking business processes across company borders: open standards integrate new systems into existing structures, enabling processes to be carried out with a greater degree of automation. This results in shorter waiting times and fewer breaks in the chain of communication.

Combining Company Data

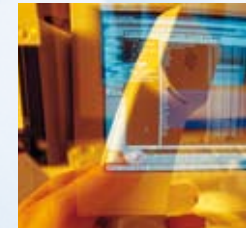
Different information systems are also being developed to manage company and customer data as well as companies' internal processes. By consistently implementing and interlinking these systems, business processes can be extensively analysed and optimised. Interpreting these analyses is

made easier by clearly laid out representations of complex information. Only in this way can concrete conclusions be drawn and courses of action be derived from the flood of information.

Providing Protection for Business

Systems for authentication and secure payments enable new forms of cooperation and open up further channels of distribution for companies. The development of new business models and forms of organisation is geared towards the market conditions prevailing at any given time.

For advice on this and other research in the area of E-Business, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Open Data Exchange

In future, it will be possible for business processes to be integrated and performed between different companies without any problem. »openXchange« technology creates the basis for companies to cooperate with each other quickly and in a way that can be easily structured.

Test Centre

The »Fraunhofer Electronic Business Innovation Centre« looks at every aspect of electronic business from different perspectives. Using examples of application scenarios, e-business solutions are presented in a concrete way and the underlying technologies of software development, networking and in particular, security technology are illustrated.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

E-Government

Service before administration: Departments online, digital consultation, information ready to hand, on call 24 hours a day - administration and citizens, companies and other organisations are now entering a new age of cooperation thanks to information and communication technology. The result of this is greater transparency, shorter processing times, higher quality, and less expense.

The Modern State

What does it cost to change the law?
How can the people of a town or region become involved quickly and at little cost in decision-making processes that deal with urgent questions?

In what way can people with an impairment also make use of the services of the state through the Internet without any difficulty? The answers lie in the area of e-government, where the objective is to realise trend-setting, secure solutions and optimised processes for authorities and administrations using modern information and communication technology.

The Fraunhofer Information and Communication Technology Group (ICT) develops innovative solutions for the modern state in its business area of E-Government, focusing on the implementation of economical ideas aimed at increasing productivity.



After all, the application of modern systems and solutions pays off for government and administration as well as for every citizen.

ICT Trends: The Service State

To meet citizens' expectations in future with regard to the modern state, companies and service providers are making use of innovative information and communication technologies and are planning safe, reliable, standardised and mobile products. Portals for public administration, fast and secure business and administration processes, more service and quality, optimised organisations, fewer costs and greater transparency and efficiency are the added values that can be achieved with innovative e-government.

Applications, Reference Projects and Research Trends in the Field of E-Government

Networking Authorities

Together with the areas of politics, administration and business, the ICT Group is developing technologies with which information can be exchanged between the systems of the widest range of organisations and authorities without any complication or loss. This smooth flow of information is based on open standards.

Getting Citizens Involved

Our barrier-free information portals and discourse systems enable citizens to contact authorities and administrations directly. Not only does this speed up the necessary processes – it also makes them transparent and comprehensible. In order for us to

work through administration processes together, we integrate the widest variety of communication and cooperation functions. Document and content management systems ensure that the right information is also available at the right time.

Guaranteeing Trust

Security and authenticity have absolute top priority in the sensitive area of e-government, and our developments therefore meet the highest statutory requirements.

For advice on this and other research in the area of E-Government, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

The State as Partner

New concepts for public-private partnership demonstrate how the provision of services and information of public institutions can be implemented and run. Citizens should actively use the range of services offered, while the authorities for their part generate the necessary information services readily and smoothly.

Esslingen Construction Platform

The web-based system comprises Internet, extranet and intranet. The town administration's extranet contains the »Virtual Building Authority«, where, for example, cadastral maps, plans and other documents relevant to the respective planning project are stored in digital form. In a protected area of the Internet platform, architects and planning engineers use a virtual project room to work on applications for building permission and approvals.

Combined Expertise

The expertise of eight Fraunhofer institutes is making a decisive contribution in Europe towards the development of workable e-government structures. The institutes in this market alliance can each refer back to the knowledge gained over many years in their different technological and organisational areas of specialisation. The know-how from research and development is combined in the Fraunhofer E-Government Centre.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Communication Systems and Interdisciplinary Applications

No progress without communication: New technologies have now made information and mobile services available everywhere. Modern information and communication technology thus puts people at centre stage. New business models are opening up for the telecommunications industry as they are for many other areas – for example in aviation and space travel, the automotive industry, entertainment electronics and medical technology.

Always on Stand-by

»When I come home, I'd like to watch the news and then check my e-mail!« This information is sent from the mobile terminal unit, for example a PDA, via networked communication structures to the domestic computer system. The mobile assistant carries out its user's wishes down to the smallest detail. Scenarios like this are no longer just to be found in the world of science fiction. To manage this ever more complex and diverse world we need new networked structures.



In their business area of »Communication Systems and Interdisciplinary Applications«, the institutes of the Fraunhofer Information and Communication Technology Group (ICT) combine all their know-how to develop new mobile and personalised multimedia applications.

A key requirement for this is solid, perfectly coordinated chains of communication, turning users' terminal units into multimedia and interactive units.

ICT Trends: Computers in the Collar

Users are increasingly losing sight of technology yet at the same time it is becoming increasingly ubiquitous. The possibilities for this already exist, making the fiction of communication on board the Starship Enterprise become a reality. Interfaces to the widest range of media elevate communication between man and machine to a new level. An outstanding role here is played by those software solutions that take over the task of interpreting information and filtering it for users (»Semantic Web«). Terminal units such as PDAs, handheld computers and cellular phones will be given new multimedia functions to do this.

Applications, Reference Projects and Research Trends in the Field of Communication Systems and Interdisciplinary Applications

Border-free Communication

The ICT Group offers solutions for communication beyond the borders of individual infrastructures. The advantage of our systems is that the user does not in any way notice that he is communicating across different technologies. He need not think about this whatsoever because the combination that is best for him is chosen automatically.

Surroundings are Communicating

The ability of an extremely wide range of everyday objects to communicate with each other enables devices to organise themselves without the need for human intervention. In addition, these objects can be controlled from anywhere. In the Intelligent House, for example, numerous functions can be controlled through the Internet. We offer communication systems that enable this giant potential of functions and services to be used.

Interdisciplinary ICT Technology

ICT overcome the widest range of challenges in many other sciences and specialist fields. As a group of ICT institutes within the Fraunhofer society, we can offer solutions to the problems faced in all subject areas by working out these solutions together with the relevant experts.

For advice on this and other research in the area of Communication Systems and Interdisciplinary Applications, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Automatically New

The testing and development environment »3G beyond« facilitates mobile and personalised services that extend across any terminal units and different mobile networks. The user can access various services with any network technology following the third generation of the mobile phone infrastructure. A wide variety of media contents can, for example, be adapted automatically to the requirements of each user.

System Test

Many trial runs are usually required for systems, communication networks and software to function properly. A platform based on TTCN-3 was developed to carry out this task easily and conveniently, above all in distributed systems and networks. The concept standardises the testing procedures and integrates the widest variety of technologies.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Culture and Entertainment

Multimedia creates understanding: Universities and museums, entertainment parks and the media industry, schools and further educational institutions, authorities and administrations – all these use multimedia to present information and entertainment. Modern information and communication technologies form the basis for new, innovative products and services.

New Opportunities for Education

A school trip to see the largest dinosaur skeleton in the world need not remain an unfulfilled dream for children, even in times of short funds and busy timetables. Modern technologies bring the dinosaur into the middle of the classroom, perhaps even bringing it to virtual life. There is therefore a great market potential for applications that provide learning contents in the field of »edutainment«.



The Fraunhofer Information and Communication Technology Group (ICT) combines innovative technologies and visionary ideas for marketable applications in its »Culture and Entertainment« business area. It allows a wider public to be better provided with complex knowledge, possibly from different cultures, through digitalisation and documentation with other multimedia

contents such as pictures, texts and videos than has usually been the case until now. Even the most difficult contents can be provided successfully through interactive, fun concepts.

ICT Trends: The Edutainment Offensive

It will not be long before money can be earned with multimedia contents, as the value of this information increases with just about any new product, any new innovative form of representation for learning contents, and any further advance in the possibilities of mobile communication. The industrial heavyweights especially have recognised this trend and are investing in the technologies of the future. In the end, museums and other cultural institutions will also be backing such Information and communication technologies as they become much cheaper. In our view, robots will also be playing an important role in this in the near future. Experts reckon that by the year 2010 every Japanese household will have on average two edutainment robots. Overall, Information and communication technologies are increasingly becoming a driving force for intelligent edutainment.

Applications, Reference Projects and Research Trends in the Field of Culture and Entertainment

Museums - Virtual yet Accessible

The ICT Group offers solutions for digitalizing cultural objects and then making them vivid and accessible by means of innovative presentations. We can bring real and virtual objects into contact with each other, so giving completely new insights into history.

My Friend and Helper

Our independently acting robots can explore places that are inaccessible or too dangerous for people to go. We are also working on modular entertainment robots that can be adapted flexibly and freely programmed at little expense to tackle a wide variety of different tasks.

Learning Easily and Playfully

Our varied learning environments use playful concepts in order to encourage people to learn, with knowledge and cultural contents provided in a far more effective way.

Designing Technology in a Usable Way

We assess the usability of devices and software for different user groups. For example, as new systems are developed it is possible to ensure that they can be used by the elderly and the handicapped.

High-tech Sport

One of the many applications in the area of leisure is, for example, the positioning system on the football pitch, where someone watching the World Cup on television is provided with information on the height of the ball or a player's sprinting speed. For joggers, there is a running speedometer that uses radar technology to measure their sporting performance with maximum precision.

For advice on this and other research in the area of Culture and Entertainment, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Learning through Touching

The future belongs to the combination of informatics, mechatronics and robotics. Various projects are organised to promote this interrelationship and bring it home to a wider public. These include the »Robo-Cup German Open« or »Roberta«, where young women in particular are given the opportunity to get a better feel for robotics.

Modern Nomads

In a constantly changing environment, people need diverse yet simple orientation aids. Supported by information and services, they can also cope competently with unforeseen situations. With »Situation Awareness in Motion«, a nomadic information system is being developed to provide the mobile visitor to a complex environment with information that is both personalised and adapted to a specific situation.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Medicine and Life Sciences

Health means quality of life: politics, patients, doctors, hospitals, health insurance companies, medical and pharmaceutical companies – all those involved must lend a hand if this quality of life is also to remain affordable in the future. What is needed are integrated concepts, new products and services, modern technologies and successful investments.

Health is Worthwhile

Modern technologies are making this possible: from 2006, 80 million people will receive their electronic health card on which all relevant patient data is stored; 500,000 health professionals are to receive an identity card so that they can access important information as required. The electronic patient file also increases the quality of medical care, makes important information available where it is needed, and increases transparency for both doctor and patient.



The Fraunhofer Information and Communication Technology Group (ICT) combines the expertise of all its 17 member institutes in its business area of Medicine and Life Sciences in order to optimise the procedures between patient, doctor, hospital, pharmacy, care services, health insurance companies, the public sector - in short between all those involved in healthcare.

After all, modern innovative forms of treatment and diagnostic methods, as well as the administration of medical information, are some of the most important areas where information and communication technology can be applied.

ICT Trends: Leading the Market in Medicine

In the future, it will become increasingly important to put health employees, financial resources and technical possibilities to the best use. This is the only way in which maximum output can be achieved, above all with regard to quality. By making use of advanced Information and communication technologies, modern companies are increasing efficiency and productivity in healthcare. Of particular importance are products and services that secure quality of life for all, especially the older generation. The technology is only accepted when the equipment becomes easy and intuitive to use. In the area of organisation, modern systems allow integrative cooperation between the most diverse areas of healthcare without giving up the right to transparency and checks (data protection) as well as safety.

Applications, Reference Projects and Research Trends in the Field of

Medicine and Life Sciences

At Home under Medical Supervision

One of the areas the Fraunhofer ICT Group is focusing on is the development of technologies for easy-to-use diagnostic and reporting systems which can be worn on the body like a piece of clothing. They know, so to speak, the medical history of their owner, continually analysing the information on the person's state of health so that he or his doctor can be given a radio warning early on. Medical checks can thus be carried out at any place and at any time, perhaps also in combination with intelligent prostheses or auxiliary robots.

Operations that can be Planned

Other systems currently being developed by the ICT Group allow operations on trial, so to speak: the surgeon can plan the operation using detailed visualisations so that the risk to the patient is kept to a minimum. In the same way, the technical equipment and facilities in the operating theatre can be tested or practiced on during medical training as a three-dimensional visualisation.

Simulating New Medicines

Particularly promising is the search for new methods of treatment by simulating biological processes in cells and organs. Not only does this allow new active substances to be discovered more quickly and at less expense, but also the effect of possible medicines on the body can already be predicted before a single laboratory experiment has been performed.

Organisation, Safety, Acceptance

Information and communication technologies enable processes in healthcare to be organised more efficiently, for example with the aid of the electronic patient file. With all our developments, reliability and safety, legal aspects and the protection of the individual's private space are of paramount importance. Only in this way are innovative ICT actually also accepted in the medical field.

For advice on this and other research in the area of Medicine and Life Sciences, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Measuring Breast Cancer on the Skin

By measuring skin temperature, experts are able to diagnose breast cancer. With the aid of so-called fuzzy logic, an ingenious system formalises available expert knowledge to interpret temperature measurements. The system becomes a quasi-»expert« in thermography.

Mobile Patients

A cordless sensor armband for measuring the pulse wave curve, heart frequency and oxygen saturation in the blood can be worn comfortably on the wrist. It is part of a multiparameter network for mobile observation of vital values. The network is used, for example, by clinics for disease management programmes and sleep monitoring, by home-care facilities and manufacturers of medical equipment, as well as by sportspeople who wish to monitor their readings during training.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Production

Globalisation means productivity: The pressure of competition and cost on companies means that products have to be developed more quickly and more efficiently. Time to market is crucial. That is why innovative companies use new technologies to boost productivity in their product development, in production and in logistics.

Time to Market

When products were developed in the past, the design had to be repeatedly adapted to the results of the simulation. By contrast, more recent methods do the exact opposite: with the aid of Simulated Reality, important parameters can be taken into account in advance. This shortens the development processes while at the same time increasing product quality.



Technologies developed by the Fraunhofer Information and Communication Technology Group (ICT) optimise product development and process control in areas such as the chemical and textile industries, robot manufacturers and suppliers, planning offices and consultancies. Modern systems cross-link all existing data and information on the function and quality of the product as well as on costs, time and other resources.

Additional room for manoeuvre is opening up for the producing sector. Designers, technicians, engineers and supervisors can work jointly and interactively on a project from different locations with the aid of ICT.

ICT Trends: Quantum Leap in Manufacture

The individual areas of an enterprise will in future grow more closely together: process engineering will merge with machinery design, quality assurance with load scheduling and choice of location. Such integration processes are realised using Information and communication technologies. So-called hybrid simulation models, for example, can represent production processes in their entirety. This enables not only the flow of information, energy and materials to be included, but also the interacting technical aspects of production processes. One of the most important trends in industrial production also includes virtual platforms across which planning and development tasks extending between companies and locations can be completed.

Applications, Reference Projects and Research Trends in the Field of Production

Design on the Digital Drawing Board

ICT Group solutions for virtual product development enable products to be represented realistically together with all their functions and properties, long before the first prototype has been built. This allows virtual models to be worked on just as intuitively as real objects.

Cooperation in Spite of Distance

For experts who jointly develop products from different locations, the ICT Group offers technologies enabling them to work together almost as if they were sitting in the same room. Such solutions for cooperation also exist for larger teams or teams working at different times from one another.

The Simulated Factory

In order for the efficiency of production plants to be predicted and appraised accurately, we simulate not only the actual production process but also all the important indirectly connected factors, such as the information flow to and from suppliers, the delivery of materials, financial transactions and expected maintenance times.

For advice on this and other research in the area of Production, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Quick Threads

During the production and processing of chemical fibres, the individual fibres are subjected to forces that result in quite definite fibre movements. By simulating these thread dynamics, a new instrument comes into existence for accelerating process development, process layout and their optimisation, or for making them at all possible.

Closely Meshed

Models and methods of mathematical optimisation have been developed for strategically designing supply chains to support decision-making on the procurement of materials, production, choice of location and the distribution of goods across the whole logistics chain.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Security

Security creates room for manoeuvre: Urgent questions concerning security present a risk not only to the protection of private space and the trustworthiness of companies, but also to economic growth. Only if the most up-to-date protection mechanisms are put in place do innovative business models such as e-business have a chance to establish themselves as well.

Security Pays Off

The iris of each human eye is unique and unmistakable. It is therefore particularly suitable for identifying individuals beyond any doubt. Security-intensive business enterprises such as banks and airports are putting such biometric techniques to increasing use. Security solutions are however also catching on in the private field. More and more people, for example, are using mobile communication and are benefiting from new media for shopping and exchanging important data. Secure electronic signatures are in demand among providers in the area of mobile and telecommunications, in the health industry as well as commerce.



Because of this exceptionally large demand for security technologies, the Fraunhofer Information and Communication Technology Group (ICT) has greatly expanded its business area of Security over recent years. Whether sensor-aided monitoring systems,

reporting or access-control systems, solutions for protection against catastrophes, security standards in the producing sector or concepts for integrated security and risk management, with the group's know-how almost any challenge to the security of technologies can be met.

ICT Trends: Private Space Remains Inviolable

Regrettably, questions of security are still only ever integrated as an afterthought in many applications, although forward-looking companies, associations and administrations are to an increasing extent making IT security a fixed component of their design concepts. At the same time, integrated approaches are combining both technical and organisational measures. Thanks to innovative information and communication technologies, the difficult balance can be kept between maintaining the highest possible security standards and protecting each individual's private space.

Applications, Reference Projects and Research Trends in the Field of Security

Security Concepts as a Unified Whole

The ICT Group is developing integrated security solutions that are not only restricted to information technology. We provide biometric and other access-control systems for the security of companies and authorities, along with error-tolerant detection and reporting technology.

Secure IT Systems

In order to provide sustained protection for the backbone of companies – the IT infrastructure – we offer a wide range of solutions, from standard technologies to the protection of individual local systems and networks, through to complete security architectures. Such concepts also include mobile field-service staff. So that companies can make full use of the advantages of the Internet without simultaneously being subjected to the considerable risks of this global medium, we offer solutions for all-round security against malicious attacks from the web.

Information with Origins

To safeguard the accuracy and source of information, we offer technologies that use cryptographic methods to prevent the content of a document from being falsified and so that it can only be read by the correct recipient.

Catastrophe Management

ICT can help to forecast and prevent catastrophes, or at least limit the damage. For example, by simulating and comparing different organisational models, action forces can be better prepared for a catastrophe.

For advice on this and other research in the area of Security, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Mobile Signatures

The law that came into effect in January 2004 to modernise statutory health insurance allows for every doctor to be able to prescribe medication and treatment electronically, i.e. without paper, by 2006. The Trusted Pocket Signer (TPS) was developed in order to prevent abuse and to allow usual working procedures to continue unimpeded. Signing documents with this pocket computer is both secure and surprisingly easy.

More Security on the Internet

On the basis of new security infrastructures, companies, citizens and administrations can make use of services over the Internet to help create and check confidential documents, enabling digital signatures and encryption techniques to be used easily by a wider mass.

A Centre for Security

Many years' experience and intensive cooperation with companies and the public sector at both national and international level are trademarks of the Fraunhofer E-Security Centre. Several institutes of the ICT Group are combining their expertise to create integrated solutions to large and interdisciplinary tasks. Clients receive advice, service and development, as well as an introduction into technologies, policies and processes relevant to security, from one source.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Software

Software brings solutions: Modern software is the basis for resources being put to full use, for company processes to be represented in their entirety and for the most complex of challenges to be mastered. New technologies ensure the marketability of large, medium and small sized companies alike, and facilitate modern public administration.

Preprogrammed Changes

Millions of computers worldwide are all working together on one and the same solution – something that may well sound quite utopian but is already technically feasible: with »Grid Computing« a new quality of Internet can be used. Resources such as computers, software, data storage and measuring devices are combined so that complex tasks can be worked on. Overall, the demand both for industry-specific software and for software that extends across different industries remains uninterrupted. More and more value is being put on reliability, efficiency and reusability in the development and integration of new solutions.



In its »Software« business area, the Fraunhofer Information and Communication Technology Group (ICT) realises complete information technology systems by

integrating software and hardware. Software systems that are both critical to security and error-tolerant, along with special systems that work closely with hardware, are right at the top of the list of priorities. The ICT Group's new developments are

designed to be holistic in their approach while also meeting the highest standards, such as those of real-time capability.

ICT Trends: Integration through Software

Many software developers use state-of-the-art technologies to adapt standard components to the specific requirements of companies and organisations. At the same time, software is taking on an increasingly significant role in the development of new products and services. Many companies in future will transfer development work to other locations. As the world becomes ever more complex, the use of distributed resources, for example through grid computing or efficient data mining to distributed databases, is one of the most important areas of development for information and communication technology.

Applications, Reference Projects and Research Trends in the Field of Software

It Won't Work without Software

As hardware cannot function without software, the ICT Group provides possibilities for engineers to develop appropriate software systems to meet the high requirements of reliability and correctness in daily use.

Developing Systems with a System

For modern team-based software development we offer a range of tools and process models to aid cooperation and so ensure that the software is consistent, correct and meets expectations.

Systems that don't Crash

The ICT Group offers the latest methods and concepts for the development of correct and reliable software. The correct analysis of both system requirements and component technology ensures that an overview is maintained at every stage of development so that the whole process can be accurately planned.

For advice on this and other research in the area of Software, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

The System is Running

Modern tools are required in order to define business processes in an organisation and to integrate them on the relevant platforms. The »Model Driven Service Creation« project provides a whole software development suite for this.

Self-test for Software

Newly developed software must undergo extensive testing before it can be implemented in order to rule out any faults. Quasar is a tool for the automatic generation of test cases. Before automatic and systematic testing, Quasar checks which system is involved and how it behaves.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de

Traffic, Transport, and Mobility

Mobility creates dynamics: Not only is the automotive industry profiting from new mobile technologies. The »nomadic worker« needs constant access to information and services – in the car, in the office and on the plane. Modern transport systems, mobile information services and networked vehicles provide companies with marketable products and services.

Mobility Gets Things Moving

The car of tomorrow is developing from simply a means of transport into a living space. Intelligent functions are increasingly making unrestricted communication and information, relaxation as well as work possible. As the car is networked with its surroundings, new safety standards can be integrated for independent and accident-free driving. As well as acting as an assistant in the vehicle, the latest technologies also facilitate comprehensive traffic management, enabling the ongoing increase in the volume of traffic to be tackled efficiently, conveniently and safely.



The Fraunhofer Information and Communication Technology Group (ICT) develops innovative solutions for optimising the transport of people and goods by different traffic carriers such as road, rail, air and water. Some of the areas benefiting from

these solutions include the automotive and aviation industries, public institutions and commerce, logistic service providers and software suppliers, the tourism industry, along with other service providers.

ICT Trends: Finally Getting There Safely

A transport platform is becoming the central component for mobility, for with innovative telematics systems, vehicles can make progress without getting held up in traffic or having an accident. To put this into effect, vehicle electronics, car-to-car communication and automation play a crucial role alongside strategies and algorithms for intelligent and collective traffic control. Apart from intelligent vehicle and traffic management systems, ICT will also contribute in the future towards increasing traffic safety and optimising catastrophe management, for example in connection with vehicles that drive independently.

Applications, Reference Projects and Research Trends in the Field of Traffic, Transport, and Mobility

Better Control of Traffic Movement

The ICT Group develops systems that can be used to record traffic data automatically and evaluate it promptly. Traffic conditions are analysed and acted upon directly with short-term measures. Long-term planning of transport schemes can also be derived from these analyses.

The Inner Life of Intelligent Vehicles

Our reliable systems are fitted inside vehicles to provide support for the driver in critical situations in order to avoid accidents or at least limit any damage. Systems such as these are always developed with usability in mind. The possibility of having access to traffic information and office functions as well as being able to use entertainment and other functions of convenience is turning the car of the future into a link between leisure and work.

Optimising Logistics and Production

We develop information and communication systems to optimise transport chains in the logistics industry. This enables resources to be fully utilised and planned, as well as minimising transport times and costs. It is now difficult to imagine the development of vehicles without the use of simulation. Flow conditions and crash tests, as well as logistics itself, for example, can be run through on a computer in advance.

For advice on this and other research in the area of Transport and Mobility, please do not hesitate to contact the ICT Group office.



Examples from Applied Research

Full Overview

In the area of Bonn, the »City-Traffic« telematics system simulates the whole traffic system. The data originates from various sources, including satellite. The simulation enables significant forecasts of traffic conditions to be made. This makes it possible to control traffic movements and to predict and prevent hold-ups; free parking spaces can also be determined and even new traffic schemes can be examined in advance.

From Car to Car

The »FleetNet« project involves a cordless communication platform enabling vehicles to communicate with each other. Apart from facilitating communication, the system also integrates the Internet, for example, as well as other services and applications.



Fraunhofer Gruppe
Informations- und
Kommunikationstechnik

Business Office
Friedrichstr. 60
10117 Berlin

Phone: +49 (0) 30 726 15 66 - 0
Fax: +49 (0) 30 726 15 66 - 19
E-mail: info@iuk.fraunhofer.de
Internet: www.iuk.fraunhofer.de