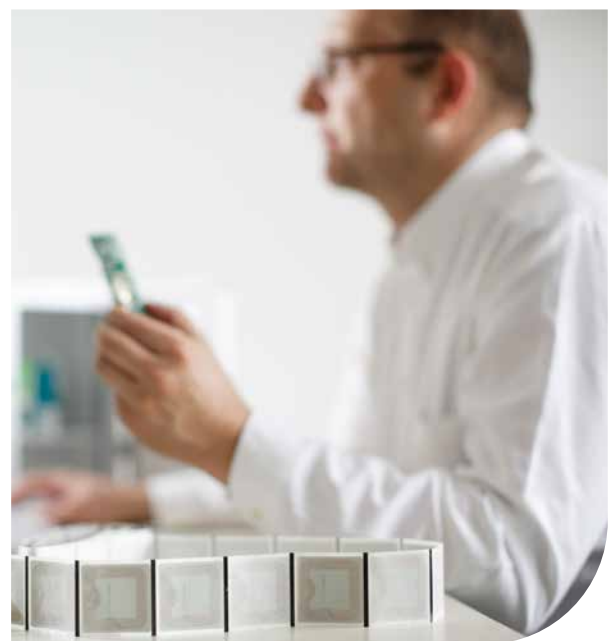




DIGITAL

Institute for Information and
Communication Technologies



The future is DIGITAL!

Sensing, analysing and networking in the digital world – that's the passion that drives our researchers.

No matter whether it's multi-sensor innovations, tomorrow's satellite communication or the next Industrial Revolution with the aid of smart information management – we are always ready to face international competition in research.

It is of equal importance to us that our work not only generates new and innovative products via our role as innovator, but also creates competitive advantage for our clients in a wide range of business areas via our role as business enabler.

Dr. Heinz Mayer, Director



Contact

JOANNEUM RESEARCH
Forschungsgesellschaft mbH

DIGITAL

Institute for Information and
Communication Technologies

Steyrergasse 17
8010 Graz

Phone +43 316 876-5000

Fax +43 316 876-5010

digital@joanneum.at

www.joanneum.at/en/digital

DIGITAL – Institute for Information and Communication Technologies

We research and implement web and internet technologies, signal processing for image, video and acoustics, remote sensing, communication and navigation technologies based on robust methods for developing application-oriented hardware and software solutions. Expertise in prototype development, project management, and consulting complements our scientific skills.



- Remote Sensing and Geoinformation
- Machine Vision Applications
- Space and Communication Technology
- Audiovisual Media
- Intelligent Information Systems
- Intelligent Acoustic Solutions

Our clients' benefits

Our clients benefit from the pragmatic and problem-solving approach we apply to our research. As one of the leading international research and innovation providers in information and communication technology, we provide innovative solutions, either evolutionary or game-changing, depending on the degree to which internal processes can be changed.

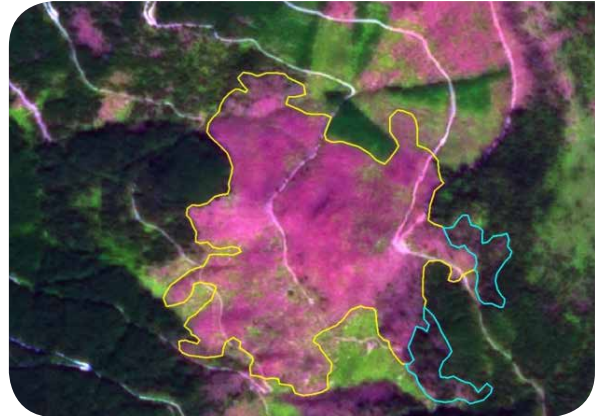
Working closely together with the client, we develop innovative solutions to product status and provide continuous product development.

Clients enjoy the long-term support we can provide and the access to sound technological expertise we have acquired over the years.

Our services

Our services range from short- and long-term support of in-house research projects to turnkey projects culminating in clearly defined deliverables.

We offer application-oriented research in line with the highest international standards in science. Clients have access to our experts, who are all specialists in their particular fields, and who receive regular opportunities to increase their knowledge through training. Our strength is the ability to implement the research results into industry-ready prototypes within a professionally managed project.



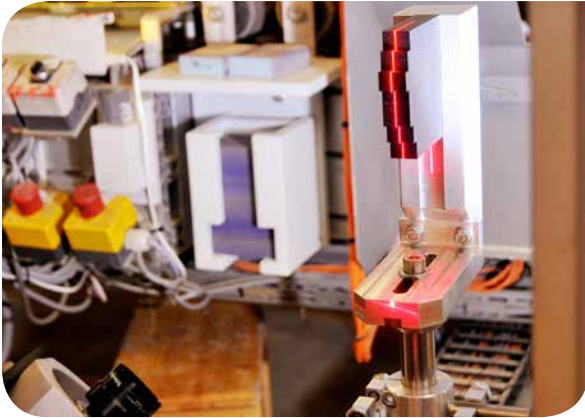
Remote Sensing and Geoinformation

Our activities include development of methods for pre-processing and analysing optical, SAR and LIDAR data, development of geographical information and management systems, and wearable multisensor systems for real-time applications based on innovative mobile user interfaces.

- **Geometric image processing**
 Geocoding, photogrammetry, interferometry
- **Environmental monitoring**
 Alps, forest and land use
- **Near-real-time decision support**
 Air-assisted disaster monitoring, crisis management, data fusion
- **Wearable assistance systems**
 Context and activity detection, head and body-mounted systems

Airborne platform: ADAM (Airborne Data Acquisition Module) offers a flexible and inexpensive solution for taking aerial photographs with a high resolution, LIDAR-data and thermal data. Detailed orthographic images, image mosaics or 3D surface models can be derived with the aid of the associated software. Fast downlink technology allows near-real-time evaluation of data.





Machine Vision Applications

We develop contactless machine vision methods for measurement and navigation and for inspection of work pieces and materials in production processes.

A wide range of machine vision technologies is used for applications in industrial inspection and metrology, human-centred image analysis, and robotics. Two- and multi-dimensional measuring tasks are implemented with the aid of imaging sensors, an information processing system to execute the necessary algorithms, and an integrated mechatronic set-up.

- Industrial inspection
- Human-centred image analysis
- Robotics & 3D Visions

Registration of deformable bodies:

The use of radiation for medical therapy and diagnostics must be as precise as possible. Due to the deformability of the human body, research focuses on the exact registration of volumetric data so that experts can react to changes. One initial application of our development is radiotherapy.

OCR based process monitoring in steelworks:

The increasing quality requirements to be met by steel products requires a high degree of quality inspection and end-to-end process monitoring. The system based on optical character recognition (OCR) allows identification of steel billets based on the embossed numbers even in harsh industrial environments.



Space and Communication Technology

For decades, we have been excelling in satellite communication, electromagnetic wave propagation, and space flight experiments. Our skills range from developing innovative modern solutions for satellite radio, developing and manufacturing prototypes for experiments suitable for space flight, to studies and small series for ESA, NASA and many other clients and project partners.

- Satellite and terrestrial broadband communication
- Radar technology, navigation & wave propagation
- Development of space-qualified hardware and software

2D-Video-Distrometer: Reliable models of the fine structure of precipitation are the precondition for a wide range of applications in telecommunications, remote sensing or meteorology. With extensive evaluation options, the high-precision equipment for measuring precipitation particles, in use all over the world, provides the basis for precise statements about the effects of the various types of precipitation on satellite radio paths.



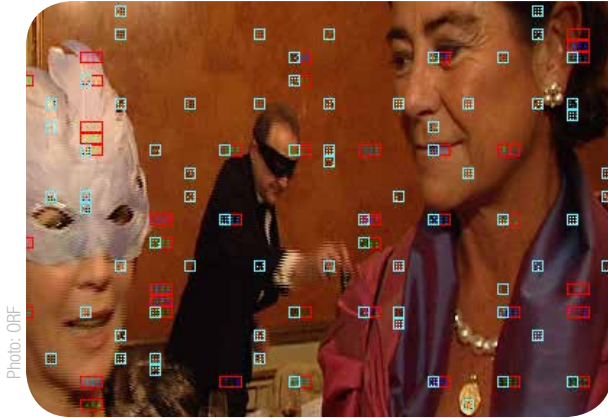


Photo: ORF



Photo: Maxisport – Fotolia.com

Audiovisual Media

Our focus is the automatic extraction and exploitation of information from visual content. Digital technologies permit high-performance, largely automated analysis and processing of audiovisual media. We focus on analysing, describing, indexing, processing and visualising multi-media data, particularly image, video and film. We deploy these technologies mainly in the fields of culture, media and security.

■ Cultural heritage

Preservation and restoration of audiovisual content, including metadata handling and conversion

■ Media

Enabling efficient use and fast extraction of information in vast amounts of media for media monitoring and production

■ Security

Advanced solutions for monitoring public space and traffic infrastructure

Monitoring of wrong-way driving and car parks:

The software solution for robust real-time detection of wrong-way drivers takes advantage of existing video camera infrastructure to trigger immediate action. Another application enables an inexpensive solution to customer-friendly parking space maintenance by means of automatic detection of arrival time and duration of stay.





Intelligent Information Systems

We revolutionise information access and networking in complex, networked application environments based on new software architectures and technologies.

Modern analysis methods for information and data streams from industrial processes, the Internet of Things, and interactive media in connection with excellent software development and project management expertise forms our scientific foundation to ensure the competitive advantage for business and industry.

Appropriate ICT safeguards and security models ensure maximum protection against unauthorized use of data and resources.

- **Culture and media**
End-to-end software solutions for modern museum and archive management
- **Industrial Internet**
Process optimisation by means of data analysis and event processing
- **Security and safety**
Avoidance of critical infrastructure failure by means of information security in complex networked IT systems
- **Intelligent information systems and mobile solutions**
Conception and implementation of innovative, customer-specific solutions

*imd*as *pro* was developed in collaboration with museologists and culture experts. The software package supports all work processes of cultural facilities and can be flexibly modified to suit individual requirements – from registering and cataloguing objects to scientific evaluations, exhibition planning, and creating websites and catalogues.

Internet of Things: Modern communication technologies such as RFID (Radio Frequency Identification) and NFC (Near Field Communication) enable contactless exchange of information between objects as the basis for the Internet of Things. We are developing a platform that enables quick and easy implementation of a wide range of different application scenarios while observing the highest demands with regard to security and protection of privacy.



Intelligent Acoustic Solutions

We do research in the fields of acoustic monitoring, vibrations, audio and multimedia. We have a broad scientific base and a wide range of expertise required for developing a holistic system in real-life conditions. This ability to create holistic systems enables system developments from the initial idea to research projects at various stages and the fully functioning system.

- **Acoustic Monitoring**
Road tunnel, industry and production
- **Expert Listening Panel**
Listening laboratory analyses
- **Innovative Future Acoustic User Interfaces**
Speech- and audio communication for industry and robotics

Expert Listening Panel: Evaluation and assessing the acoustic properties of technical products has become an increasingly important factor in recent years. This has also increased the industry's need for standardisation of such test series. We offer according to international standards the best-equipped listening laboratory in Austria, trained and professional listeners ("Expert Listeners") as well as the design and the performance of the test procedures.



Infrastructure – Products – Solutions

- Listening Room
- Distrometer
- Image Processing Laboratory
- CUDA Research Center
- Sensor Platform
- Human Factors Lab
- Space Technology Lab
- Communication Technology Lab
- RFID Lab
- Acoustic Tunnel Monitoring
- BrandDetector
- Modern Collection Management with *imdas pro* and *archivis pro*
- Comprehensive Edge Control for Furniture and Doors
- VidiCert – Efficient Quality Assessment for Video and Film
- Monitoring of Wrong-way Driving and Car Parks
- Digital Image Measurement System in Tunnel Construction
- Automatic Evaluation of Polished Sections
- OCR-based Process Monitoring in Steelworks
- High-precision, Real-time-enabled 2D Position Sensor
- Registration of Deformable Bodies
- ESA ExoMars Rover 2018 PanCam 3D Vision



Contact



Dr Heinz Mayer

Director

Phone +43 316 876-5001
heinz.mayer@joanneum.at



Maria Fellner, MBA

Business Development

Phone +43 316 876-1637
maria.fellner@joanneum.at



Werner Haas

Strategic Consultant

werner.haas@joanneum.at



Prof. Dr Mathias Schardt

Head of Research Group
Remote Sensing and Geoinformation

Phone +43 316 876-1754
mathias.schardt@joanneum.at



Gerhard Paar

Head of Research Group
Machine Vision Applications

Phone +43 316 876-17 16
gerhard.paar@joanneum.at



Dr Michael Schönhuber

Head of Research Group
Space and
Communication Technology

Phone +43 316 876-25 11
michael.schoenhuber@joanneum.at



Georg Thallinger

Head of Research Group
Audiovisual Media

Phone +43 316 876-12 40
georg.thallinger@joanneum.at



Harald Mayer

Deputy Director
Head of Research Group
Intelligent Information Systems

Phone +43 316 876-11 36
harald.mayer@joanneum.at



Dr Franz Graf

Head of Research Group
Intelligent Acoustic Solutions

Phone +43 316 876-16 31
franz.graf@joanneum.at

JOANNEUM RESEARCH
Forschungsgesellschaft mbH

DIGITAL

Institute for Information and
Communication Technologies

Steyrergasse 17
8010 Graz

Phone +43 316 876-50 00

Fax +43 316 876-50 10

digital@joanneum.at

www.joanneum.at/en/digital