

Fraunhofer-Segment for Defense and Security VVS

We carry out research into
the security of mankind,
society and the state

Fraunhofer Segment for Defense and Security VVS



We carry out research into the security of mankind, society and the state – for a life of freedom.«

In times of social and political unrest, defence and security become increasingly important. We develop technologies, products and services for the early detection of dangerous situations, so that they can be counteracted, consequential damage can be minimised and, as a result, the overall level of risk can be reduced.

The Fraunhofer Segment for Defence and Security pursues research and development in the areas of defence and civil security. Our wide-ranging expertise and research have delivered highly practicable solutions and operational support, both at the national and international level. In defence research, our excellent judgement and consultancy skills make us indispensable independent experts and partners of the German ministry of defence (BMVg). We research and develop technologies and system solutions for the ministry, its government bodies and for the German armed forces (Bundeswehr). Our technical solutions and systems in civil security are designed to deliver the best

possible protection for society. We cover the interests and activities of our member institutes, acting as their representative both within and outside the organisation. We create joint benefits through mutual support, by complementing one another professionally, through a division of labour and by coordinating the areas in which we specialise.

The Fraunhofer Segment for Defence and Security provides comprehensive security models: Our research focuses on security and protection against military, technical, terrorist, natural and criminal threats.

From this, we deduce the areas of application for our research:

- Systems and technologies for use on land, in the air, water, space and cyberspace
- Information gathering, provision of information and decision-making support
- Networked operations
- Protection and impact
- Electronic warfare
- Cross-system technologies
- Resilience and protection of critical infrastructures
- Combating of terrorism and crime
- Border security
- Crisis and disaster management
- Digital transformation

We carry out research into the security of mankind, society and the state – for a life of freedom.

Protection, security and effects

Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI

develops and researches new approaches and solutions for applications in the business segments defense, security and resilience, space, automotive and aviation. The institute's competences are the investigation of impact, shock and penetration phenomena by experimental, simulation-based and analytical methods in order to improve the security, safety and reliability of components, structures and systems under dynamic loads.

Protection & bridging technologies

Fraunhofer EMI analyzes and develops protection concepts and new materials for high dynamic loadings, sensor systems for the application in ballistics as well as practice oriented engineering software.

Solutions range from vehicle and personal protection systems against ballistic and explosive threats, the protection of service infrastructures and the development of materials to the reduction of vulnerabilities of aerostructures and vehicles.

Protection of critical infrastructures

The main research focus lies on technologies to physically protect critical infrastructures. Our solutions include efficient building reinforcement and structural concepts, the development of dedicated, customized materials such as ultra high performance concretes and integrated sensor systems for real-time monitoring of static loading capacities. Thus, we can offer balanced security concepts of the protection of building infrastructures.



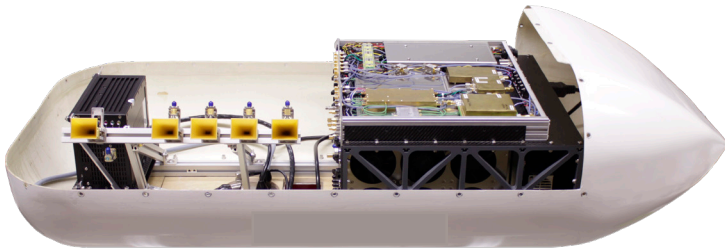
Formation of a vapor cloud in a laser-irradiated sample made of carbon-fiber-reinforced plastic. © Fraunhofer EMI

Hazard and risk analysis

Hazard and risk analysis research services provided by Fraunhofer EMI support the risk management especially in case of terrorist events such as explosions, but also in case of industrial accidents, natural disasters and even of cross-linked, multimodal risks caused by such events.

Key technology radar

Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR



Intelligent multifunctional radar sensors for autonomous airborne platforms. © Fraunhofer FHR

Fraunhofer institute for high frequency physics and radar techniques FHR researches customized concepts, techniques and systems for electromagnetic sensors from the long wavelength range through to the lower terahertz range. For its partners, the institute develops high frequency sensors for ultra-precise range and position determination as well as imaging systems with resolutions of up to 3.75 mm. The systems are capable of tracking and classifying detected objects. Typical application areas for these systems include reconnaissance, surveillance and protection on various platforms in rural and urban environments. Radar is ideal for the acquisition of position data irrespective of weather and lighting conditions.

With several anechoic measurement chambers, technology centers for the production of analog and digital circuit boards as well as high frequency technology through to the lower terahertz range, the institute offers excellent possibilities for the development of modern electromagnetic sensor systems. The technologies used range from traditional waveguide techniques to highly-integrated silicon-germanium chips with frequencies of up to 300 GHz.

Fraunhofer FHR is recognised as a research leader in the field of Modern Electronic Warfare (EW). In addition, the institute is working extensively on solutions to enable System-of-Systems operations.

The range of services offered by Fraunhofer FHR include:

- Technology consulting, performance analyses and appraisals
- Development of user-specific imaging, detection, classification and tracking methods (signal processing and result presentation in real time and knowledge-based)
- Hardware and software development for robust, interference-resistant radar systems for various platforms with high resolution and dynamics from the design right up to the operational product
 - Scanner and mobile systems for the active screening of persons and objects, detection of fire sources, monitoring of critical infrastructures
 - Perimeter, coastal and air surveillance, detection of small drones and floating bodies
 - Observation of gatherings of people, panic detection, detection of signs of life
- Design of active and passive radar sensors for close- and long-range applications
- Development of camouflage methods, deception, jamming of external radars and hardening of internal systems
- Radars for space reconnaissance: techniques, methods and systems for the reconnaissance and surveillance of the situation in space, mission support and analyses
- Technologies for Resilient Position Navigation and Timing (R-PNT)
- Cognitive Radar

Command and reconnaissance

Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE

develops technologies and processes aimed at early detection, mitigation and management of existential risks. In close collaboration with strategic partners, the institute devotes itself to the entire data and information processing chain from acquisition to transmission and processing, to reliable data protection. The human factor is of central importance for the work of Fraunhofer FKIE. Its focus is on developing effective and efficient human-machine systems centered on the human as the key decision-maker and responsible actor.

For its partners – the German Federal Armed Forces, civil security agencies and industry – Fraunhofer FKIE develops methods and processes for internal/external security as well as in the dimensions of land, air, sea, and Cyber- and Information Space. Its research services range from studies and tests to prototype development.

Its total of ten departments with different, complementary core competencies, gives the institute a broad range of expertise enabling it to offer systemic solutions. Each of these departments conducts research and development at the high level of scientific excellence synonymous with the Fraunhofer name. With broad-based competence and excellence in detail, Fraunhofer FKIE meets current scientific and technological challenges in security-related questions.

From sensor data to situation picture

Fraunhofer FKIE researches systems and components for the acquisition and processing of heterogeneous sensor data. The latest sensor technologies, networked communication systems



One of the goals of Fraunhofer FKIE's research is to provide decision-makers with a comprehensive picture of the situation.

© 123rf anolkil / Fraunhofer FKIE

and information fusion help to detect threat situations. Autonomous systems are also used in this context. The institute continues to develop methods and tools for detection and defense of threats from cyberspace. The collected information is compiled into a comprehensive situation picture and served to the user in a role-appropriate manner.

From decision support to command and control information system

Fraunhofer FKIE's research aims to provide decision-makers with a comprehensive situation picture. In order to obtain such a picture, information is analyzed in an application-specific manner, processed in a user-appropriate way, and presented ergonomically. This enables rapid, reliable identification of threat situations. It supports the command and control process as a whole, from decision-making to management, as well as the exchange of information between disparate systems and secure communication in every situation. Fraunhofer FKIE also helps to detect unauthorized access in cyberspace. At the same time, it demonstrates protective measures to ensure the best possible security of critical systems even under the highest security requirements.

Sensors for safety, security and reconnaissance

Fraunhofer Institute for Applied Solid State Physics IAF

Fraunhofer IAF offers a broad portfolio for safety, security and reconnaissance applications – reaching from high-resolution radar systems, laser spectroscopy, integrated circuits and power amplifiers to infrared components as well as quantum sensors:

- Imaging millimeter-wave cameras and infrared detectors for applications under restricted visibility conditions, e. g. strong smoke or dense fog
- High-resolution radar systems for fast and precise distance measurements, supporting helicopter pilots during landing maneuvers under whiteout or brownout conditions
- Infrared laser for real-time, distance-based detection of minimal traces of explosives and warfare agents
- Infrared laser for directed countermeasures to protect flying, moving or floating platforms
- Directional radio links for very high data rates for broadband, wireless communication such as tactical data links
- Broadband jammers to suppress radio signals activating explosive devices
- Detector matrices in the solar-blind ultraviolet spectral range and dual-color infrared sensors to protect aircrafts from approaching missiles
- Diamond-based quantum sensors for GPS-independent navigation



Solid state power amplifier (SSPA) © Fraunhofer IAF

Due to their physical properties, III-V semiconductors and synthetic diamond are ideal candidates for state-of-the-art defense and security technologies. On the basis of these materials, Fraunhofer IAF develops pioneering components for high-frequency, power and optoelectronics as well as quantum technologies and is one of the few research institutions world-wide to cover the entire value chain in these fields: from material research and the design of components to the realization of complete modules and systems. For its research activities, the institute is equipped with a clean room and a MOCVD machine hall featuring cutting-edge semiconductor process and measurement technology.

The R&D activities of Fraunhofer IAF are certified according to ISO 9001/2015.

Security, safety and energetic materials technology

Fraunhofer Institute for Chemical Technology ICT

offers its long-standing research experience in the field of explosives to the German Federal Ministry of Defence, the public sector and industrial customers in the form of extensive knowhow, laboratories and experimental workshops for R&D purposes at Fraunhofer ICT allow for carrying out projects from a laboratory up to a small production scale. Fraunhofer ICT draws on the competence of its employees in the development of improved chemical energy sources, energy supplies and systems for the German army and the development of new technologies and materials for defense against terrorist attacks.

Energetic materials

Development, manufacture and characterization of:

- Gas generators
- Gun propellants, explosives, new ignition systems
- Chemical fuels and systems
- Safety and protective systems
- Rocket propellants for defense and space applications

Modeling tools:

- Interior ballistics
- Reaction kinetics, combustion processes, thermodynamics

Detection technology:

- Detection of explosives in the area of civil security, for example for portal systems in the framework of national and european projects (EXPEDITE, EMPHASIS, among other projects)



Sea mine sensing. © Fraunhofer ICT

- Test center for the detection of liquid explosives
- Electrochemical sensor technology

Safety and security technology:

- Technologies for counter IED and defense of terrorist attacks
- Non-lethal weapons

Technical safety and security

- Risk analyses in the handling of combustible and explosive materials
- Investigation and analysis of safety risks and accident scenarios in the design / operation of industrial testing units
- Safety and security assessments of energy storage devices

Energy supply systems

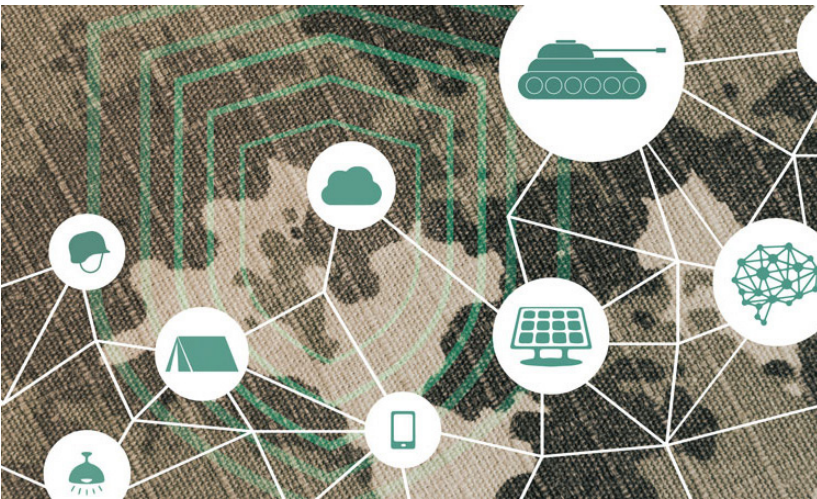
Electrochemical energy storage devices and converters:

- Redox-flow batteries
- Lithium ion batteries
- Fuel cell systems
- Safety investigations on energy storages and converter systems
- Energy management systems
- Safety investigations on energy storages and converter systems
- Energy management systems

Software-, systems- and innovation engineering

Fraunhofer Institute for Experimental Software Engineering IESE

is one of the world's leading research institutes for applied research in the area of software-, systems- and innovation engineering. We research trendsetting key technologies for smart digital ecosystems and accompany our customers and partners on the path to digital transformation. The focus of our work is especially on scalable systems engineering with guaranteed qualities in the areas of safety and security as well as software-driven innovation.



The offers of Fraunhofer IESE include:

- **Virtual engineering**
 - Design and management of standardized Digital Twins
 - Development of customized virtual engineering environments
 - Coupling of simulators and virtual hardware (Digital Twin)
- **Data engineering**
 - Technology development regarding Big Data analytics and AI applications
 - Development of quality and prediction models
 - Big Data potential analyses
- **Engineering of safety concepts**
 - Assessment of the safety of software-intensive applications
 - Safety of autonomous systems
 - Modeling and analysis of safety aspects
 - Safety of adaptive systems
- **Simulation**
 - Performance of what-if analyses
 - Validation of safety concepts
 - Validation of design decisions through simulation
- **System and software architectures**
 - Development of operational and system architectures in accordance with NAF and ADMBw
 - Evaluation and analysis of system and software architectures
 - Testing and simulation of architectures

Communication, localisation and security

Fraunhofer Institute for Integrated Circuits IIS

Founded in 1985, Fraunhofer institute for integrated circuits IIS in Erlangen, Germany is the largest of the Fraunhofer institutes.

Backed by a wide range of know-how in the field of security, we develop x-ray applications such as 3D computed tomography for inspecting air freight or ocean containers, 2D radio-scscopy or fast x-ray detectors that feature a high degree of radiation stability.

In the field of communications, one of the institute's core areas of expertise is wireless communication. This includes software defined radio technology for tactical radio communications, high-quality voice and data services for security and military personnel and RFID systems used in security applications and logistics processes.

Fraunhofer IIS provides extensive know-how and experience in the field of positioning and navigation technologies and among other applications develops systems for the localization and precise positioning of people and objects within critical infrastructures. In this area the institute also develops GNSS receivers that are robust against to spoofing or jamming.

Fraunhofer IIS is also engaged with the integrated cyber security of networked and distributed systems in the IoT. We research secure narrowband communication channels especially for industrial processes and applications.

The Nuremberg location is furthermore home to the L.I.N.K. test and application center, a one-of-a-kind facility featuring state-of-the-art equipment for supporting security system development projects and testing.

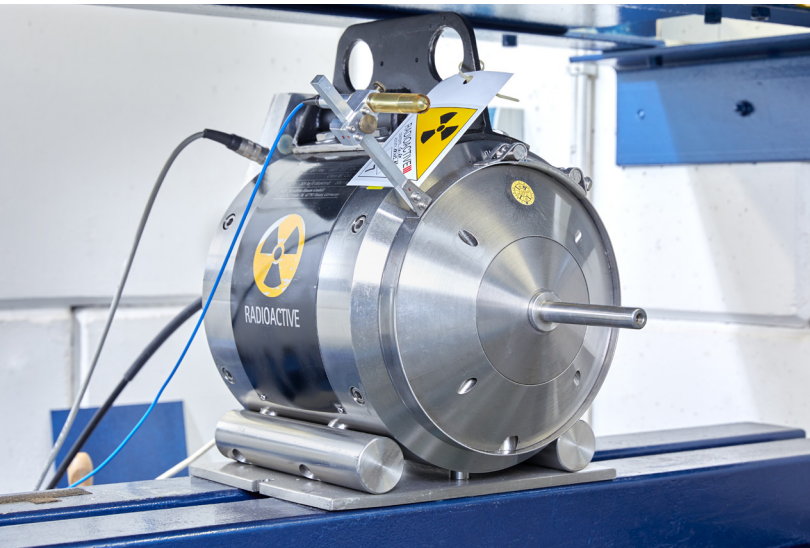
In the field of security applications Fraunhofer IIS is also involved in the development of virtual reality systems designed for training security and public safety personnel. Fraunhofer IIS offers a wide range of services, from technology and business consulting, feasibility studies, research and development, technology licensing, to independent testing and measurements and various IC technologies for security applications.



Planning support for state and industry

Fraunhofer Institute for Technological Trend Analysis INT

provides scientifically sound assessments and counseling on the entire spectrum of technological developments. On this basis, the Institute conducts technology forecasting, making possible a long-term approach to strategic research planning. Fraunhofer INT constantly applies this competence in projects tailor-made for our clients.



Cobalt-60 irradiation facility. © Fraunhofer INT

Over and above these skills, we run our own experimental and theoretical research on the effects of ionizing and electromagnetic radiation on electronic components, as well as on radiation detection systems. To this end, Fraunhofer INT is equipped with the latest measurement technology. Our main laboratory and large-scale appliances are radiation sources, electromagnetic simulation facilities and detector systems that cannot be found in this combination in any other civilian body in Germany.

For more than 40 years, Fraunhofer INT has been a reliable partner for the federal German ministry of defense, which it advises in close cooperation and for which it carries out research in technology analysis and strategic planning as well as radiation effects. Fraunhofer INT also successfully advises and conducts research for domestic and international civilian clients: both public bodies and industry, from SMEs to DAX 30 companies.

Business units

- Defense technology foresight
- Public technology and innovation planning
- Corporate technology foresight
- Electromagnetic effects and threats
- Nuclear security policy and detection techniques
- Nuclear effects in electronics and optics

Applications ranging from high-security communication to customized laser technology

Fraunhofer Institute for Applied Optics and Precision Engineering IOF

develops application-oriented "solutions with light" along the photonic innovation chain, ranging from novel system design concepts and photonic components to prototypes and pilot series. The institute's mission is to transform future technologies into sustainable application scenarios in the business areas of "light sources and lasers", "opto-mechanical systems", "sensors and metrology" and "quantum technologies".

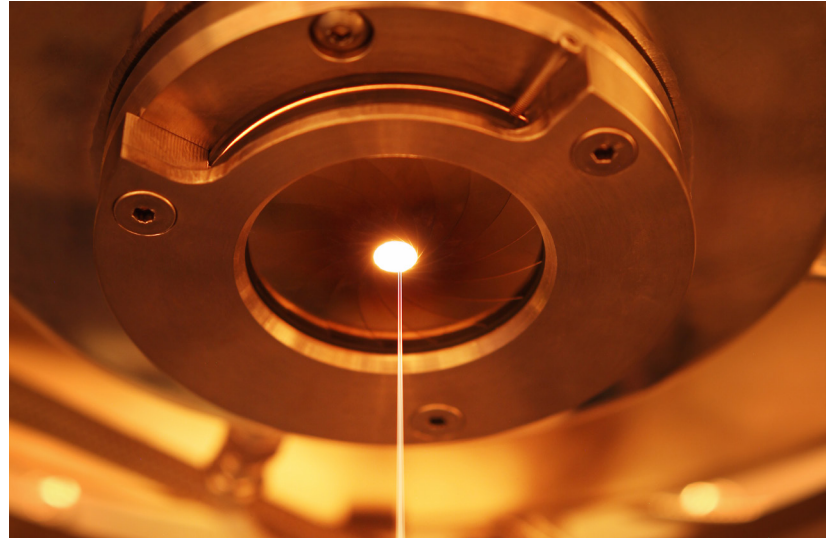
Light for more safety: Selected projects

Photonic quantum technologies

Fraunhofer IOF is one of the international pioneers in the research, development and realization of optronic components, systems and applications for photonic quantum technologies. In particular for tap-proof free-space, fiber- and satellite-based quantum communication, for quantum-based imaging methods as well as for quantum sensing and quantum computing, innovative components and systems have been developed, characterized, and successfully applied in recent years.

Fiber and laser technology

In the fiber technology center for the development and fabrication of active and passive micro- and nanostructured optical fibers, Fraunhofer IOF combines competences in laser physics, fiber and optical design as well as glass chemistry and thermo-optics. The results of this research include not only tailored high-power fiber lasers, but also their spectral,



© Fraunhofer IOF

geometric and coherent coupling, as well as efficient beam delivery systems with innovative, partly adaptive mirrors and adapted optical coatings.

Optical systems for satellite-based earth observation

Fraunhofer IOF developed system solutions such as telescopes, spectrometers and scanners for various space missions. On the basis of a unique technology platform, aspherical and free-form metal mirrors, transmission and reflection gratings as well as special coatings for the UV-VIS-IR spectral range are realized, among others. The instruments for high-precision spatially resolved Earth observation contribute in particular to studies of greenhouse gas emissions and climate change as well as to disaster control.

Federal authority for fingerprint scanners

Since 2007, Fraunhofer IOF has been a recognized testing laboratory according to DIN EN ISO/IEC 17025 of the German Federal Office for Information Security (BSI). Manufacturers of single-finger, four-finger and whole-hand scanners can have their products tested here for compliance with BSI guidelines and for optical quality criteria.

Lasers, networked sensor data up to decision making

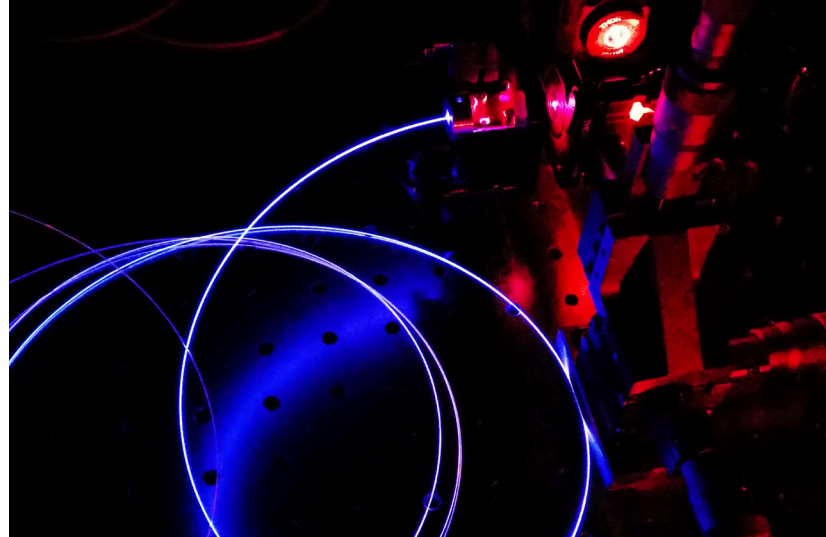
Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB

is an established partner for lasers, networked optronics (electro-optical systems) as well as image acquisition, processing and analysis. The institute's spectrum of scientific competencies covers the entire lifecycle of optronics: starting from the light sources focussing on lasers, moving on to the light propagation through the atmosphere, the gathering of information from data sensors up to preparation of information for decision-making.

Our defence research follows the mission statement »scientific advice and technology for the German armed forces «; this concludes feasibility studies and development of procedures as well as technology assessment, testing and development of demonstrators and contract research for the industry. In the fields of research for civil security, technological concepts and solutions for authorities and organizations (e. g. fire department and police) as well as for companies of the security industry are being developed by Fraunhofer IOSB.

Characteristic examples

- **Lasers for optronic countermeasures:** Solid-state and fiber lasers and their critical components in SWIR and MWIR for jamming, dazzling and damaging of optronic systems.
- **High energy lasers for directed energy applications:** SWIR fiber lasers and components for coherently combined HEL
- **Laser protection:** novel, non-linear optical filters protect sensors and eyes from dazzling / destruction in the visible and infrared range



Laser fiber. © Fraunhofer IOSB

- **Space-based early warning:** satellite-based, electro-optical sensor-systems for the detection of ballistic missiles during launch or after cloud break
- **Terrain databases for simulation systems:** ad-hoc generation of 3D environmental models acquired by imaging sensors for a quickly available terrain simulation database
- **Intelligent video surveillance:** algorithm-based recognition of behaviour patterns in public spaces (e.g. hitting, kicking, falling)
- **Digital map table:** position visualization in distributed environment on almost any end device based on standardized geo- and sensor-data interfaces
- **Drone defence (counter-UAS):** early and reliable detection and classification of mini-drones using coupled sensor stations and self-developed tracking units
- **Robot systems for environments hostile to humans:** such as the dismantling of landfills or nuclear facilities
- **Cyber security learning lab:** compact, practical qualification of specialists and managers from industry, utilities and public administration

Operational command and communication for security authorities

Fraunhofer Institute for Transportation and Infrastructure Systems IVI

Varying threats of a greatly complex nature and with atypical patterns call for specially trained response forces and the availability of high-performance command and communication technologies.

Since 2003, Fraunhofer IVI has been developing modular technologies in accordance with the extremely short innovation cycles of modern ICT technologies.

MobiKat® was developed to support the work of administrative staff, technical command and control as well as disaster response staff. The system is used during large-scale disasters such as floods, extreme weather conditions, large-scale events and daily response tasks of fire and rescue services.

The MobiKat® modules for disposition and optimization are in 24/7 operation in numerous control centers throughout Germany (110/112).

In the event of assassinations, terrorist attacks or hostage takings, the specialized units and forces of the police in particular are faced with extreme challenges. These kinds of operations have a great risk potential and require the highest level of professionalism, as well as the best technical equipment available. The SE-Netz technology developed at the institute offers management modules for the staff in control centers and mobile applications for response teams in the field with the following functions:

- connected operational command
- decision support for the optimal disposition of staff and resources
- operational communication and data transfer
- documentation of measures etc.



© Fraunhofer IVI

This technology has become established as a nation-wide standard among special police units. Its further development under the name EKUS is managed by the federal criminal police office of Germany (BKA). Its pioneering software architecture with flexible functionalities has an extremely high safety standard level and forms the basis for MePol – a novel communication system for regular police service.

MePol has been optimized with regard to the structures and processes of patrol services and other operational forces. In accordance with the respective user rights, the common operational picture can be viewed and edited both by the control center as well as the response team on site.

SE-Netz/EKUS, MePol and MobiKat® are compatible with one another. In accordance with the requirements of operations and in cooperation with the users, the systems are under continuous development.

Secure processes for secure structures

Fraunhofer Institute for Structural Durability and System Reliability LBF

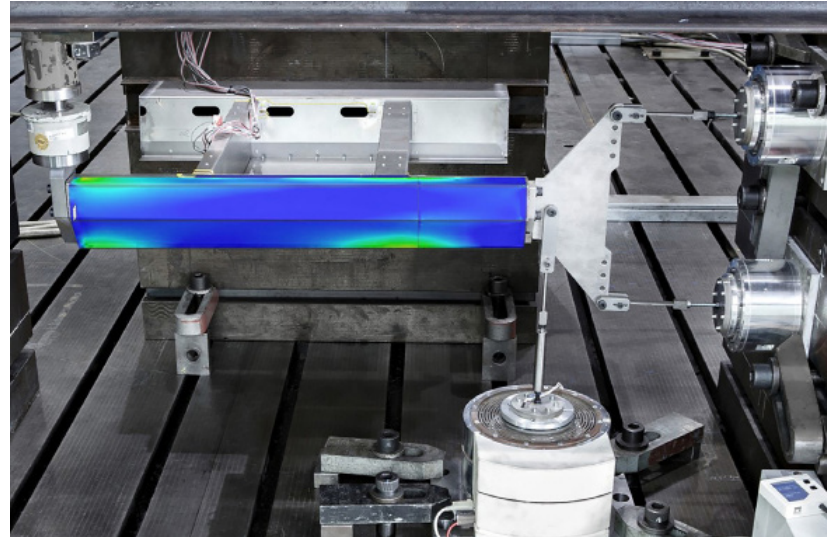
In the central research fields of reliability, lightweight construction, vibration control and polymer technology, the scientist teams at the Fraunhofer LBF systematically develop innovative solutions and tailor-made methods from product design to verification. Their goal is always for the system to work reliably and safely!

Process efficiency

The development and evaluation of safe and reliable structures in mobility carriers and systems on land, in the water and in the air are the core competences of the institute. To this end, the research teams continuously work on pioneering and further developing methods of the experimental-virtual reliability simulation which accompanies and safeguards development when reproducing complex operational and operating conditions. Another focus is the development of solutions and methods for the integration of sensors and actuators for the condition monitoring of critical components and structures as well as for the adaptation of structural and system properties to the acute operating conditions. Likewise, the institute develops processes and methods for the development of tailor-made properties of plastics, e.g. in terms of flame-retardant requirements.

Reliable in use

The solutions developed ensure the reliable operation of equipment and vehicles under real operating conditions. Reliable vibration reduction not only improves the precision of machines, but also minimizes their wear. Vibroacoustic



Innovative test and validation methods enable the rapid validation of variants and new application scenarios.

© Fraunhofer LBF

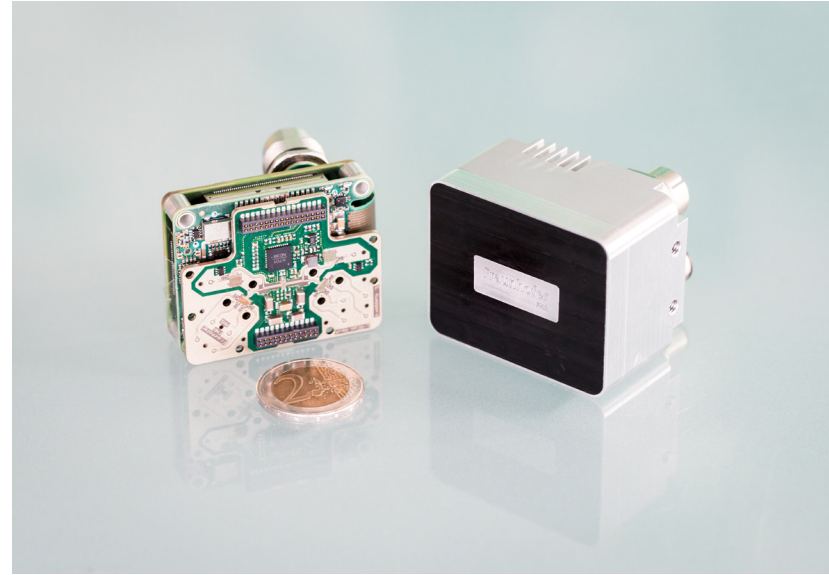
measures reduce the burden on humans and the environment. The continuous, in-service state detection in turn allows the detection and assessment of the damage impact. As a result, maintenance measures are oriented to the actual condition of structures, which increases the effectiveness of the measures and enables higher availability of the systems.

Our services at a glance

- Structural safety and reliability for improved operational capability
 - Realistic reproduction of complex operating conditions in the experiment and simulation
 - Condition monitoring during operation and damage detection
 - Customized additivation of plastics
- Vibration and noise reduction to improve effectiveness and precision
- Flame retardants for plastics
- Shock reduction to improve protection

Our distinctive features

- Coordination of large-scale projects
- System solutions to complex issues
- Excellent infrastructure and laboratory equipment
- Continuous availability of technical expertise at the highest level
- Superb network with research, industry and government
- Thorough judgement and consultancy skills in defence R&T
- Interdisciplinary work and broad technology portfolio



Range of Services

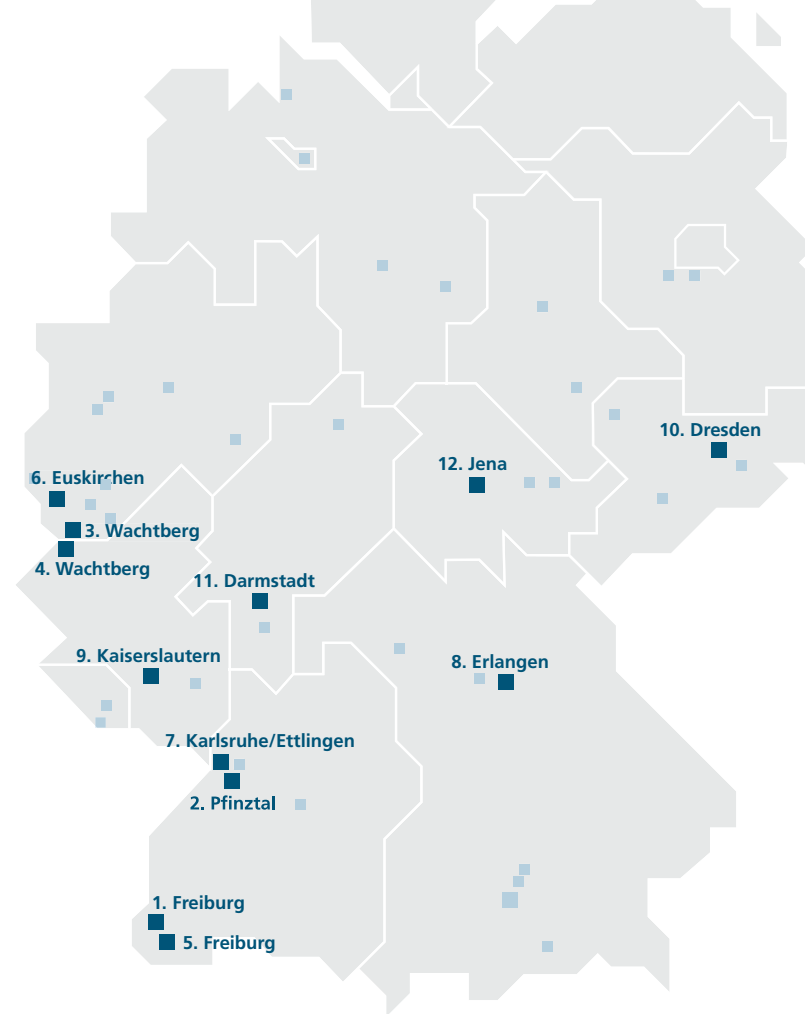
- Feasibility studies
- Strategic foresight, scenarios and roadmapping
- Technological needs and trend analyses
- Assessment of (third-party) systems
- Development of prototypes and processes
- Pilot series production
- Development of methods, technologies, components and systems



Locations of our Institutes



1. Applied Solid State Physics IAF
www.iaf.fraunhofer.de/en
2. Chemical Technology ICT
www.ict.fraunhofer.de/en
3. High Frequency Physics and Radar Techniques FHR
www.fhr.fraunhofer.de/en
4. Communication, Information Processing and Ergonomics FKIE
www.fkie.fraunhofer.de/en
5. High-Speed Dynamics, Ernst-Mach Institute, EMI
www.emi.fraunhofer.de/en
6. Technological Trend Analysis INT
www.int.fraunhofer.de/en
7. Optronics, System Technologies and Image Exploitation IOSB
www.iosb.fraunhofer.de/en
8. Integrated Circuits IIS
www.iis.fraunhofer.de/en



9. Experimental Software Engineering IESE
www.iese.fraunhofer.de/en
10. Transportation and Infrastructure Systems IVI
www.ivi.fraunhofer.de/en
11. Structural Durability and System Reliability LBF
www.lbf.fraunhofer.de/en
12. Structural Durability and System Reliability LBF
www.iof.fraunhofer.de/en

Our members

Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI

Protection, security and effects

Founded in 1959, staff 360, annual budget €30 million
Director: Prof. Dr.-Ing. habil. Stefan Hiermaier
stefan.hiermaier@emi.fraunhofer.de
Ernst-Zermelo-Straße 4, 79104 Freiburg, Germany

Fraunhofer Institute for Communication, Information Processing and Ergonomics FKIE

Command, control and reconnaissance

Founded in 1963, staff 480, annual budget €42.3 million
Director: Prof. Dr. Peter Martini
kontakt@fkie.fraunhofer.de
Fraunhoferstrasse 20, 53343 Wachtberg, Germany

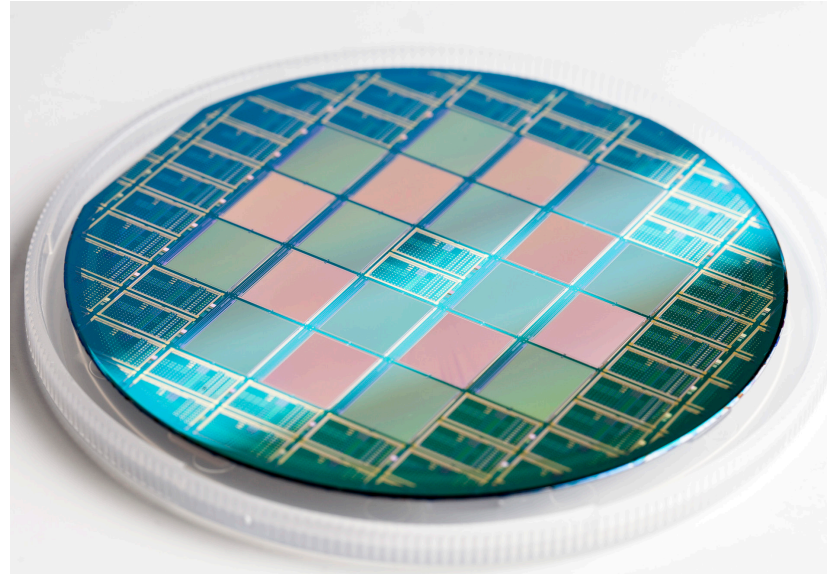
Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR

Radar - a key technology

Founded in 1957, staff 390, annual budget €42.1 million
Executive director: Prof. Dr.-Ing. Peter Knott,
Director: Prof. Dr.-Ing. Dirk Heberling
info@fhr.fraunhofer.de
Fraunhoferstrasse 20, 53343 Wachtberg, Germany

Fraunhofer Institute for Chemical Technology ICT ***Security, safety and energetic materials technology***

Founded in 1959, staff 539, annual budget €43 million
Director: Prof. Dr.-Ing. Peter Elsner
peter.elsner@ict.fraunhofer.de
Joseph-von-Fraunhofer-Strasse 7, 76327 Pfinztal, Germany



Fraunhofer Institute for Experimental Software Engineering IESE

Software-, systems- and innovation engineering

Founded in 1996, staff 250, annual budget €17.6 million
Director: Prof. Dr.-Ing. Peter Liggesmeyer
peter.liggesmeyer@iese.fraunhofer.de
Fraunhofer-Platz 1, 67663 Kaiserslautern, Germany

Fraunhofer Institute for Technological Trend Analysis INT

Planning support for state and industry

Founded in 1974, staff 132, annual budget €13.2 million
Director: Univ.-Prof. Dr.-Ing. Dr. rer. pol. habil. Michael Lauster
info@int.fraunhofer.de
Appelsgarten 2, 53879 Euskirchen, Germany

Our members

Fraunhofer Institute for Transportation and Infrastructure Systems IVI

Operational command and communication

Founded in 1999, staff 170, annual budget €15.6 million

Director: Prof. Dr. Matthias Klingner

matthias.klingner@ivi.fraunhofer.de

Zeunerstrasse 38, 01069 Dresden, Germany

Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB

From networked sensor data to decision

Founded in 2010, staff 810, annual budget €70 million

Director: Prof. Dr.-Ing. habil. Jürgen Beyerer

juergen.beyerer@iosb.fraunhofer.de

Fraunhoferstrasse 1, 76131 Karlsruhe, Germany

Fraunhofer Institute for Structural Durability and System Reliability LBF

Secure processes for secure structures

Founded in 1938, staff 360, annual budget €32 million

Director: Prof. Dr. Tobias Melz

tobias.melz@lbf.fraunhofer.de

Bartningstrasse 47, 64289 Darmstadt, Germany

Fraunhofer Institute for Applied Solid State Physics IAF

Sensors for safety, security and reconnaissance

Founded in 1957, staff 280, annual budget €35.6 million

Director: Prof. Dr. Rüdiger Quay (acting)

ruediger.quay@iaf.fraunhofer.de

Tullastrasse 72, 79108 Freiburg, Germany

Fraunhofer Institute for Integrated Circuits IIS

Communication, positioning technologies and x-ray for safety and security applications

Founded in 1985, staff 1170, annual budget €190 million

Executive director: Prof. Dr. Albert Heuberger

Director: Prof. Dr. Alexander Martin

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