R&D Projects in IMA

Technology Topics

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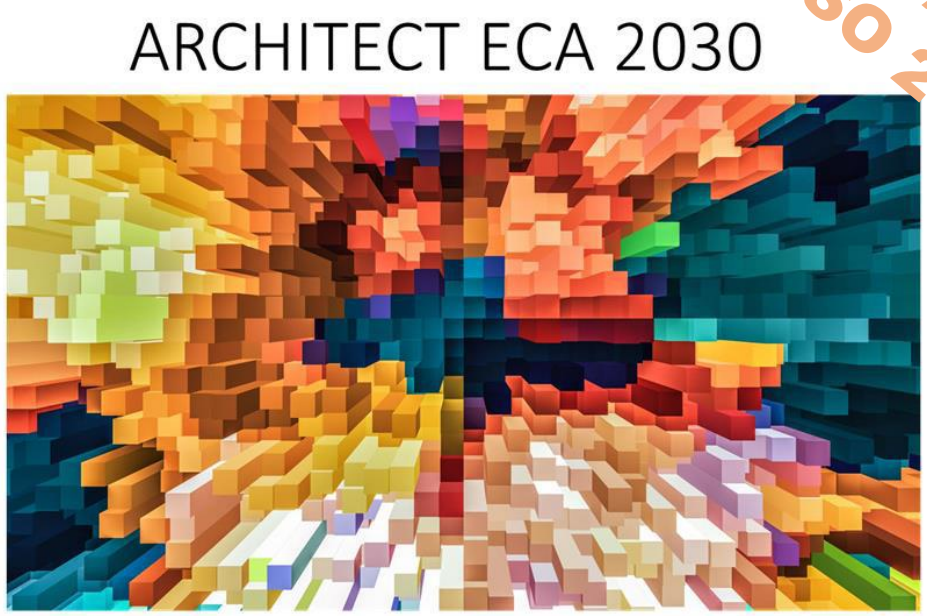
ArchitectECA2030

- Robust mission-validated traceable design of electronic components and systems (ECS)
- Quantification of an accepted residual risk of ECS for ECA vehicles to enable type approval, and
- Increased end-user acceptance due to more reliable and robust ECS.

IMA challenges w.r.t. standards

- How to collect requirements on the Test Code (TC) & Code Review (CR)
- How to set up methodology and criteria for TC development and CR
- How to apply CR methodology
- How to perform validation test
- How to evaluate test results

ISO/PAS 21448
ISO 26262



Trustable ECS Value Chain for L3, L4, L5 vehicle

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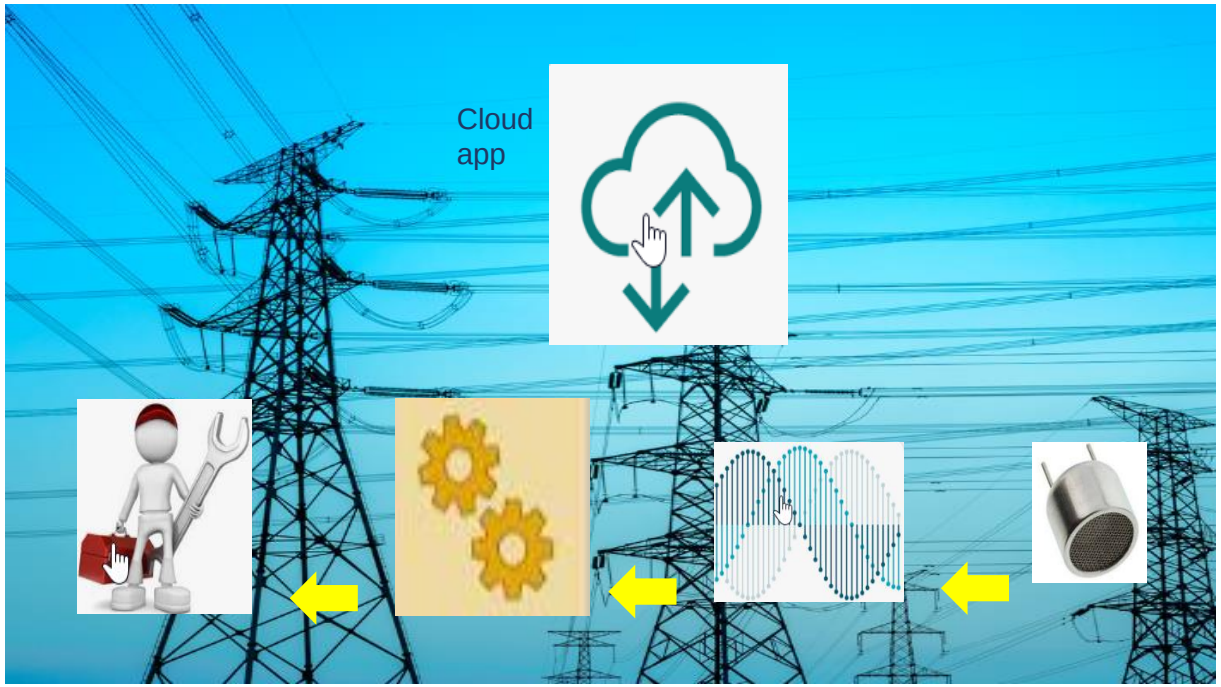
Listen2Future

- New materials for high volume piezoelectric acoustic transducers
- Size reduction > higher sensitivity > consumption reduction > demonstrating the dual frequency PMUTs > more efficient piezoelectric thin film materials > improving ASIC immunity against ultrasound attacks in voice control systems

IMA owner of the UC <Infrastructure monitoring and maintenance optimization>

- Partners: UTIA, BUT, SINTEF, IFAT, IFD, CODA
- Localization and identification of issues on electric distribution network, specifically within substation.
- Reduction of an unexpected breakdown of critical components and avoid unexpected maintenance
- AI experience utilization



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A-IQ Ready

IMA is partner of Safe co-existence of automated and manual transport at industrial sites - Industrial park demonstrator

IMA challenges

- Improvement of human safety using a radar-based platform (RBP) implementation on industrial machines (Reachstacker Kalmar)
- MA seeks to build a base for a new product that consists of the system for monitoring and detection of the objects and obstacles, software services processing and interpreting the sensor data. AI model will be implemented.
- Investigation of processes at container terminal in Prague
- RBP system demo at Kouvola Rail and Road Terminal (Finland)

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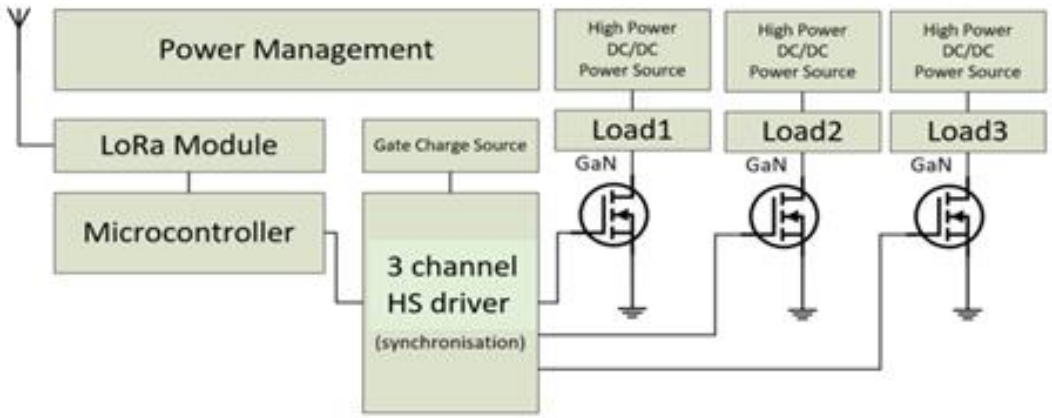
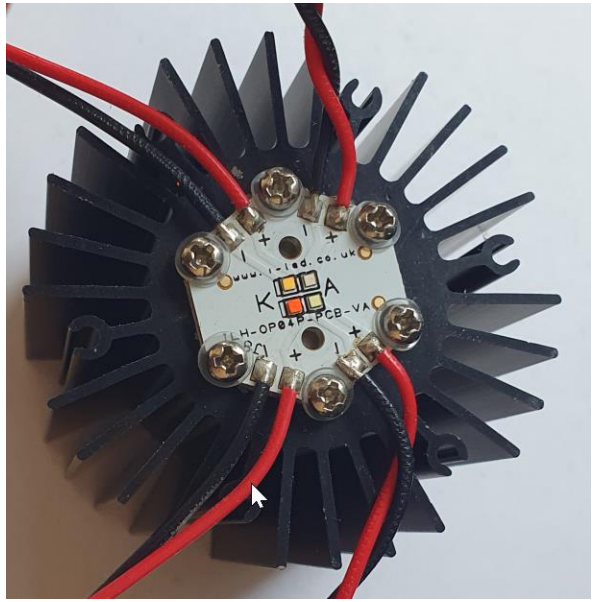
Gan4AP

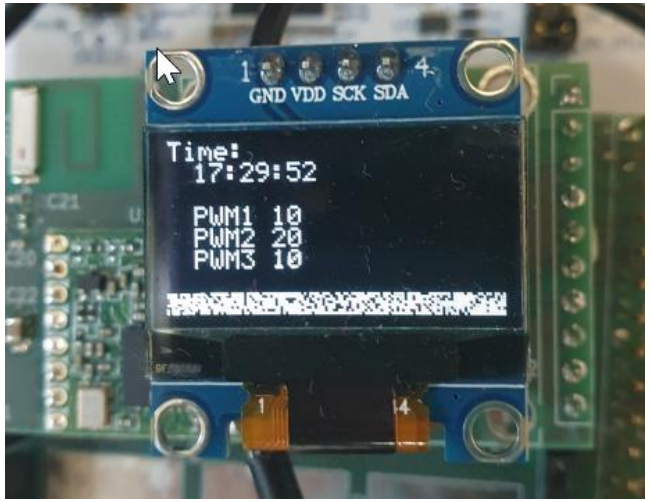
- Gallium nitride (GaN) is a wide-bandgap material that could take electronic performance to the next level
- New generation of vertical power GaN-based devices on MOSFET architecture
- New concept high-frequency packages that can achieve the requested 99% power conversion efficiency.

IMA challenge

GaN-based power actuator for remote control in industry digitalization and IoT network







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SA4CPS Situational awareness for critical cyber-physical systems

- Sensor systems design and implementation,
- Ultrasonic and Time of Flight technology for object movement detection,
- AI & ML tool chain application

IMA challenge

- AI based sensor system for a monitoring of an interaction among humans and machines (based on neural networks)
- An early alert service for collision avoidance
- Data sets acquisition for objects (HM) featuring
- Situation modeling
- Digital twin approach for system testing and training

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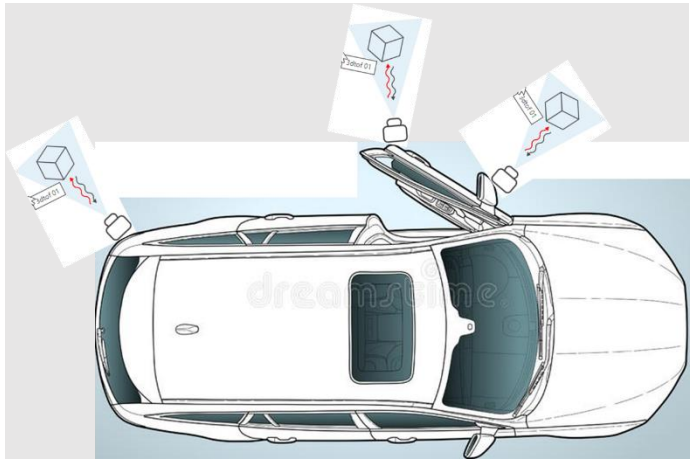
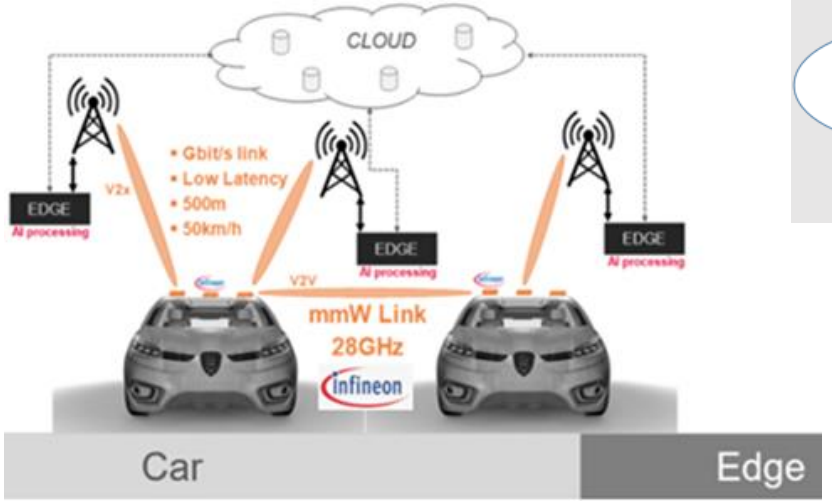
AI4CSM

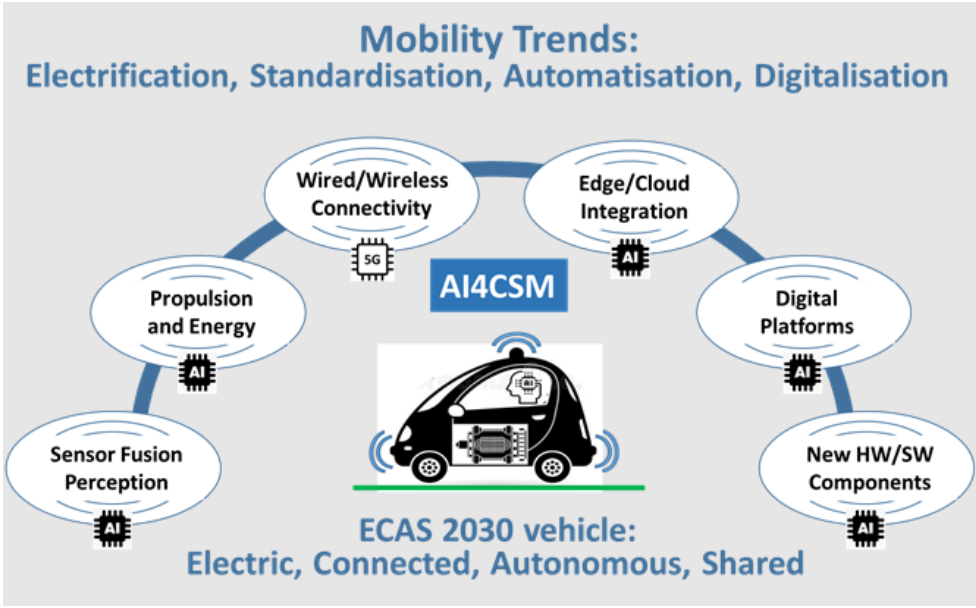
Automotive Intelligence for Connected Shared Mobility

Perception, Sensor Fusion



Connectivity & Communication





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StorAIge

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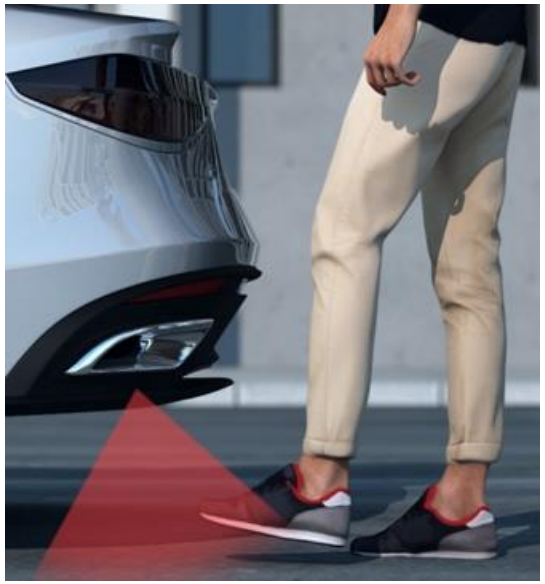
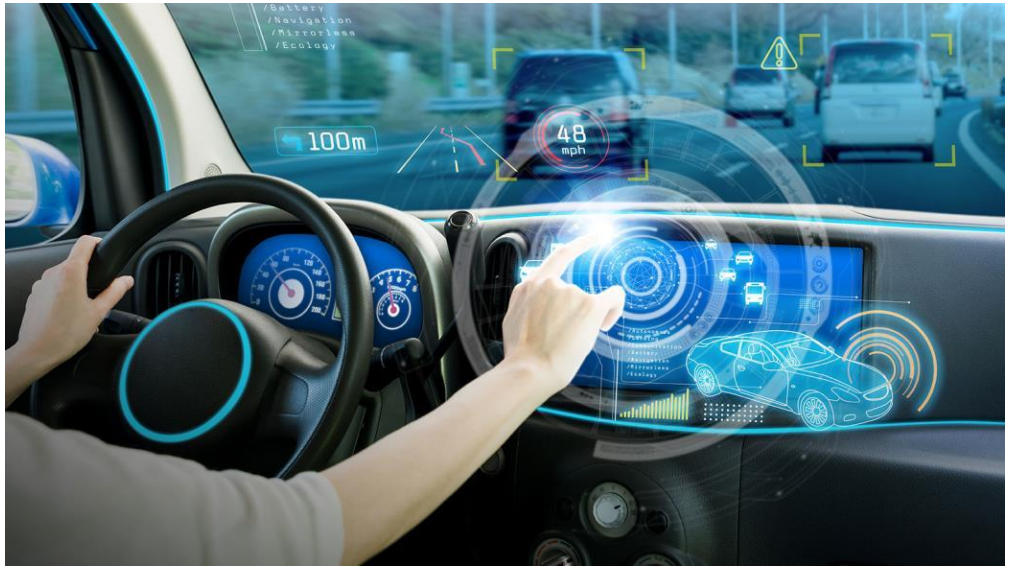
ima

Embedded storage elements on next MCU generation ready for AI on the edge

IMA challenges

- Low resolution Time of Flight sensor matrix gesture recognition
- Embedded Neural network data processing
- Algorithmic generalization





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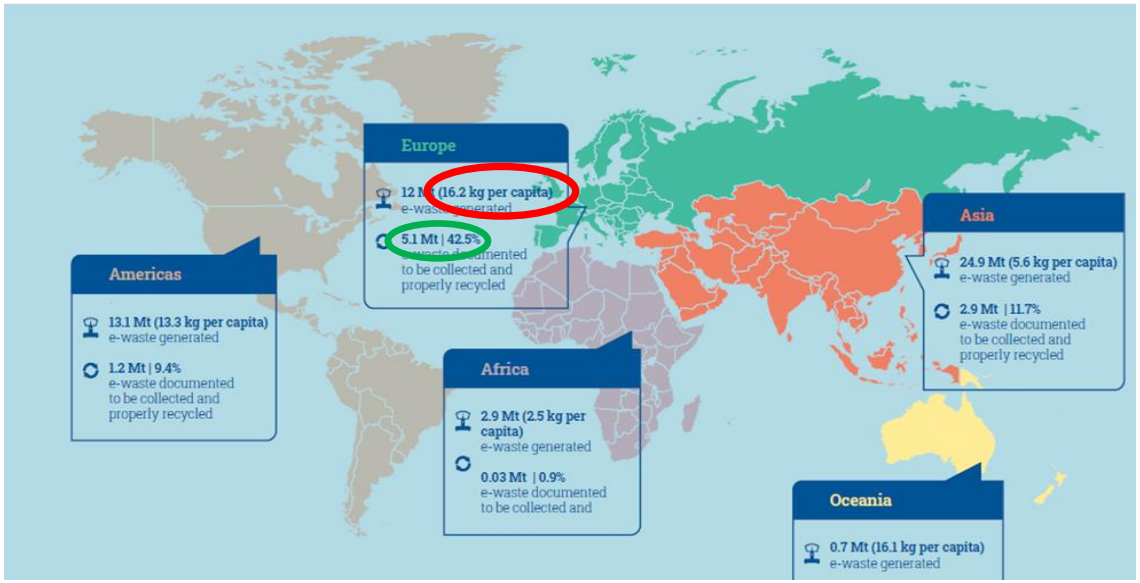
EECONE European ECOsystem for GreeN Electronic

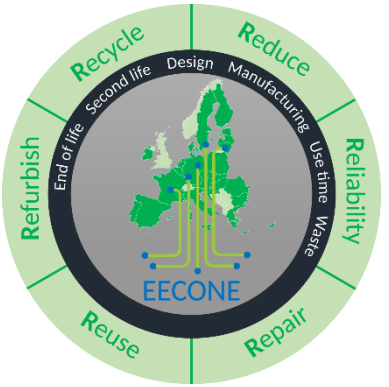
Environmental impact is far beyond energy!

IMA challenges

- Reusable modular architecture
- Functional integration for decreasing components count and energy consumption
- System lifetime prolongation
- OTA
- Life-time respecting mission profile investigation



Source: The Global E-waste Monitor 2020 (United Nations University)



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