



**Fraunhofer**

**IOSB**

ADVANCED SYSTEM TECHNOLOGY AST

**CUTTING-EDGE TECHNOLOGY  
FOR COMPLEX SYSTEMS**





## ABOUT US

We work towards new methods and processes for the optimal use of complex cybernetic systems and translate them into innovative operation control applications for various purposes like cross-sectoral energy systems and water supply. Our solutions can be found worldwide in numerous applications of our clients. These include power plant dispatch planning, management of storage units, power supply systems, virtual power plants, water supply networks and barrage cascades.

Localization solutions and autonomous robot platforms for the industry form a further focus of our work. We have set a benchmark for deep-sea suitable autonomous underwater vehicles with our own base system "DEDAVE", which we successfully brought to the market.

Our excellent R&D activities are consequently tailored across multiple sectors to the major topic "digitalization". For public contract research, we are excellently positioned on federal state and European level.

We have a research infrastructure for indoor and underwater robotics, a pressure test bench for deep-sea components as well as numerous platforms for the "digitalization of the energy supply". For the latter, the service offering covers energy (data) management solutions and test areas about IT security for critical infrastructure.

# DEPARTMENT OF ENERGY

## Software systems for energy technology and business

- | Demand and feed-in forecast
- | Supply optimization in liberalized markets
- | Balancing group and network access management
- | Software solution EMS-EDM PROPHET ®
- | Implementation of forecasting and optimization methods
- | Market regulations support (MaBiS, KoV IV)
- | Open, cross-system IT-architecture
- | Scalable, high performance client/server systems
- | Safe IT-infrastructure for the electrical energy supply

## Energy systems and components

- | Network simulation and planning
- | Intelligent networks (smart grids)
- | Grid system management optimization and adaptive grid protection
- | Grid integration of energy storages and E-Mobility
- | Plant engineering and small producers
- | Components for efficient energy use
- | Decentralized energy storages / network protection components
- | Automation devices / safe IT-components

## Energy business and system analysis

- | Conduction of system and data analysis
- | Development of methods for the forecast of demand and feed-in
- | Mathematical modeling of complex planning and operations management processes
- | Analysis and implementation of processes for energy logistics and communication in the context of liberalized energy markets
- | Analysis and evaluations in the context of energy economy and energy efficiency

## IT-security for critical infrastructures and water

- | Trainings within the Fraunhofer Academy Initiative  
„Learning lab cyber security“

# DEPARTMENT OF WATER AND MOBILE SYSTEMS

## Embedded systems

- | Autonomous, mobile systems
- | Assistance systems
- | Real-time systems
- | Tracking and localization systems
- | Diagnosis systems

## Water supply and wastewater treatment

- | Simulation, automation and optimization of:
  - drinking water treatment & distribution
  - storage and dam systems
  - wastewater and mud treatment
- | Dimensioning and management of UV-LED plants

## Maritime systems and surface water

- | Simulation and management of underwater vehicles
- | Hardware development for underwater vehicles
- | Virtual test environment
- | Automated inspection of underwater structures
- | Modelling, simulation and optimization of surface water systems
- | Water demand forecast



## OUR OFFER

### ENERGY- & ENERGY DATA MANAGEMENT

#### **THE software solution for the liberalized energy market: EMS-EDM PROPHET®**

- | Balancing group and grid use management for electricity and gas
- | Demand forecast for energy, gas and district heating
- | Energy optimization in consideration of guidelines and power plant structures
- | Automated energy management processes
- | Flexible and extensive times series management

### ENERGY RESEARCH

#### **ICT-Technology for cross-energy management**

- | Innovative ICT Technology for centralized and decentralized energy supply systems
- | Distributed energy supply, storage and virtual power plants
- | Research and simulation of energy distribution grids
- | Research and simulation of energy distribution grids, IT-security lab for critical infrastructures



## **INTEGRATED WATER MANAGEMENT**

### **Process optimization and decision support systems**

- | HydroDyn: Online/offline simulation for water/gas, leak detection, investment cost analysis, operation optimization
- | POS: Optimized wastewater treatment
- | TOS: Optimized barrage and reservoir management
- | WaterLib: River course modelling system for the optimal water management
- | WaterDemand: Water demand modelling system
- | Prototyping of UV-LED-Facilities

## **EMBEDDED SYSTEMS / UNDERWATER VEHICLES**

### **Mobile assistance, automation and guidance systems**

- | Development of land and underwater vehicles
- | Simulation und guidance systems for underwater vehicles and land robots (single, swarm)
- | Customized real time systems
- | Driver assistance and diagnosis systems
- | Localization solutions
- | Research infrastructure: Test basin, pressure test bench, multiple demonstration systems for robotics/industrial robotics and autonomous underwater vehicles

# CONTACT

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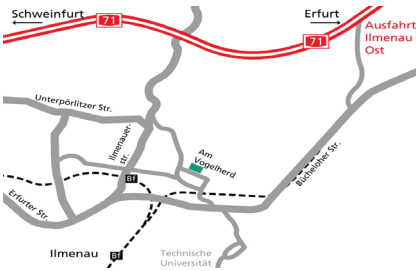
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## HOW TO FIND US



### BY CAR

Leave the highway A4 at the Erfurt interchange and merge onto A71 towards Meiningen following the exit Ilmenau Ost, continue further on B87 in the direction Ilmenau. In the city, turn right after the second traffic light at the AGIP gas station into „Am Vogelherd“. After that, drive straight ahead and turn left into the second street. The Fraunhofer AST is located at the next big building on the right hand side (entry at the left front side).

### BY TRAIN

From the stop „Pörlitzer Höhe“ you can reach the Fraunhofer AST in about 15 minutes. Or, you can also take the bus line A from the Ilmenau railway station in the direction NPI Station until IGI, from where it's 200m to walk.