

ADACORSA

ADACORSA - Airborne data collection on resilient system architectures

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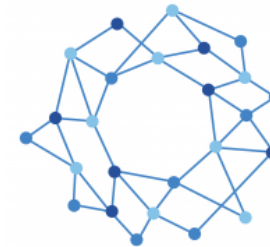
<https://adacorsa.eu/>

Pilot case for drones, forestry and AI powered analysis at the edge

FIIF event: **Edge AI in Industry**
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European
Commission

Horizon 2020
European Union funding
for Research & Innovation



ADACORSA – Why – what – how

ADACORSA is a project to develop sensor and communication technologies for drones, with the strategic aim of:

- Helping unlock potential in long-range BVLOS (beyond visual line-of-sight) drone operations
- Contributing to higher public and regulatory acceptance of drone use
 - More robust and reliable technologies, better sensors via fusion and more reliable communications via integration of data links
- Further strengthen integration of automotive and drone industry
 - World-class sensors from automotive industry
 - Commercial off-the-shelf data communication technologies and services
 - Design for automotive-style efficient production of components and subsystems
- Align with new and upcoming European and world-wide regulations for drones
 - Focus on the Specific Category via approvals under the SORA procedure



- EU ECSEL project, May 2020 to April 2023
- 50 partners, total budget 42 MEUR
- Lead: Infineon, Germany
- Most participants from: Germany (12), Netherlands (9)
- Finnish sub-consortium: Tampere University, Nokia, CrossControl

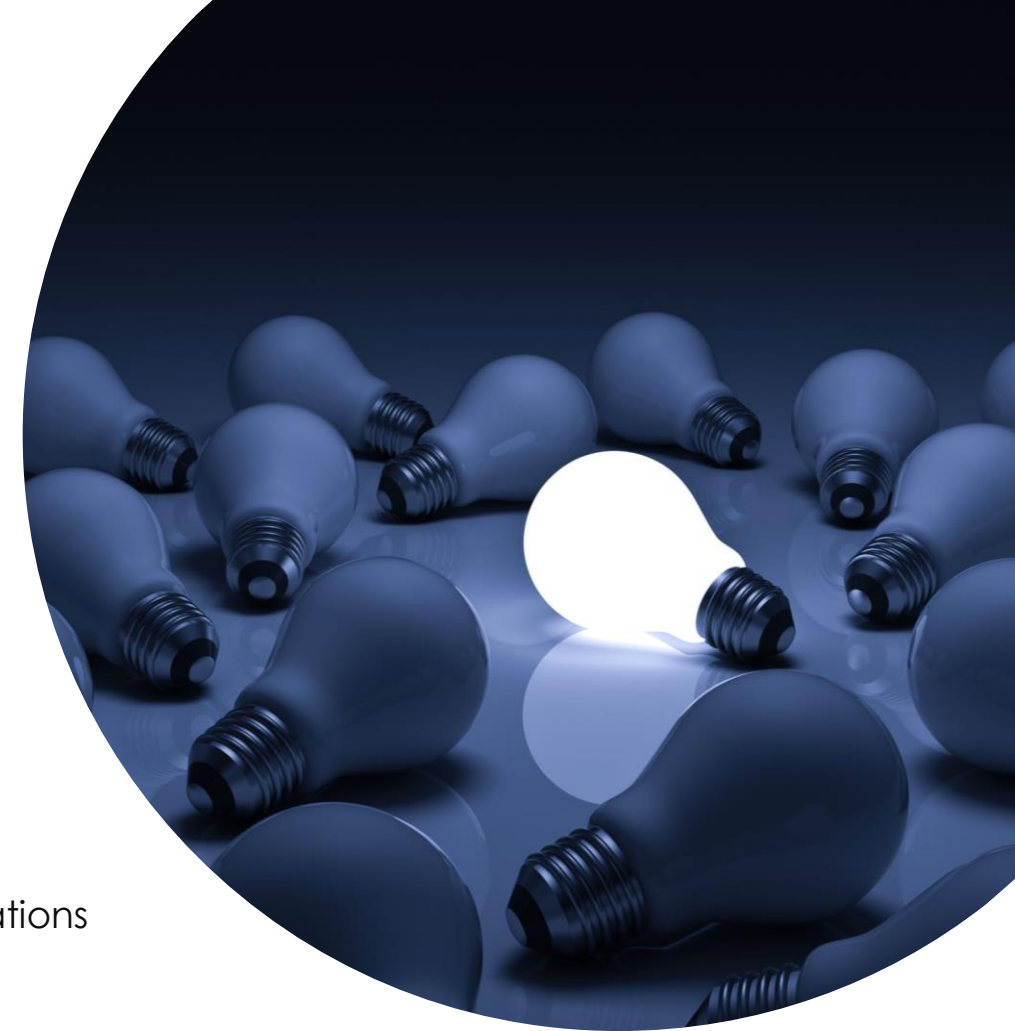
Project vision

Provide European technology to render drones as a safe and efficient component of the mobility mix, with differentiated, safe and reliable capabilities in extended beyond visual line of sight (BVLOS) operations.

Utilize automotive sense and control technologies, as well as commercial off-the-shelf communication technologies, and apply innovative security features to reach adequate safety levels for modern unmanned aviation.

Mission

- Develop technologies for operations beyond visual line-of-sight
 - Regulatory framework: EASA Specific Operations Risk Assessment (SORA)
- Develop technologies that contribute to increased trust in civilian drone operations
 - Higher reliability of data and communications increase trust
 - Increased trackability of drones, transparency of operations
- Bring relevant automotive technology to the drone industry
 - Cost-effective and tested on ground
- Leverage European primacy in automotive technologies and strengthen industry's capability in cross-domain technologies



Motivation for the European electronics industry

Long-range drones is an important topic for European competitiveness:

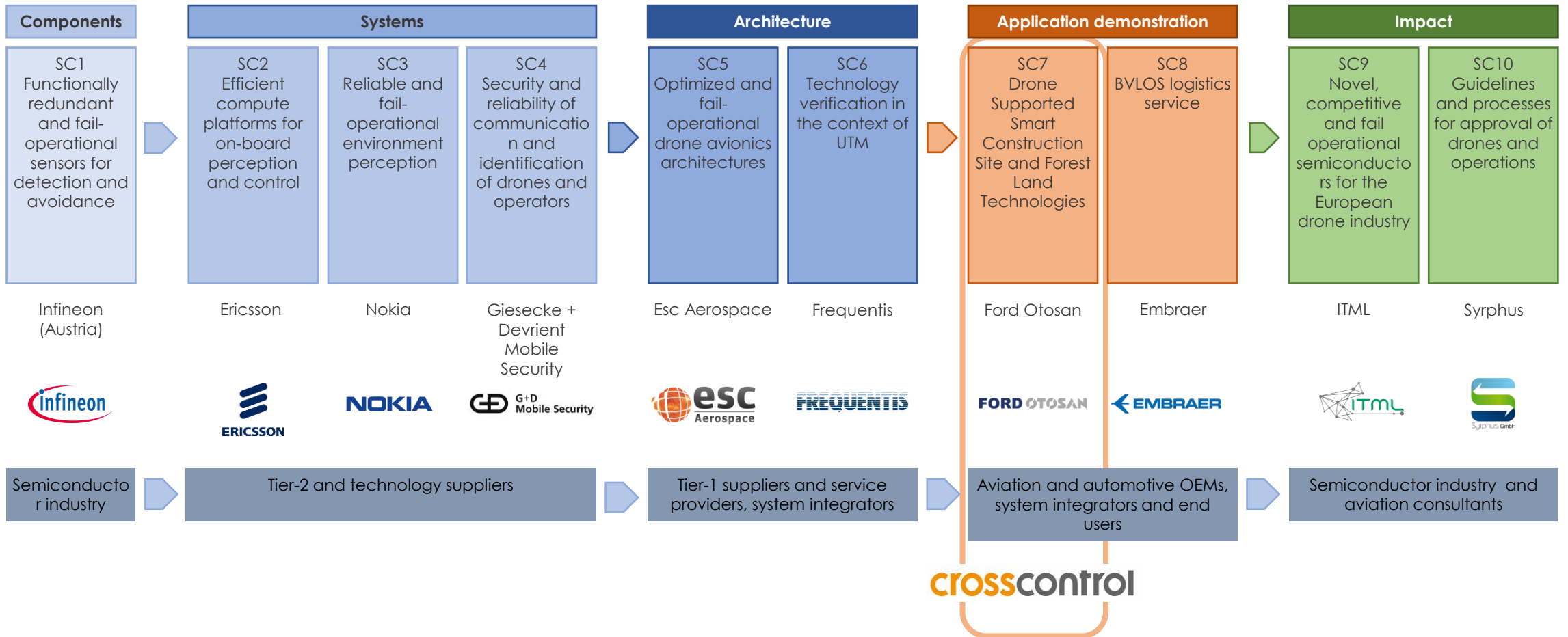
- Urban air mobility is gaining acceptance among European cities
 - Supported by certified drones and common regulations
 - Mobility of goods, e.g., parcel delivery up to 5 kg
- Drones are the fastest-growing aviation market segment
- Untapped economic potential in long-range operations to be unlocked
- Competitive manufacturing requires automotive-style supply chains
- Europe has the right mix of research, manufacturers and regulators



Participating countries

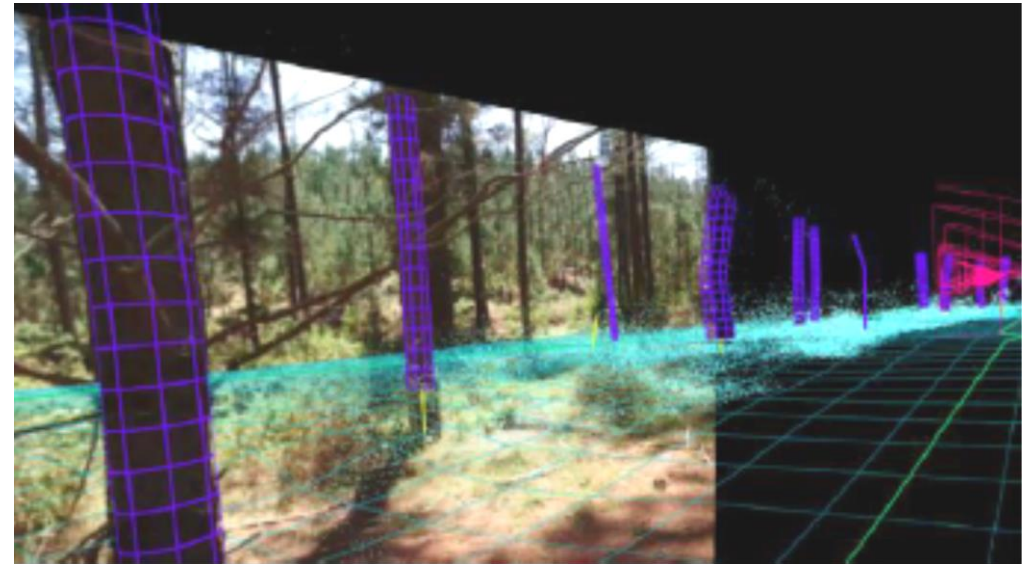
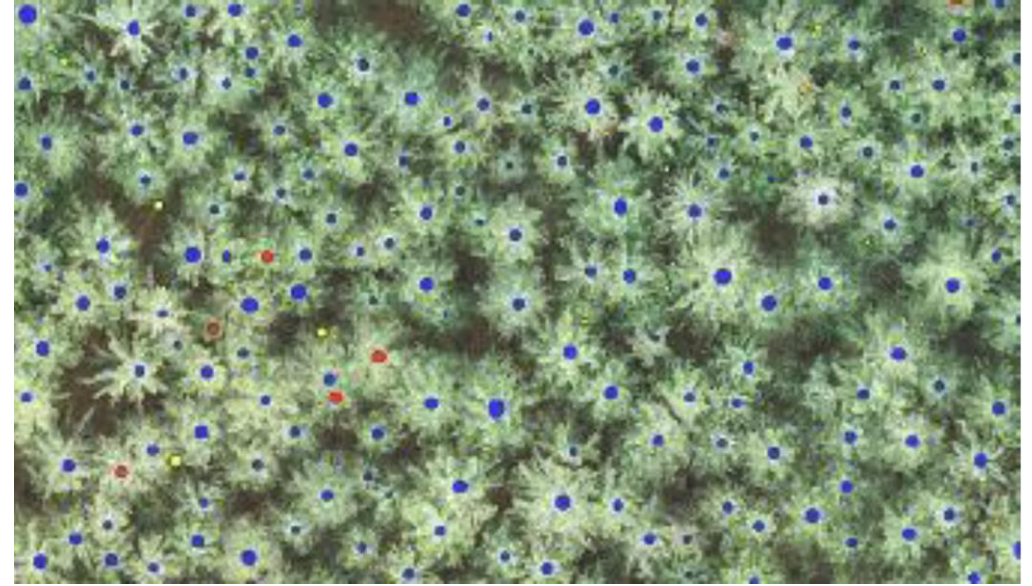


ADACORSA – Supply chains

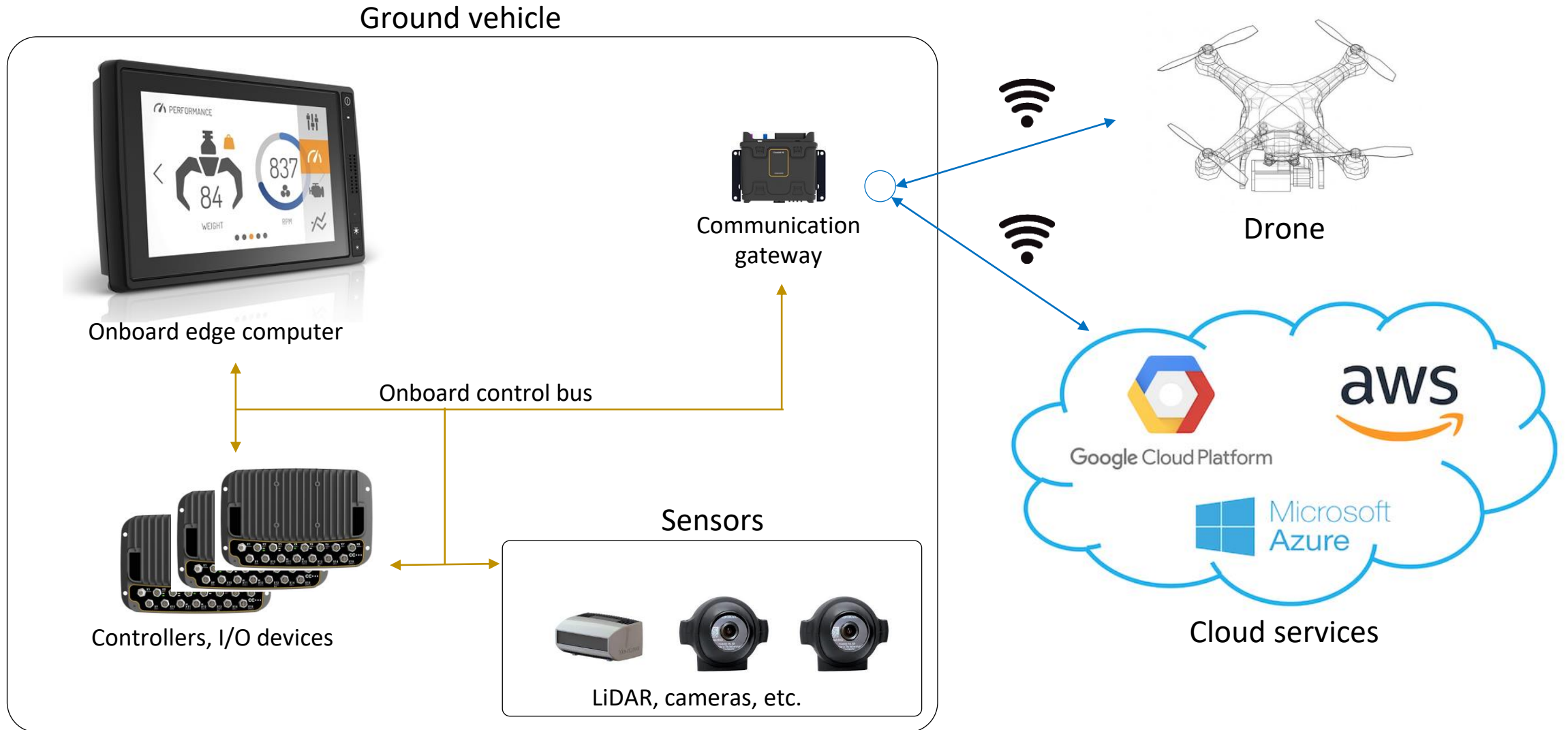


ADACORSA – Forest inventory at the edge

- Data feed (camera, LiDAR, other sensors) collected by the drone
 - Over the canopy: tree heights, locations
 - Terrestrial flight below the canopy: log width, species
- Drone and onboard computing by Avular (NLD)
- Algorithms by Katam (SWE) and University of Lund (SWE)
- Post-flight analysis at the edge computing platform by CrossControl
 - Moving the analysis from cloud to the AI-powered edge at the field

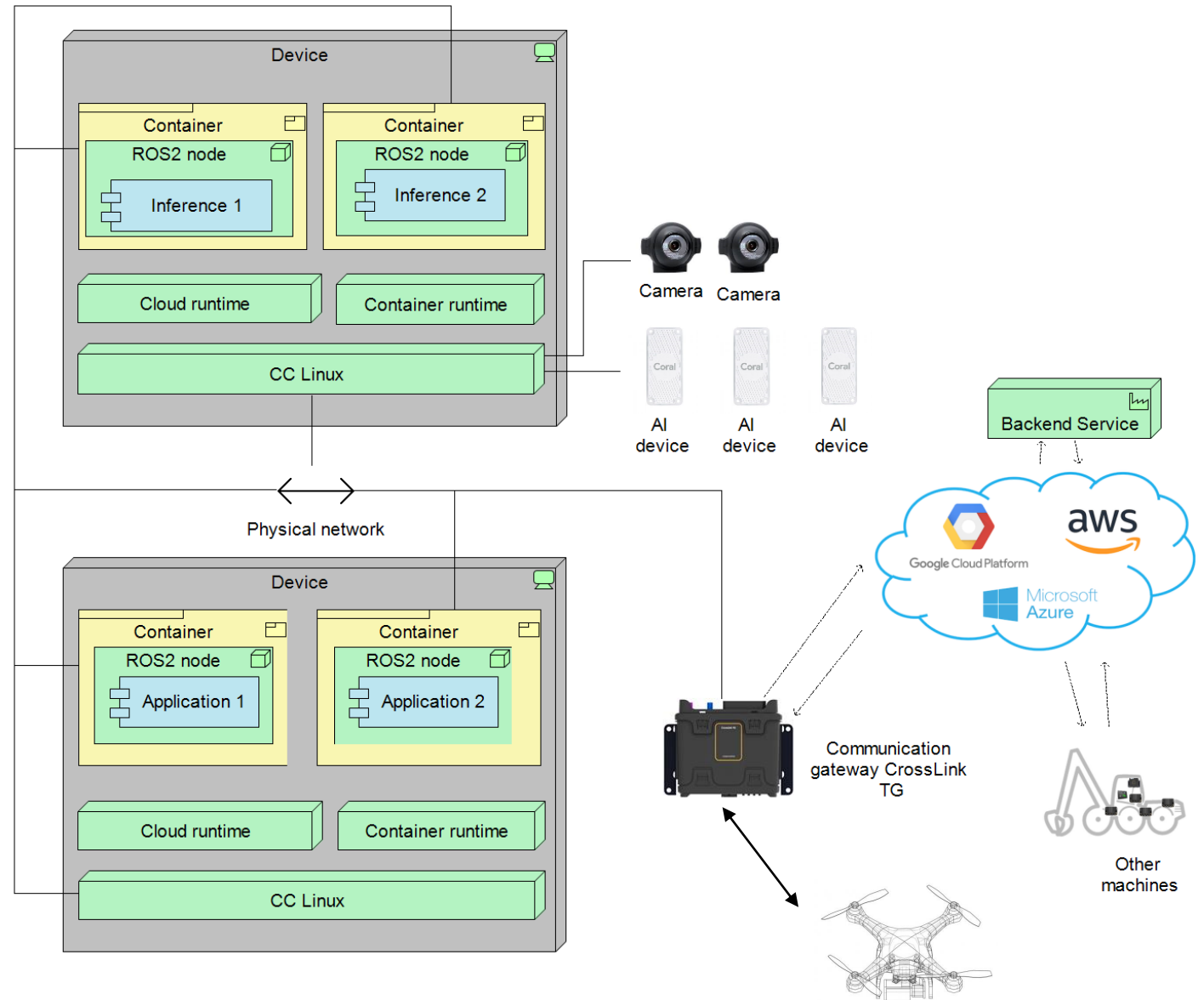


Device topology



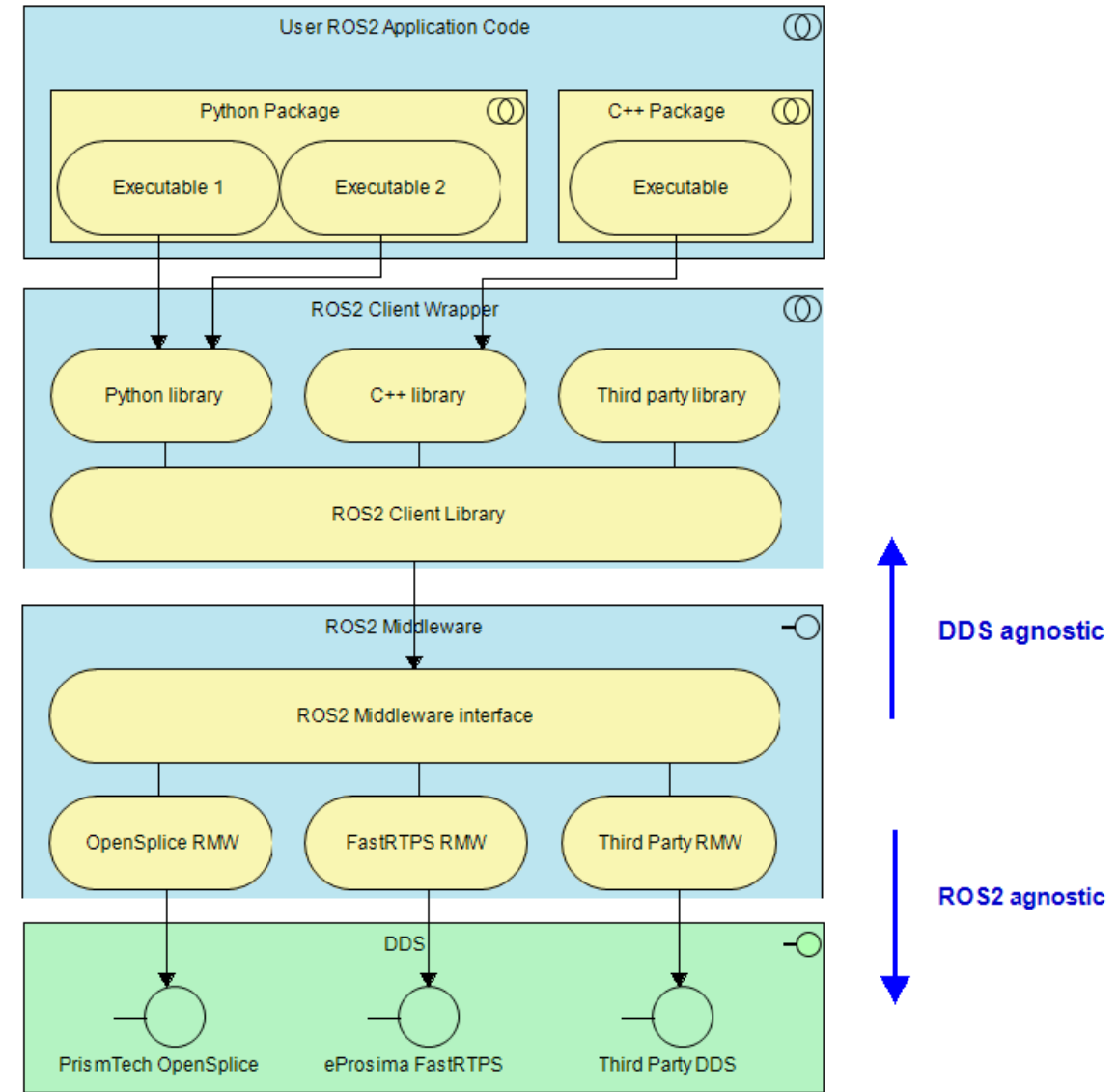
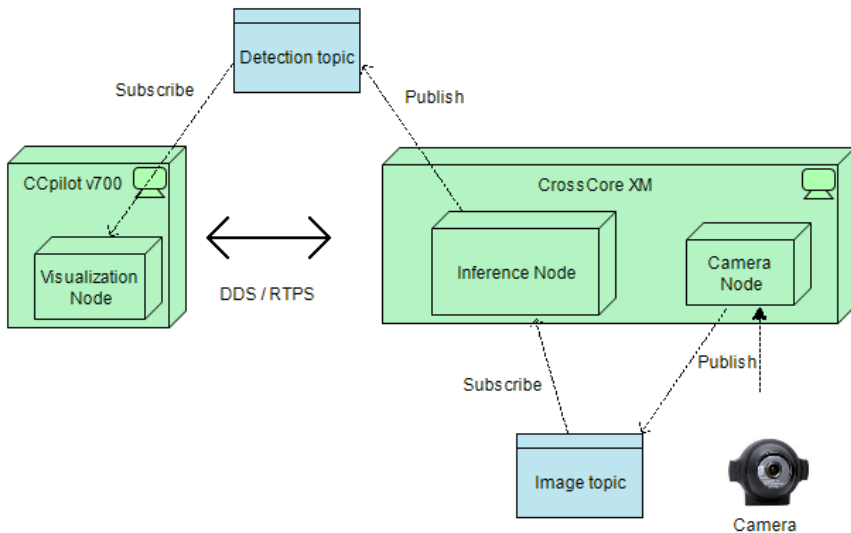
CrossControl edge platform

- Application nodes communicate with each other locally using ROS2
- Remote communication is done via cloud interface
- Cloud interface is used to
 - Deploy all containers
 - Communicate with cloud backend service
 - Communicate with other machines
- CC Linux image contains basic blocks for building the system
 - Cloud runtime
 - Container runtime
 - Drivers for the AI devices and sensors



Edge software stack

- Distributed architecture based on ROS2
- ROS2 application code is divided into packages which can be considered as containers for ROS2 code
- At runtime, an executable within a ROS2 package launches a new process, an “ROS2 node”
- ROS2 nodes communicate with each other via ROS2 middleware interface, and they may reside on different application processes or another computer



CrossControl SDK – open platform for rapid application development

Software Application Tools



UX Designer



Data Engine



Fieldbus Access



Protocols & Communications



Core system



Instrumentation

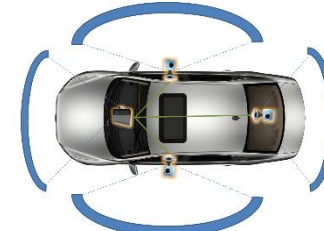


Process control



Business Logics

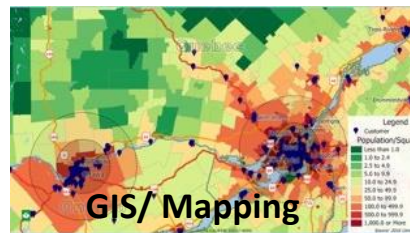
Video monitoring



Object Detection



Collision Avoidance



GIS/ Mapping

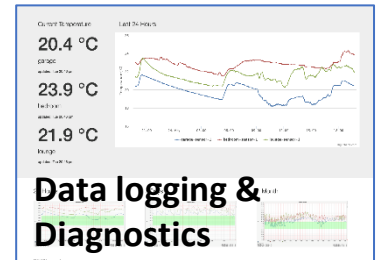
Over-The-Air updates



Telematics



Data logging & Diagnostics



Infotainment



Meet ADACORSA online at EF ECS
2021 (European Forum for Electronic
Components and Systems)



Meet CrossControl live at

- Agritechnica 2022
- Teknologia'22

