I-SENSE GROUP

I-SENSE, Intelligent System Engineering and Novel Simulations Environment Group, has been founded in February 2002, being the continuation of various smaller research groups already active from the early '90s.

I-SENSE is associated with the Microwaves and Fibre Optics Laboratory (MFOL) and with a number of other Labs of ICCS.

MFOL focuses on the design and development of radio frequency, microwave and millimetre wave systems, subsystems and components for telecom and sensors applications.

I-SENSE group, apart from its own resources and equipment, is using also infrastructure and experience from MFOL, aiming to continue and expand it in other areas.

Specific research areas include:
• Smart Embedded and Cyber Physical Systems;
• Modern Telemetry;
• QoS-aware Middleware services;
• Blockchain Apps;
• Next generation VoIP;
• Emergency communications;
• Design of Radar Systems;
• Computer Vision and Detection;
• Sensor-based situational awareness;
• Machine Learning, recommender systems, AI;
• Environmental and Circular Economy Apps;
• Crowdsourcing and Citizens Observatories;
• Digital Security;
• IoT and Wearables;
• Virtual and Augmented Reality;
• Highly Automated Driving and Automation in Transport;
• Cooperative, connected and automated mobility;
• Electromobility and Smart Grid;
• Human Factors in Connected and Automated Driving.
• Digital Transport Infrastructure;
• ICT tolls for logistics;
• Mobility as a Service (MaaS);

I-SENSE group participates in National and European research initiatives and projects as well as in industrial projects and has a significant presence in the organisation of international conferences in several areas of research.

Smart Integrated Systems RESEARCH PROJECTS
Ongoing SIS Projects
I SENSE SIS team is currently participating in 15 research projects:

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Finished SIS projects
I-SENSE SIS team has actively participated in 6th, 7th FP, H2020 and MED projects:

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Partners
I-SENSE closely cooperates with major industries, academic institutes and end-users:

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ICCS is a member of
• ERTICO - ITS Europe (Chairmanship, Supervisory Board) • ITS Hellas (Founding member, Vice-presidency) • EuroVR Association (Founding member, Vice-presidency) • EFFRA • euRobotics AISBL • AIOTI • TM2.O • WSSTP • ETP-Alice • SENSORIS • C-ITS Platform • Digital Transport & Logistics Forum • ERTRAC • GSRT-Transport & Logistics Platform • UITP

Contact Info
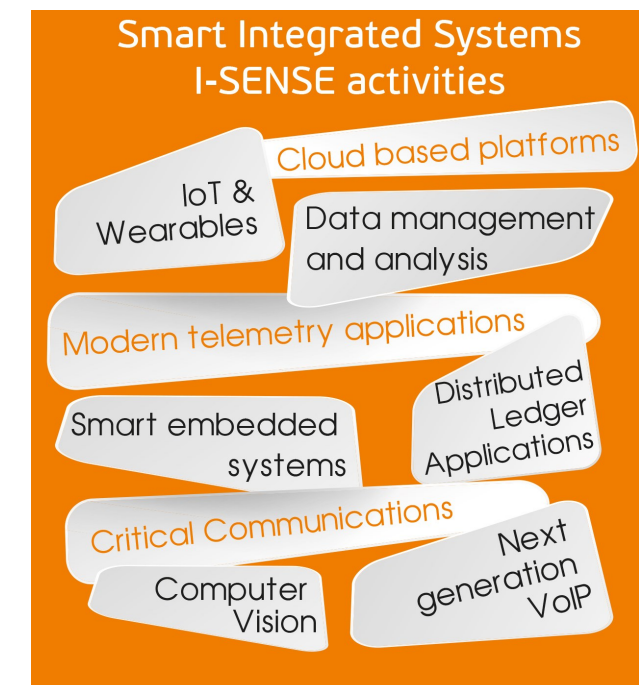E-mail: info-isense@iccs.gr • Tel: +30 210 7721663 • Fax: +30 210 7722291

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ΕΠΙΣΕΥ ICCS

INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS

i-SENSE GROUP

Intelligent System Engineering and Novel Simulation Environments Group

Smart Integrated Systems I-SENSE activities

- Cloud based platforms
- IoT & Wearables
- Data management and analysis
- Modern telemetry applications
- Smart embedded systems
- Distributed Ledger Applications
- Critical Communications
- Computer Vision
- Next generation VoIP

INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS

ICCS, Institute of Communication and Computer Systems, is a non-profit Academic Research Body established in 1989 by the Ministry of Education, Research and Religious Affairs to carry applied Research and Development activity in the following research themes:
• Hardware and Soft ware Technology;
• Computer Network Technology;
• Mobile technologies;
• Digital Communications Technologies;
• Control and Automation Technologies;
• Energy and Power Production Technologies;
• Biomedical and Biomechanics Technologies;
• Information Systems and Management Decision Technologies;
• Photonic Technologies for Communications
• Intelligent Transportation Systems
• Sensors and Systems
The above are applied in multiple applications areas like Smart mobility, Logistics, smart cities, Industrial applications, biomedical applications, environmental applications, crisis management, circular economy, etc.

ICCS is linked to the National Technical University of Athens (NTUA) and is the research host of the School of Electrical and Computer Engineering (ECE).
The personnel of ICCS consists of more than 800 researchers and scientists including Faculty Members of the Electrical and Computer Engineering School of NTUA, permanent or long term Researchers. ICCS research and scientific personnel is being supported by technical and administrative personnel both on the Lab level but also on the central administration. ICCS has more than 50 Labs and Research Teams and Groups dealing with all aspects of Electrical and Computer Engineering

ICCS has a strong presence in European research and has been the coordinator of many projects, co-funded between other by all Framework programmes of the European Union.

I-SENSE R&D activities:

Inteoperability & Data management:

- Data Management platforms for sensors' and edge devices' monitoring and remote configuration; Full support for several standards; Big data analytics and visualization;
- Data harmonisation and quality control/assessment for low-quality data, including data from citizen science, logistics and supply chain domains.

IoT & Wearables

- Embedded, connected, plug-and-play IoT devices for environmental, security, logistics and Structural Health Monitoring applications;
- Wearable devices for biometrics data collection in industrial environments and/or harsh conditions.

### Emergency and time-critical applications

- Multi-purpose, secure, and robust communication gateways, fixed or mobile, for monitoring of critical infrastructure;
- Distributed, secure and QoS-aware middleware services based on messaging protocols for time-critical applications;
- Next generation automated emergency services exploiting sensor data (NG eCall, NG monitoring emergency services).

Localisation and asset tracking

- Localisation and tracing solutions for monitoring of cargo in logistics & multimodal hubs;
- Real-time, hybrid localisation and tracking solutions for people navigation in crowded indoor/outdoor environments, e.g. in airports, logistics warehouses etc.

Computer vision, Image and voice recognition

- Computer vision techniques for face detection and recognition in several civilian applications;
- AI-enabled voice recognition modules for industrial as well as leisure environments;
- Multimedia processing of citizen sourced information for environmental parameters extraction and situational awareness;
- Computer vision techniques for defects detection in critical infrastructure; 3D reconstruction.
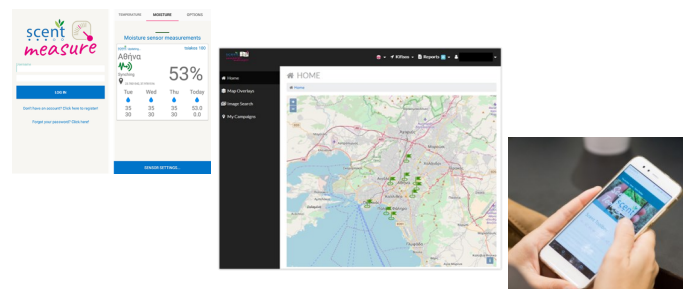

Available equipment:

- Spectrum Analyser; Mixed Domain Oscilloscope; Configurable Power supply equipment;
- Differential GPS devices;
- FARO 3D laser scanner;
- State of the art professional UAVs for civil applications;
- Sensors for smart structural health monitoring (strain, acceleration) with embedded wireless connectivity;
- High resolution localisation and tracking systems for indoor localisation;
- Wireless mote development toolkits;
- High definition computer vision and stereo cameras;
- Robot kit and robotic arm for R&D purposes;
- Hyper-spectral and thermal sensors;
- Open hardware platforms for rapid prototyping (e.g. Arduino, Raspberry Pi);
- Range of common wireless NICs, 4G-LTE Mini PCIe Modules with GPS+Glonass;
- L2/L3 routers;
- High-end development servers with RAID support;
- Fibre Bragg Grating (FBG) Interrogator.
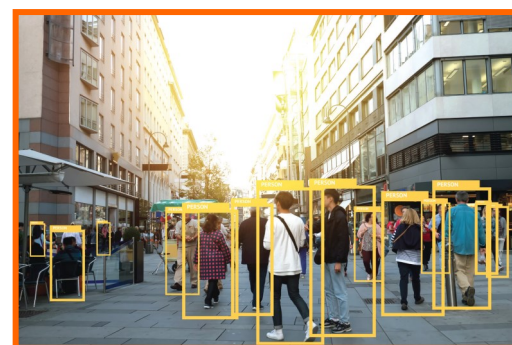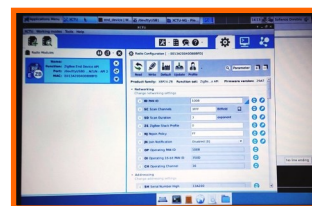
The I-SENSE group focuses on basic and applied research in the IT area. The main research directions are the following:

Virtual and Augmented Reality
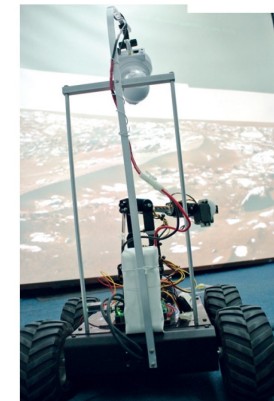
I-SENSE Virtual and Augmented Reality team specialises in the development of interactive, immersive and intuitive Virtual Environments, designed for a wide range of applications, from simulation and training to rehabilitation and ergonomics. The team also designs and implements augmented reality applications for remote support, automatic instructions and logistics support operations.

Extended tests are conducted in the I-SENSE VR Power Wall regarding virtual reality components' technical, ergonomic, applicability characteristics. Such tests include amongst other the evaluation of input devices and interaction menus, runtime software comparative tests to determine best speed, visualisation and ease of use. A variety of tools is applied including paper and pen questionnaires, psychophysiological measurements, hardware benchmarking and other.
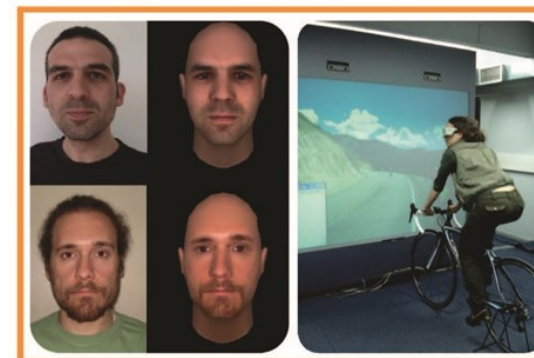
Intelligent Transport Systems

The Intelligent Transportation Systems (ITS) team of the I-SENSE Group has significant experience in Research and Development activities in the transport domain. These include advanced signal processing and multi-sensor data fusion algorithms, Advanced Driver Assistance Systems (ADAS) and active safety applications, cooperative systems (vehicle to vehicle and vehicle to infrastructure communication), automated driving and automation of the entire transport system, electromobility and electric vehicles technologies (smart grids), mobility solutions for people and freight.

Several systems, tools and SW prototypes are developed within the ITS team, such as real time onboard platforms for sensor data processing and application development (incl. tracking and situation awareness SW libraries), smartphone applications, eCall toolbox (incl. modules both in the vehicle and at the PSAP), logging tools, interfaces and interoperable SW architectures for intelligent vehicles. In addition, ITS team has acquired knowledge on methodology and evaluation of field operational tests and HMI design, development and testing.