

ECSEL related experiences

Institute of Microelectronic Applications (IMA)



Who we are?

IMA s.r.o. -> SME

Institute of microelectronic applications



- ☾ IMA is located in Praha, Pardubice, CZ
- ☾ Headcount 85 / ~35 involved in R&I
- ☾ 2018 Performance > €5 M
- ☾ In-house R&D, production and supply / service chain

Facts:

- Identification systems
- 27 years -> installations over 65M €



What are we doing?

Domains



☉ Key areas and products

- ☉ Access control systems
- ☉ Mobile access
- ☉ Cloud based solutions (SaaS)
- ☉ Vending machines, kiosks
- ☉ Localization systems
- ☉ Micro-nanoelectronics demonstrations
- ☉ Internet of Things (IoT) & LPWANs

☉ Applied R&D

☉ Exploring technology

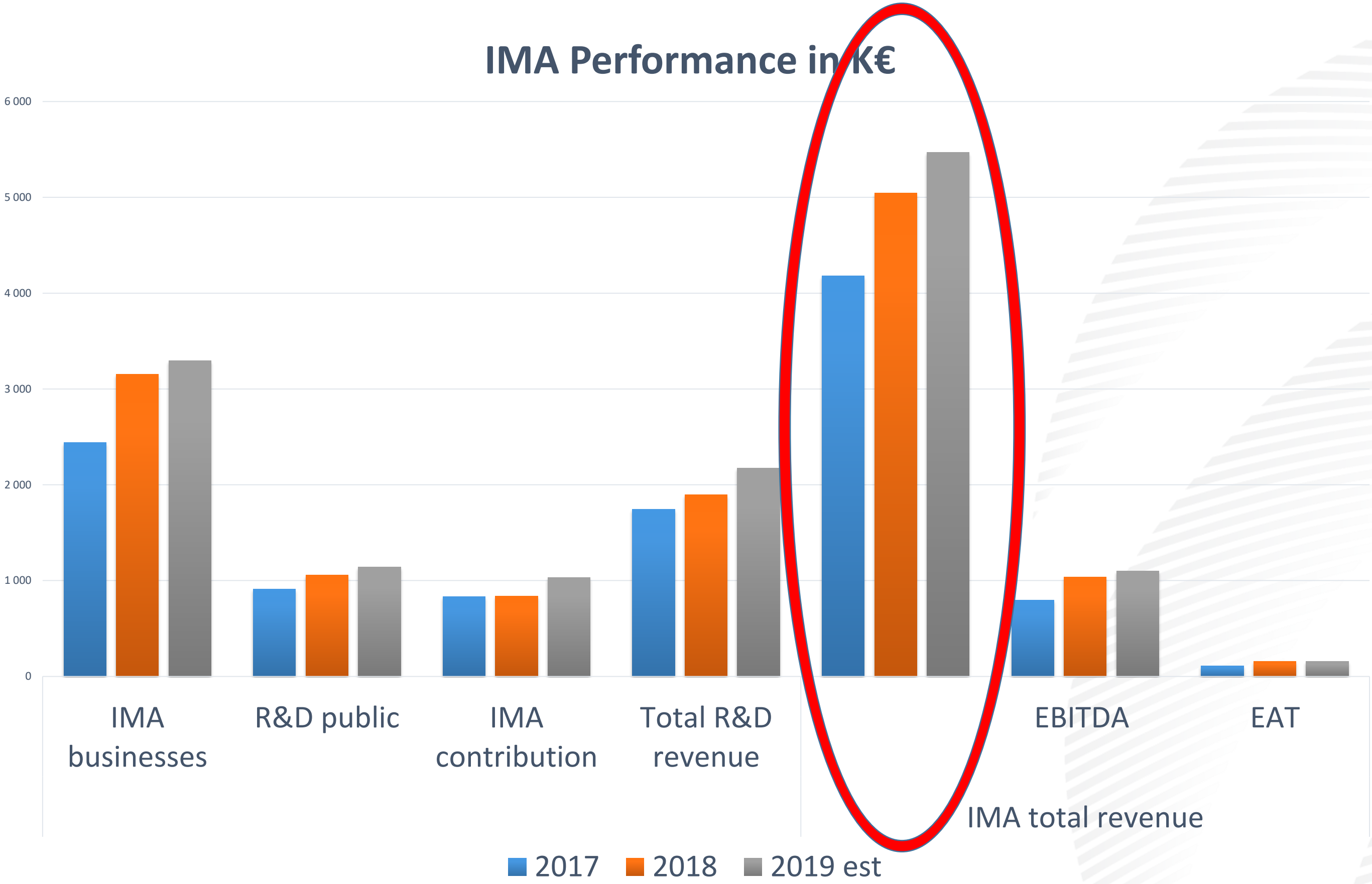




It is important to be above things

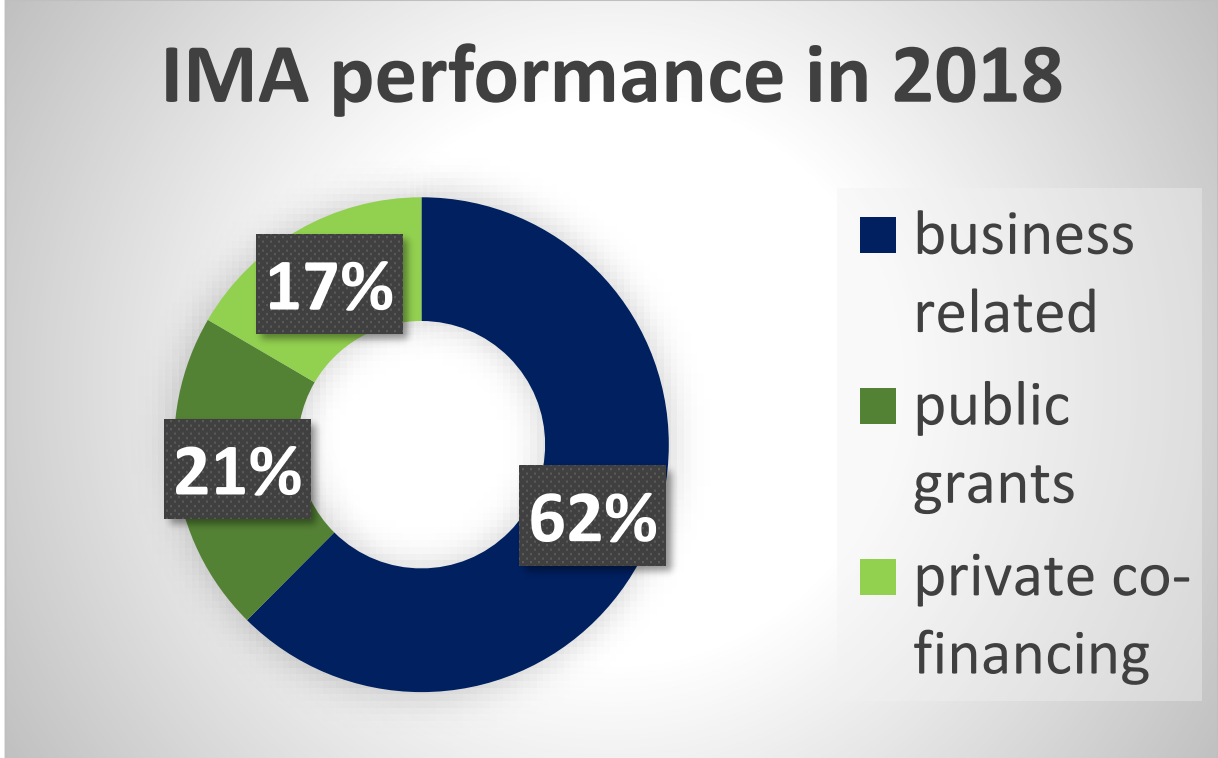


Performance



Envisioned automotive domain

© WITTE Automotive GmbH since 2018



Core businesses

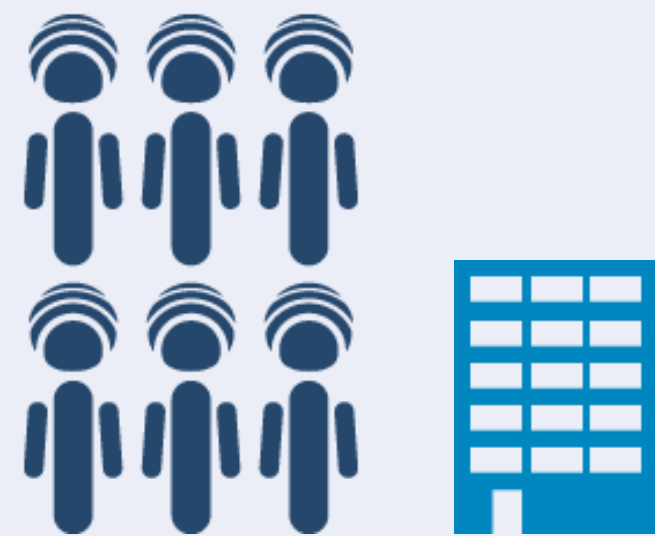
Scalable physical security solutions for the small and the big

CZ, SK, HU, PL, Baltic countries, S ...



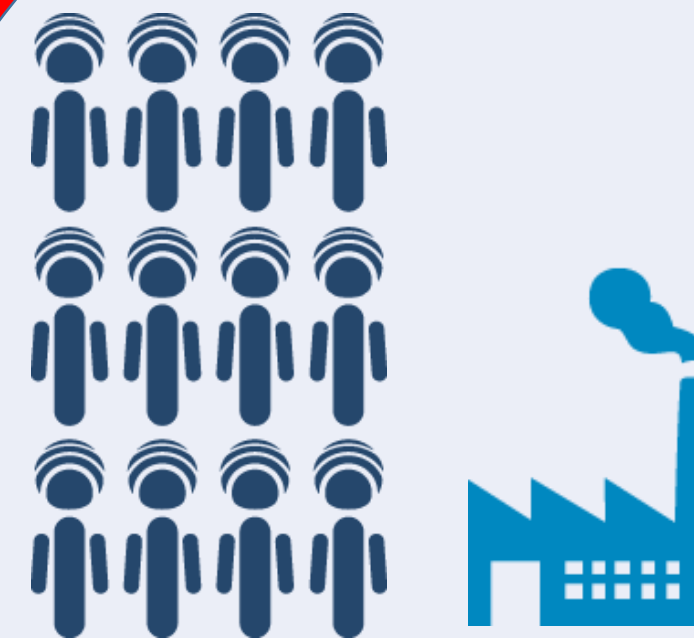
IMAPorter Mobile

Standalone system
Mobile managed
Innovative identification



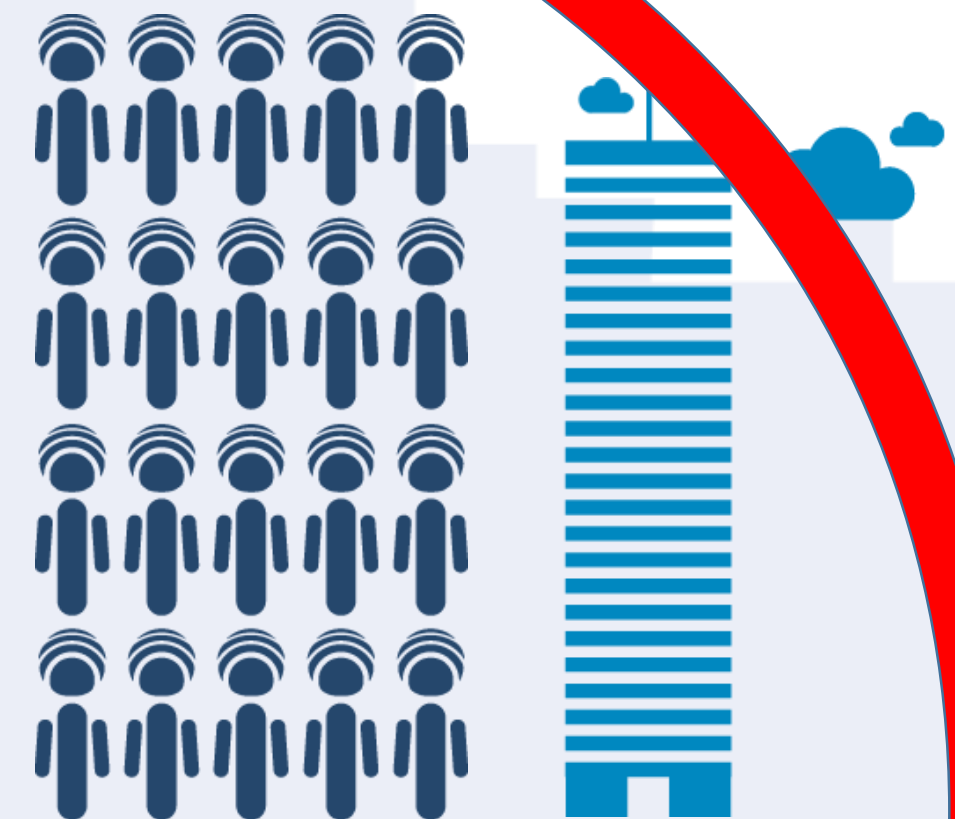
IMAPorter Basic

Centrally managed
Broader usage
Advanced functions



IMAPorter Pro

Robust solution
Universal usage
Interface for integrations



IMAPorter Cloud

Remote control
Variable functions
Cost effective Solutions

ŠKODA Auto (since 1999)

ŠKODA

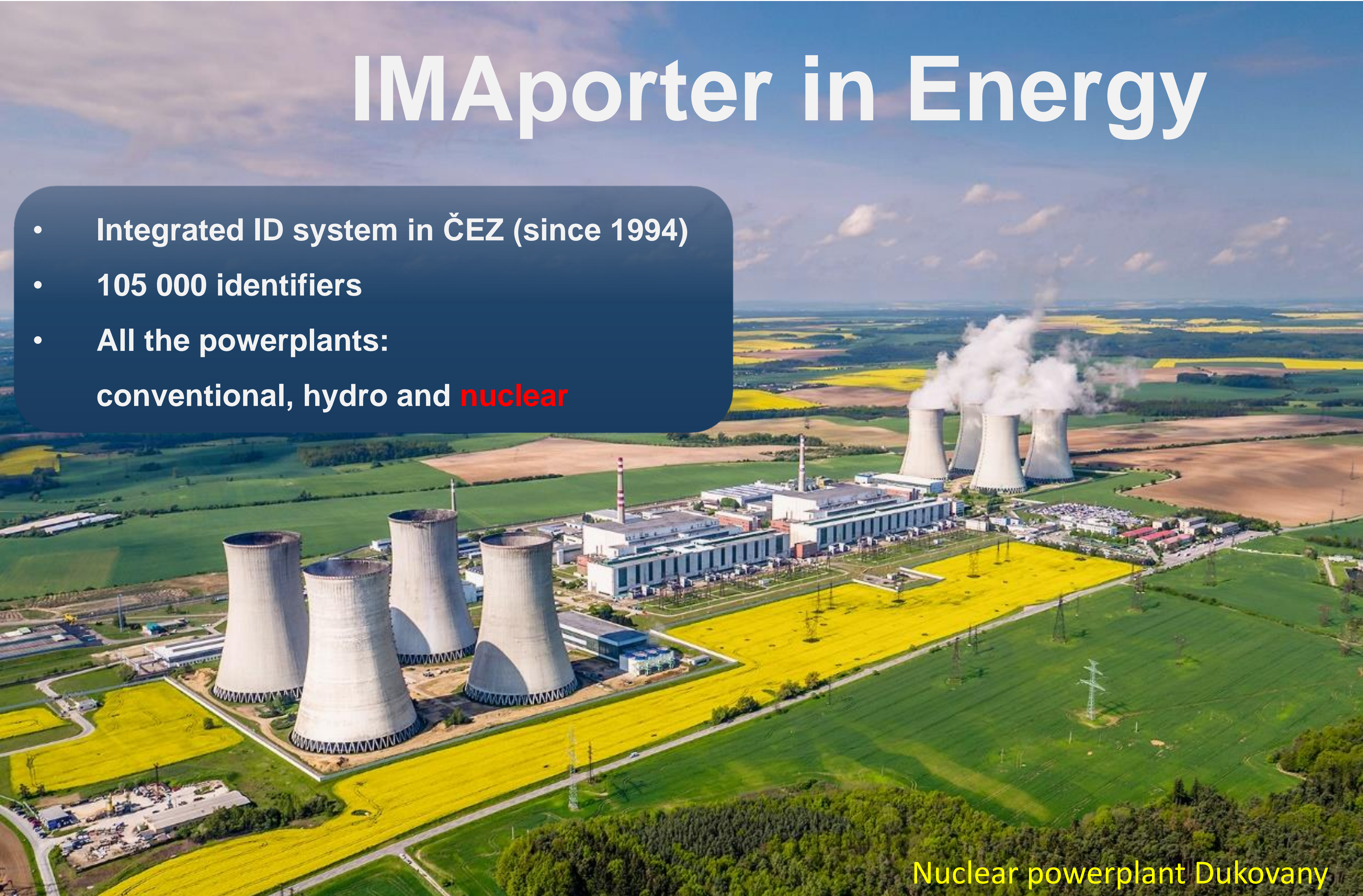


- 40 000 employee cards
- Access, Attendance, Catering, Entry gates, Vending machines, LEGIC media...
- System: IMAporter Pro

The ima logo consists of a stylized white signal icon above the lowercase letters 'ima' in a bold, sans-serif font.

IMAporter in Energy

- Integrated ID system in ČEZ (since 1994)
- 105 000 identifiers
- All the powerplants:
conventional, hydro and **nuclear**



Nuclear powerplant Dukovany

IMAporter for Univesities



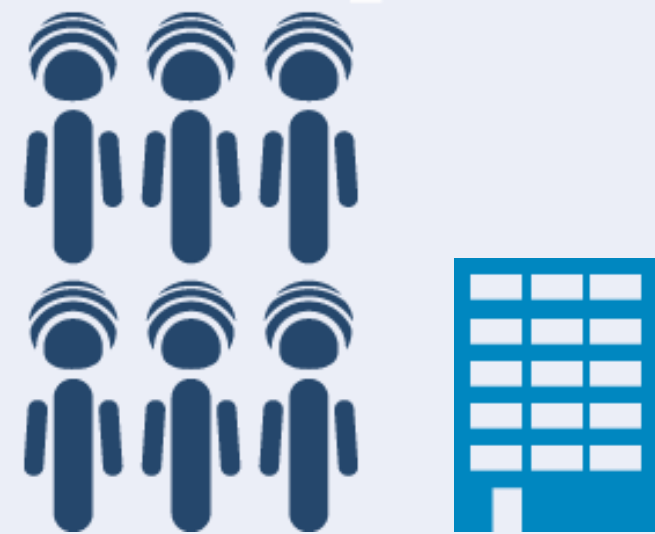
IMAporter Access Control

Scalable physical security solutions for the small and the big



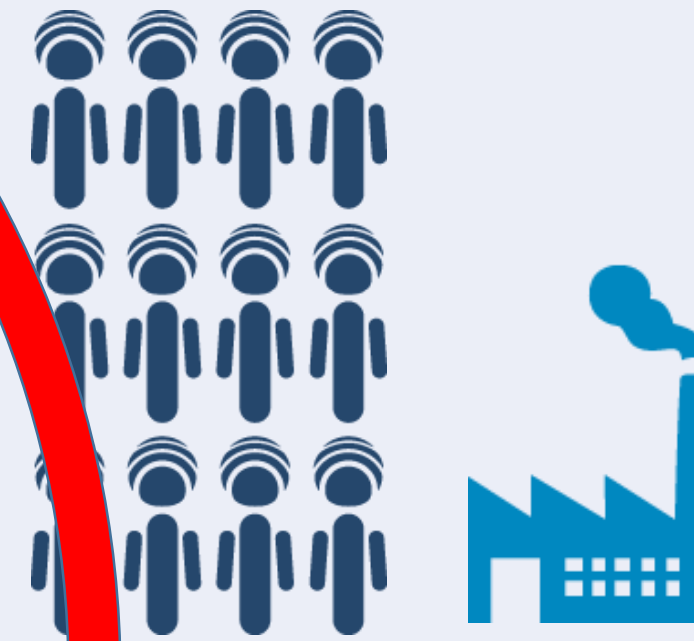
IMAporter Mobile

Standalone system
Mobile managed
Innovative identification



IMAporter Basic

Centrally managed
Broader usage
Advanced functions



IMAporter Pro

Robust solution
Universal usage
Interface for integrations



IMAporter Cloud

Remote control
Variable functions
Cost effective SaaS

Low Power WANs deployment

From IoT towards IoP.....*indirect identification*

Edge / Cloud computing -> bitcoin like reimbursement

DIGITAL FOOTPRINT

- ✓ People are leaving digital footprints. This footprint is collected and processed for multiple purposes
- ✓ IoT provides a mechanism similar to "cookies" in the Internet – the capability to track individuals over time and location



Stockholm Condominium

- Block of buildings
- 90 controlled doors (800 users)
- Integration with entry phones, garage control, MobileAccess (NFC & BLE)
- Central system management
- System: IMAPorter Basic

mBank (PL, CZ, SK)

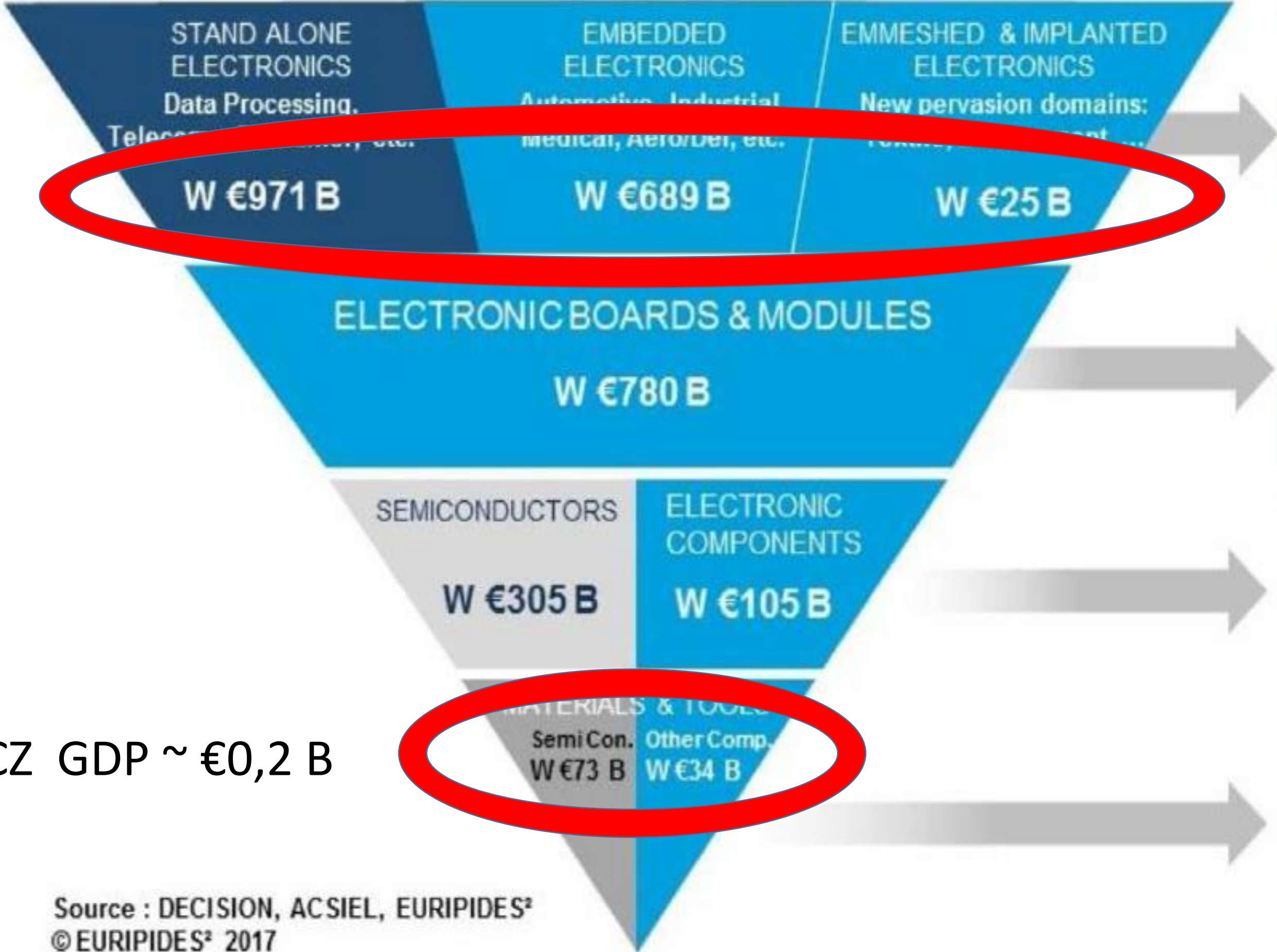


- **MobileAccess system**
- **1 000+ readers**
- **8 500 active employees**
- **System: IMAporter MobileAccess**

Research & Development & Innovations

Nanoelectronics Roadmap for Europe

Electronics and Semiconductor Industry Value Chain in 2016

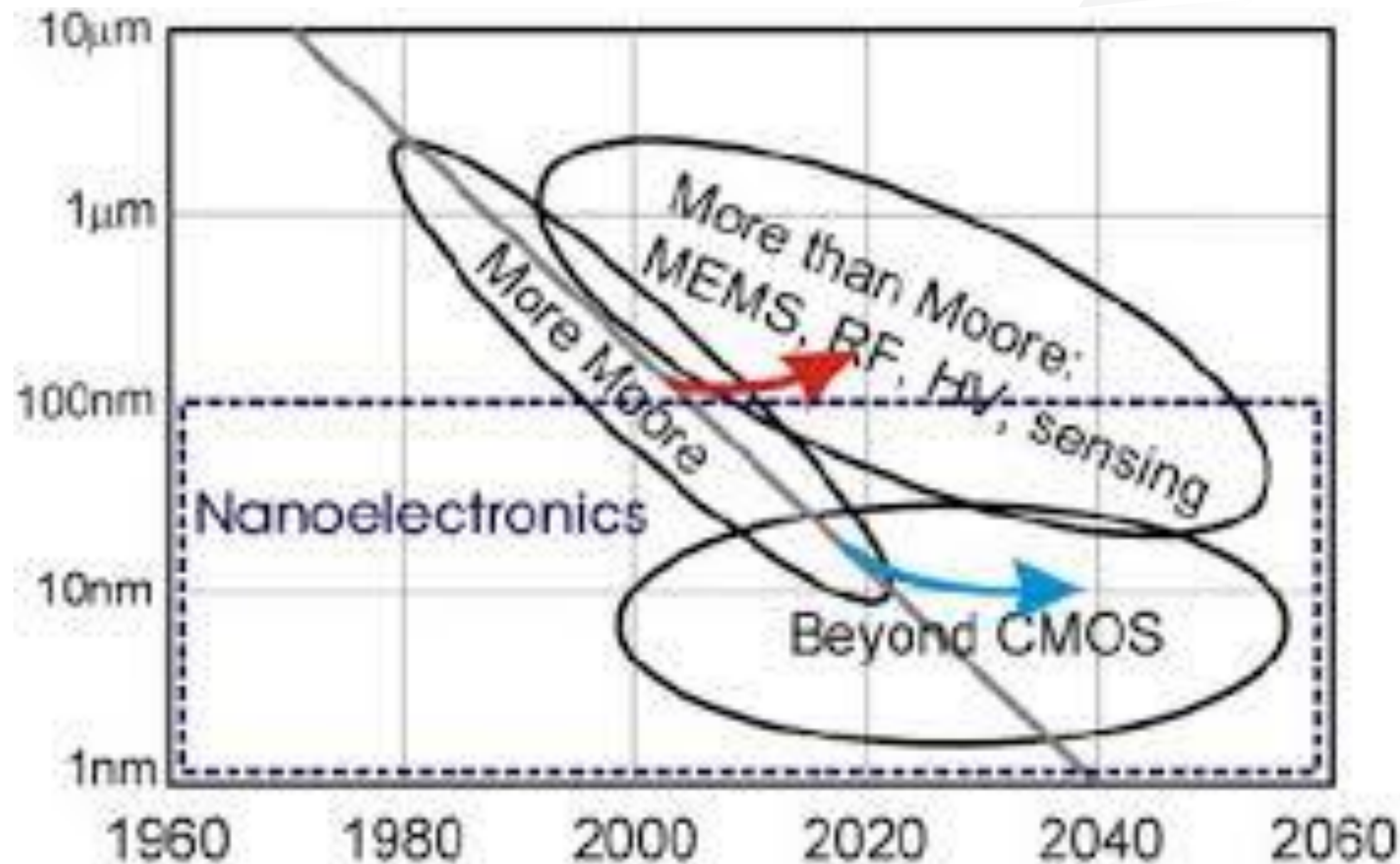


CZ GDP ~ €0,2 B

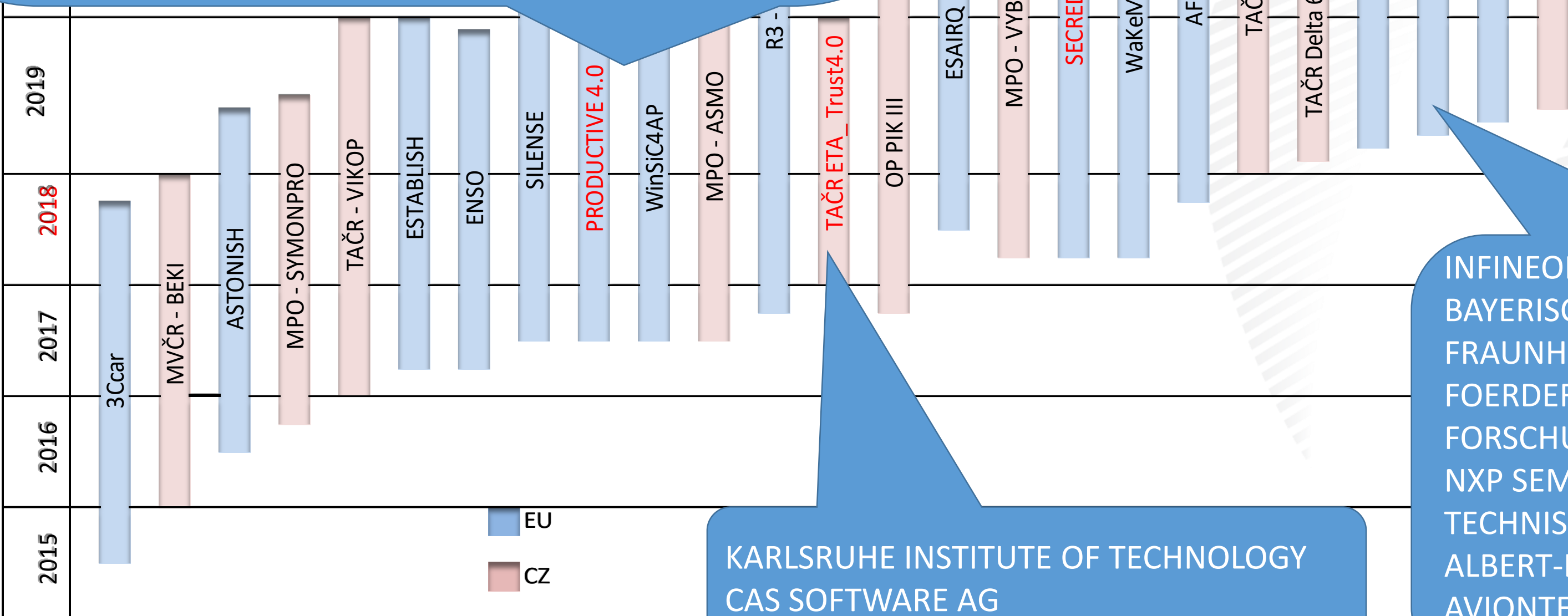
	Prod in Europe (€ B)	% Europe / World
Level 4	253	15%
Of which Embedded Electronics	189	27%
Level 3	75	10%
Level 2	43	10%
Level 1	28	26%
Of which SC	21	29%

Source : DECISION, ACSIEL, EURIPIDES²
© EURIPIDES² 2017

Do we still control novelties..?



INFINEON TECHNOLOGIES AG
 ABB AG
 BAYERISCHE MOTOREN WERKE AG
 INSTITUTE FUR ENGINEERING DESING OF MECHATRONIC SYSTEMS UND MPLM EV
 INFINEON TECHNOLOGIES DRESDEN GMBH& CO KG
 NXP SEMICONDUCTORS GERMANY GMBH
 ROBERT BOSCH GMBH
 SILTRONIC AG
 FABMATICS GMBH
 SIMPLAN AG
 SYSTEMA SYSTEMENTWICKLUNG DIPLINF.MANFRED AUSTEN GMBH
 TWT GMBH SCIENCE & INNOVATION
 XENON AUTOMATISIERUNGSTECHNIK GMBH
 ZS-HANDLING GMBH
 PI4 ROBOTICS GMBH
 FRAUNHOFER GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG E.V.
 FORTISS GMBH
 INSTITUT FUER AUTOMATION UND KOMMUNIKATION E.V. MAGDEBURG
 KARLSRUHER INSTITUT FUER TECHNOLOGIE OFFIS EV
 TECHNISCHE UNIVERSITAET BRAUNSCHWEIG
 UNIVERSITAET MANNHEIM
 UNIVERSITAET ZU KOELN
 TECHNISCHE UNIVERSITAET DRESDEN
 HOCHSCHULE STRALSUND
 SERVA TRANSPORT SYSTEMS GMBH
 KINEXON INDUSTRIES GMBH
 IEMTEC GMBH
 FRIEDRICH-ALEXANDER UNIVERSITAET ERLANGEN NUERNBERG



KARLSRUHE INSTITUTE OF TECHNOLOGY
 CAS SOFTWARE AG

INFINEON TECHNOLOGIES AG
 BAYERISCHE MOTOREN WERKEAG
 FRAUNHOFER GESELLSCHAFT ZUR
 FOERDERUNG DER ANGEWANDTEN
 FORSCHUNG E.V.
 NXP SEMICONDUCTORS GERMANY GMBH
 TECHNISCHE UNIVERSITAET MUENCHEN
 ALBERT-LUDWIGSUNIVERSITAET FREIBURG
 AVIONTEK GMBH
 FORTISS GMBH

INFINEON TECHNOLOGIES AG
 AUDI AKTIENGESELLSCHAFT
 FRAUNHOFER GESELLSCHAFT ZUR
 FOERDERUNG DER ANGEWANDTEN
 FORSCHUNG E.V.
 TECHNISCHE UNIVERSITAET DRESDEN
 TECHNISCHE UNIVERSITAET MUENCHEN

ECO system



- Ⓒ Aeneas – Artemisia
- Ⓒ H2020 – Eureka Clusters: ITEA, PENTA – Eurostars – ECSEL
- Ⓒ European Forum for Electronic Components and Systems
EF ECS 2019 Helsinki
- Ⓒ **Think big + Skills -> Subsidies -> Synergies -> Savings->
Competitiveness**
- Ⓒ Where are the synergies? -> Few examples follow



Cyber Security for Cross Domain Reliable Dependable Automated Systems

DEMO I: Autonomous Driving (leader TNO)

Location: TNO Helmond, Netherlands

DEMO II: Driver Monitoring (leader FICO-ADAS)

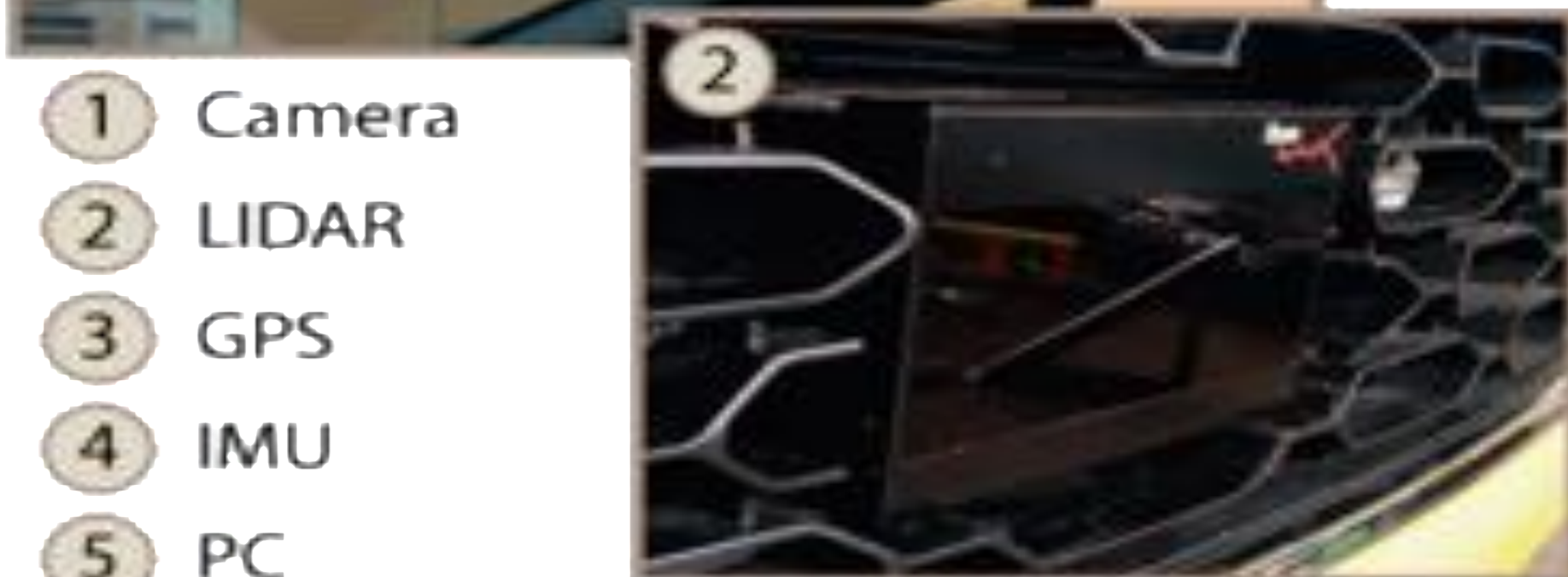
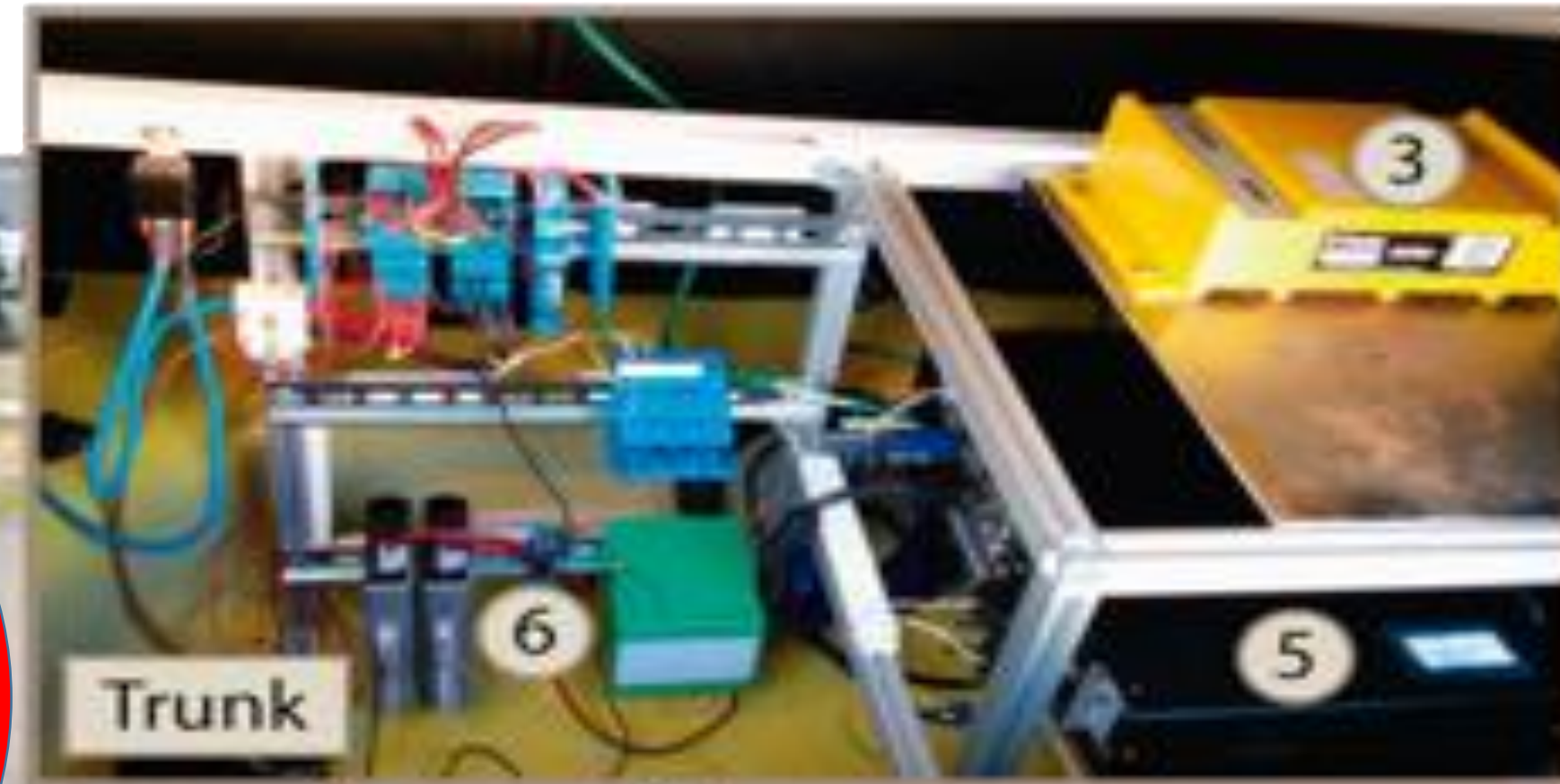
Location: CSIC premises, Spain

DEMO III: Security and Privacy (leader IMA)

Location: IMA premises, CZ

SECRDAS will spend over €51 million on Secure and Safe Automated Systems

SECREDAS

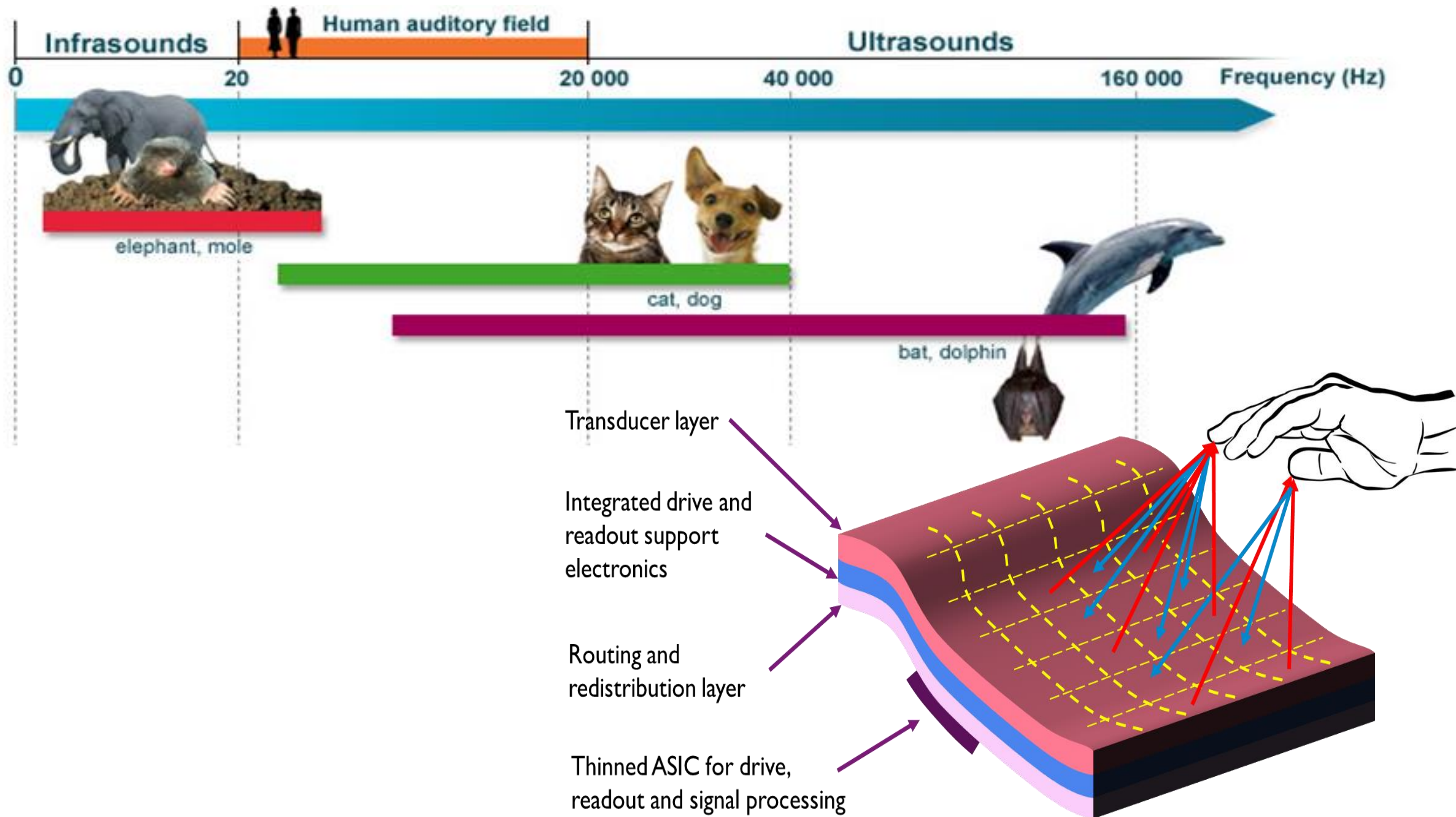


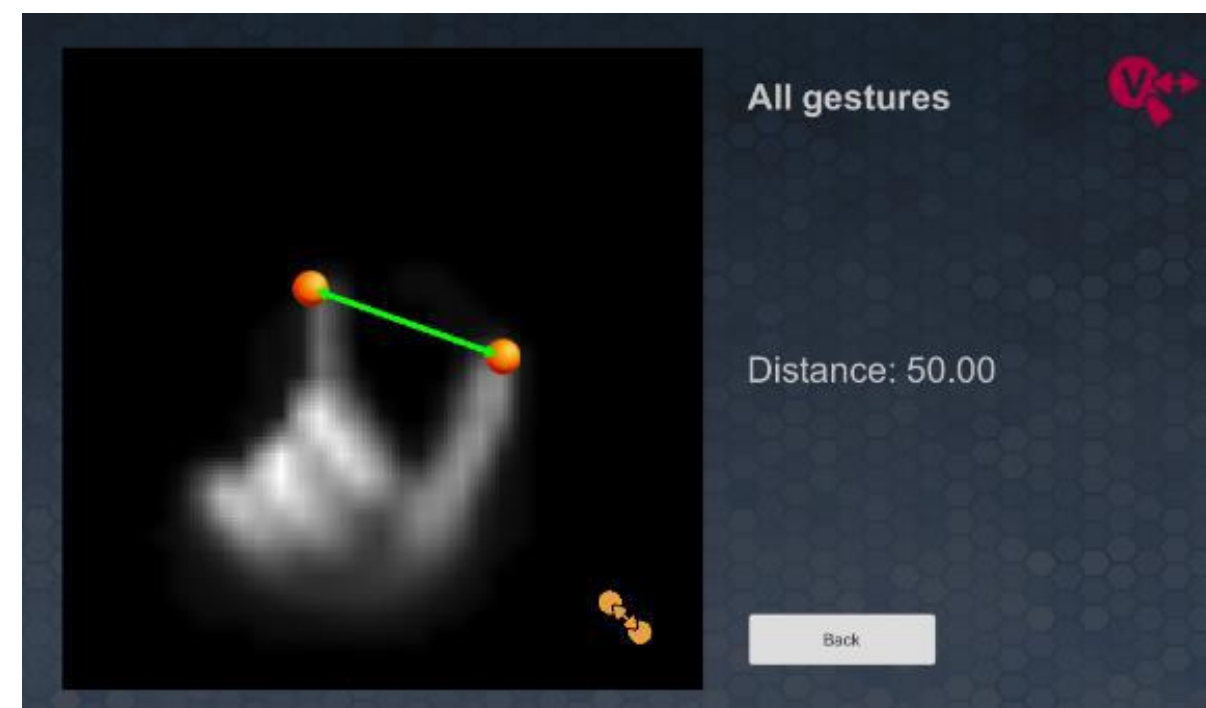
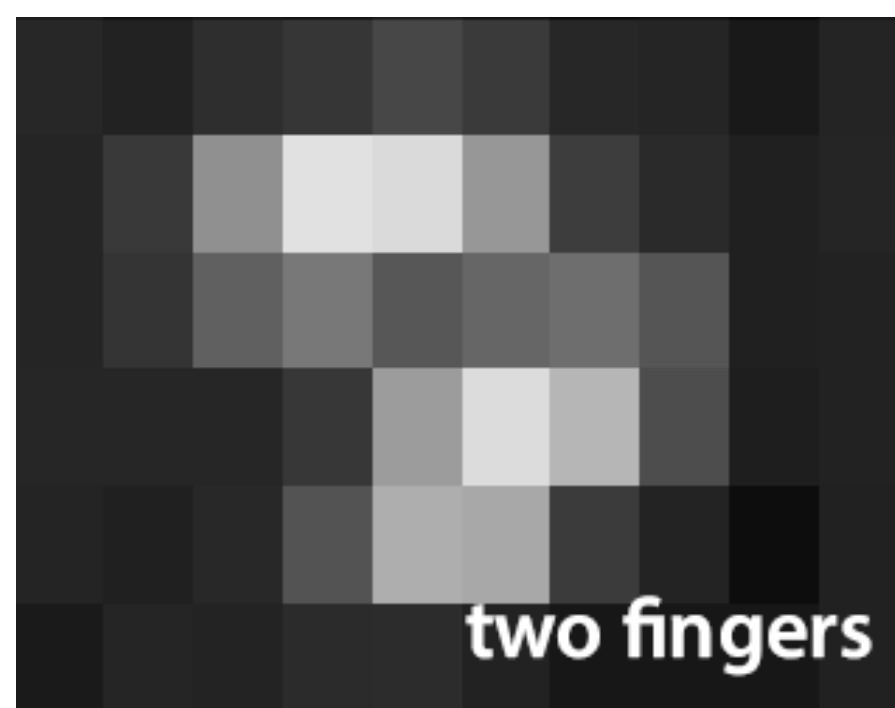
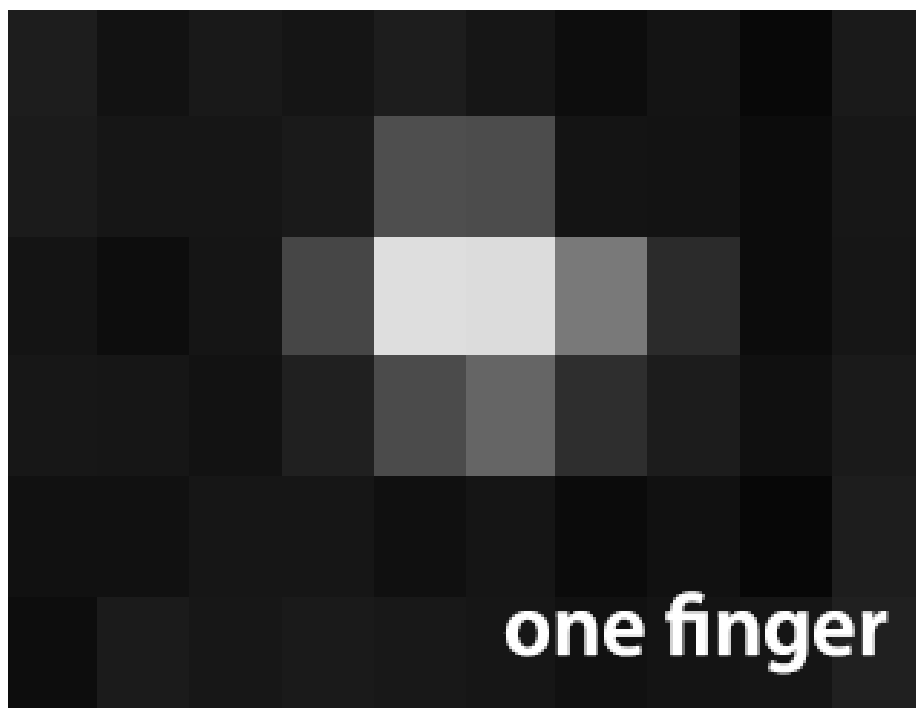
- ① Camera
- ② LIDAR
- ③ GPS
- ④ IMU
- ⑤ PC

- ⑥ A/D I/O modules
- ⑦ Touch screen
- ⑧ Actuators switches



(ultra)Sound Interfaces and Low Energy iNtegrated SEnsors







IMA involvement

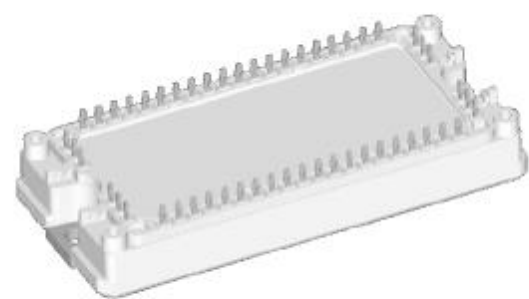
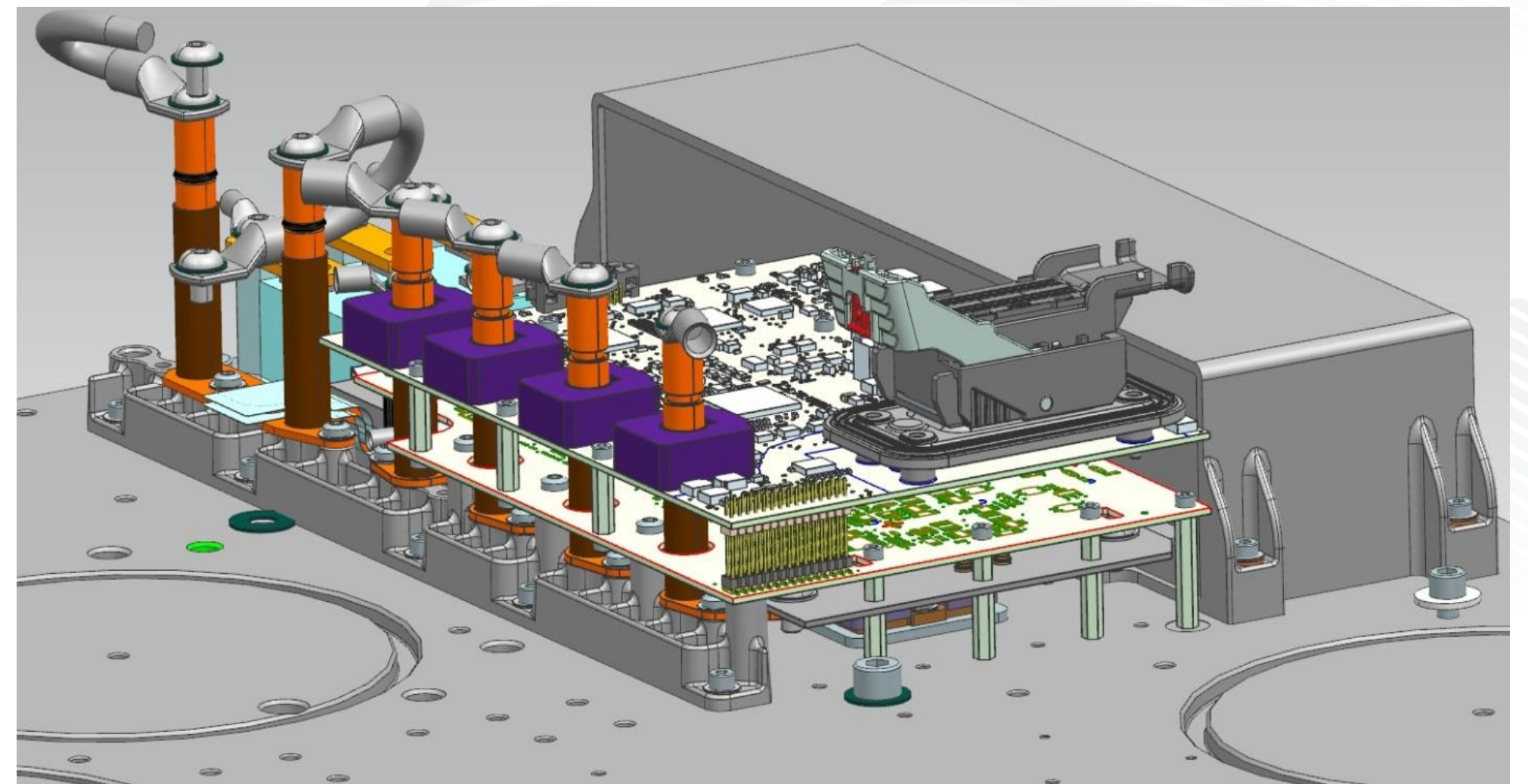
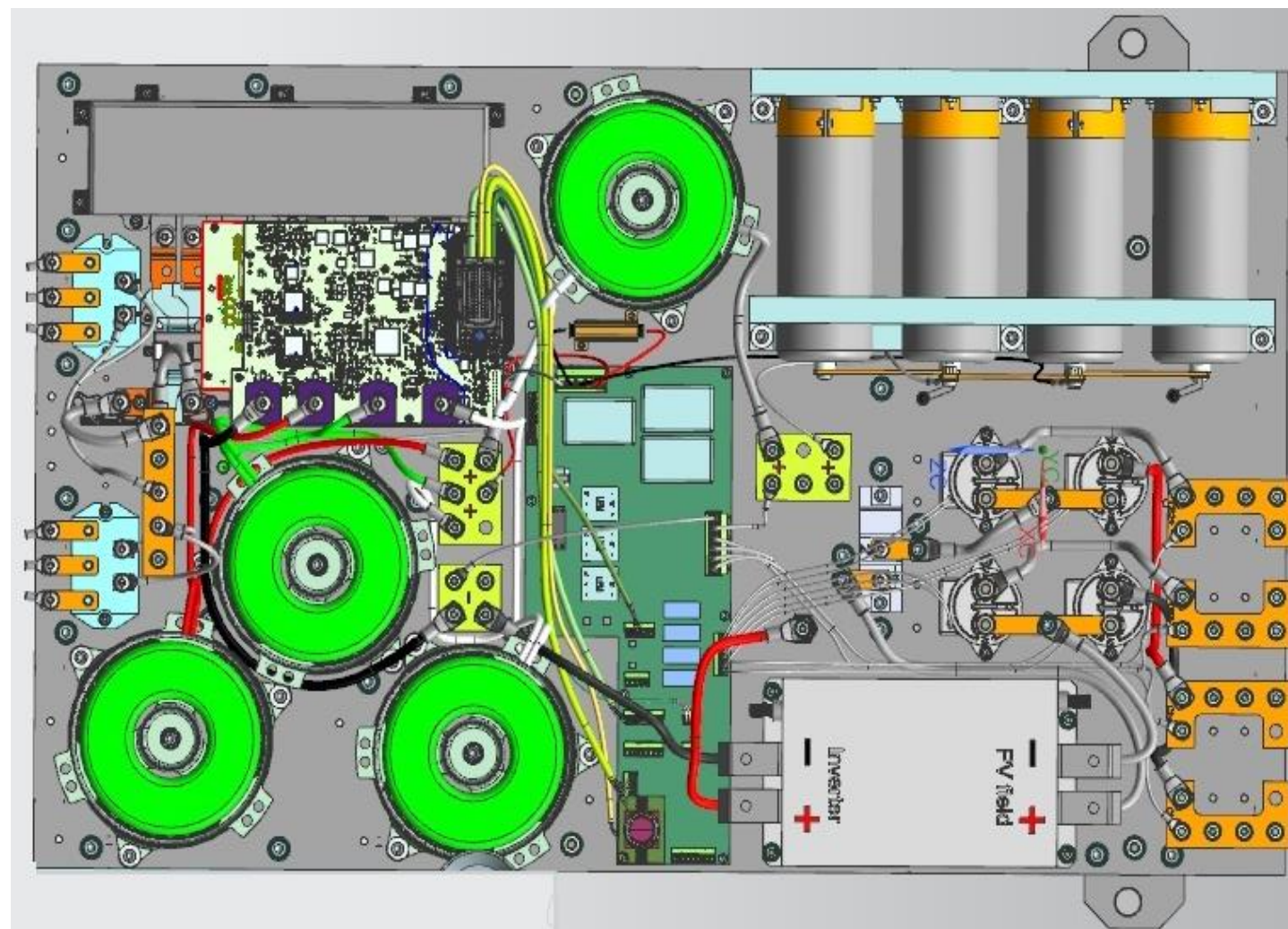
Gesture extension for identification and access control, people movement monitoring, high secure access management.

- Smart motion sensor detects deviation of the **elderly motion profile**. Jeopardy of fall or long lasting immobility is recognized by service SW and application sends alert to relatives.
- Maintenance staff approaches the **gate of the highly secured spaces**, when he's getting closer to the door his **pace is recognized** by the smart access control system



INTERACTIVE POWER DEVICES FOR EFFICIENCY IN AUTOMOTIVE WITH INCREASED RELIABILITY AND SAFETY

DC-DC convertor for fast charging (Bitron / STM)



SiC STA3S75N120P6 power module, developed by ST-I during the project





BBCU: IMA Body and board control unit



Main technical specifications:

- Automotive grade CPU NXP iMX6
- Dualcore ARM® Cortex™-A9 at 1.0 GHz, 2GB DDR3, 32GB eMMC, SD slot
- USB 2.0, 3x SD/MMC 4.4, 1x SDXC, 5x SPI, 5x UART, 3x I²C, 2x CAN, SATA
- Gigabit Ethernet, 100Mbit BroadR-Reach (Automotive Ethernet, NXP TJA1100)
- GSM, GPS, eCALL
- Backup power management - Intelligent power backup
- Accelerator, Temperature measurement, Case opening sensor

Functional features:

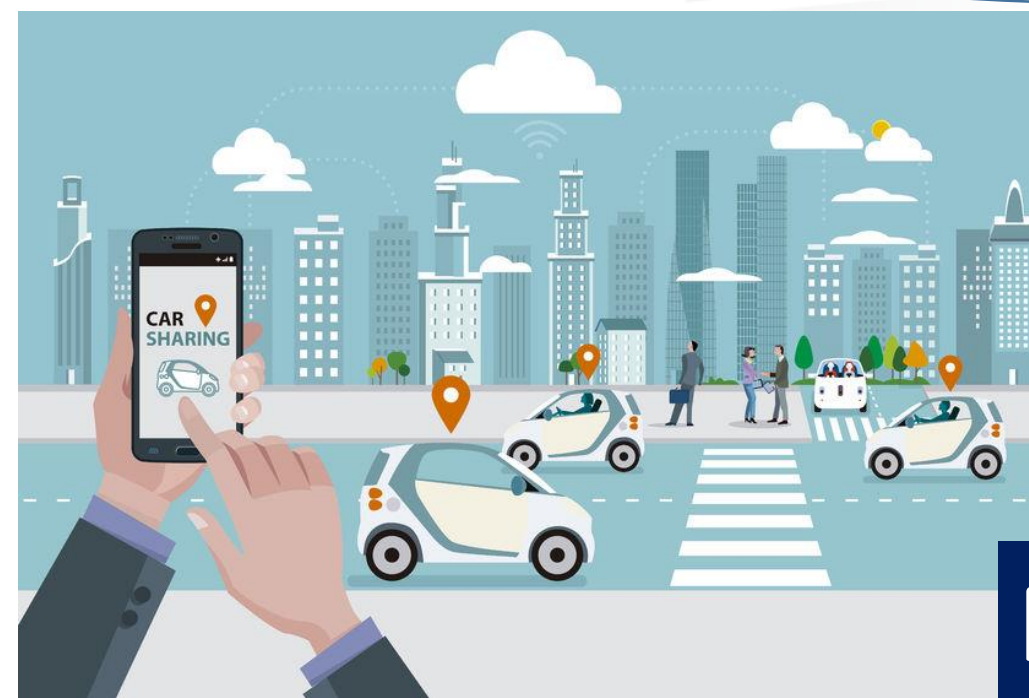
- Designed as the universal communication and monitoring unit
- Can provide CAN2Ethernet transceiver function with many additional advanced functionalities
- Dual Ethernet PHYs – SW switchable between Gigabit and BroadR-Reach
- Transition step between contemporary in-vehicle networks and TT Automotive Ethernet
- Linux based OS with U-boot and kernel 5.x



Are We Ready *for* Building in AI?

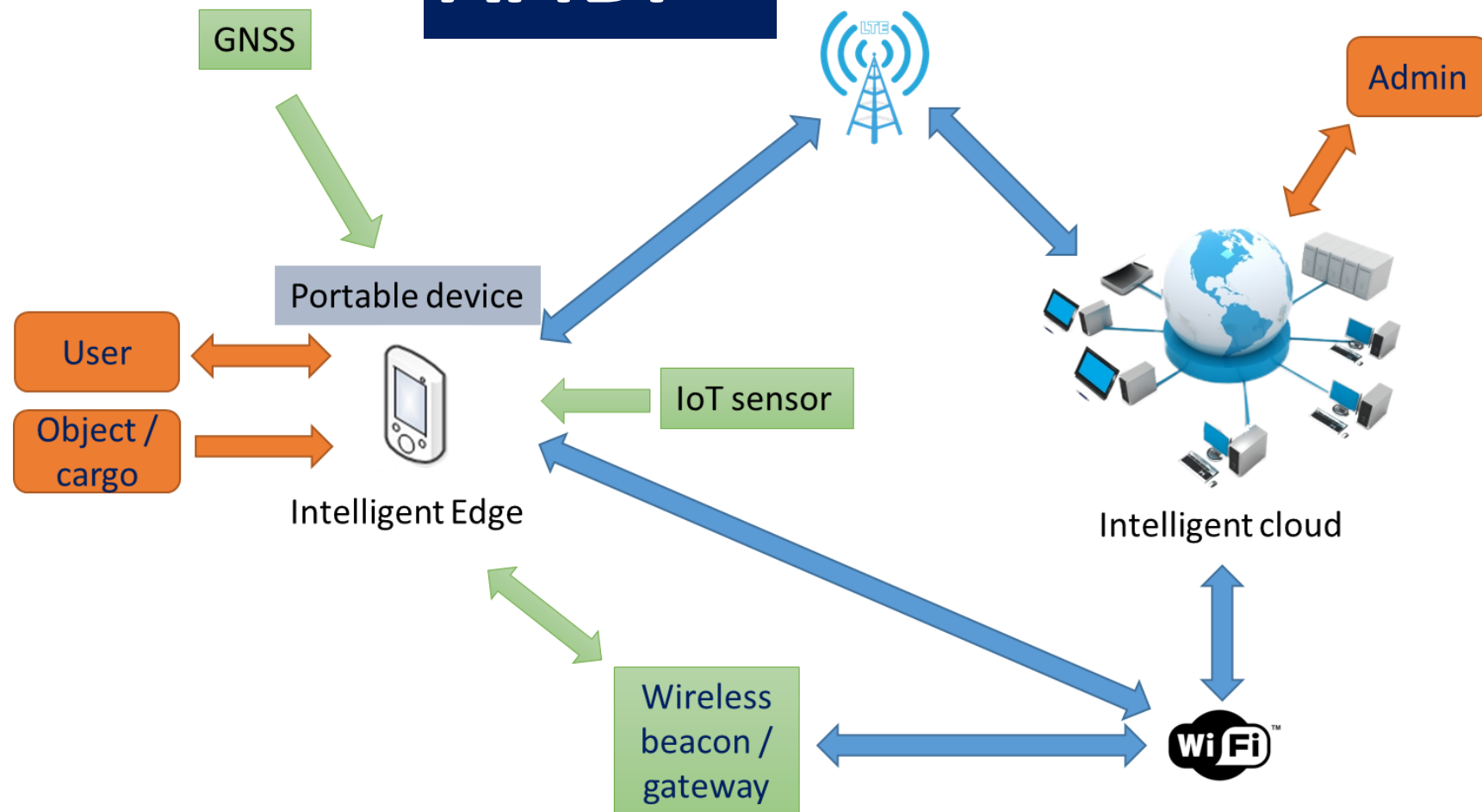
How the AI & Edge Computing helps to Human-Machine interaction and change detection within production and logistics?

How the AI helps to ensure fail-operational functions for a vehicle sharing platform?



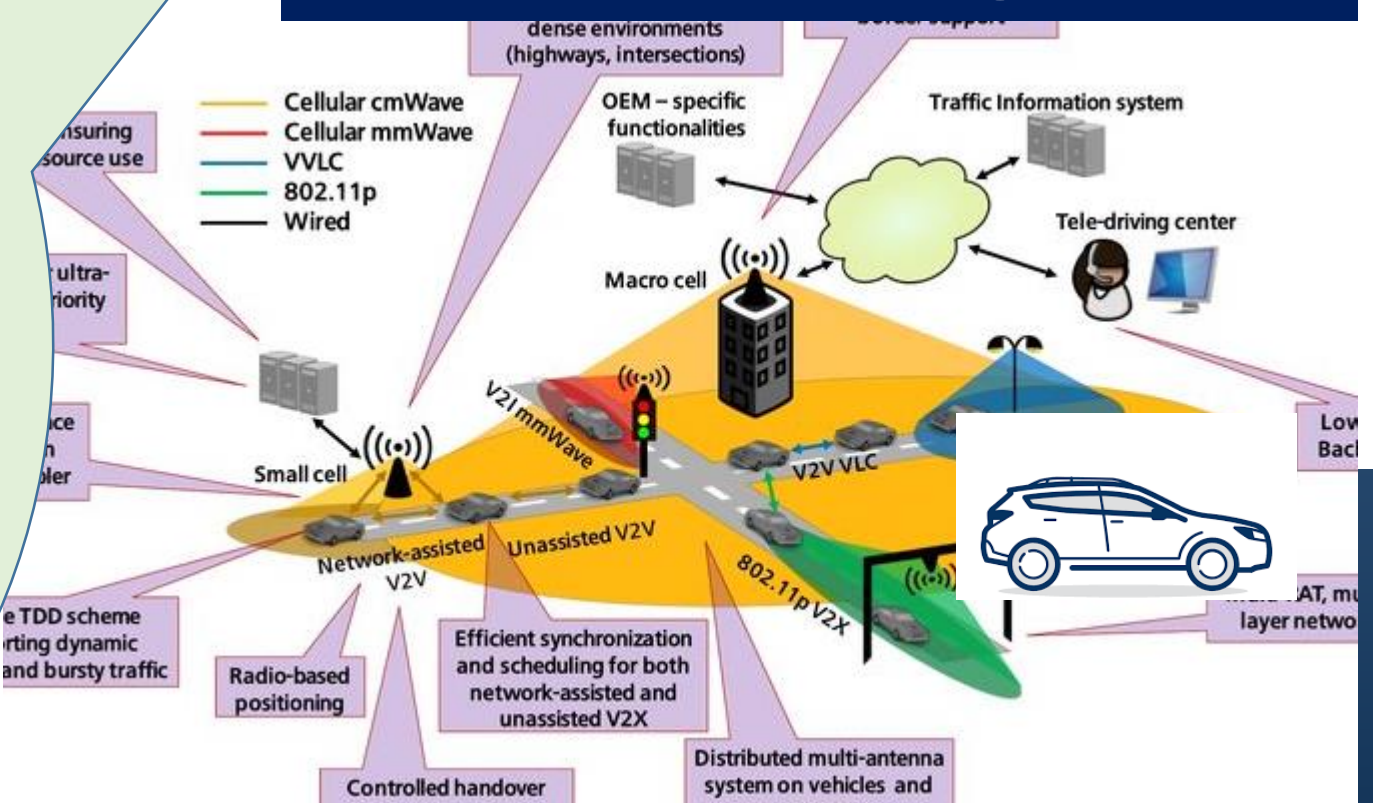
NewControl

AI4DI



How the AI algorithms help to optimize V2I services within an autonomous vehicle sharing platform?

BRAIN (coming soon)





www.ima.cz

tomas.trpisovsky@ima.cz