COMP4DRONES

Framework of Key Enabling Technologies for Safe and Autonomous Drones

USE CASE 5 - DEMONSTRATOR 1

Smart precision agriculture: from drone to rover

THE PROJECT IN A NUTSHELL

COORDINATION & FUNDING

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ECSEL Joint Undertaking

CONSORTIUM

MISSION

COMP4DRONES project complements SESAR JU (https://www.sesarju.eu/) efforts focusing on **safe software and hardware drone architectures**. The main goal is to **provide an ecosystem ranging from application to electronic components**, realized as a tightly integrated **multi-vendor** and **compositional drone embedded architecture solution** with an associated set of **tools**.

GOALS & EXPECTED IMPACT

- **Sustainable impact** and creation of a community
- Minimizing **design and verification** efforts
- Easing integration/customization of **embedded systems**
- Enable **autonomous decisions**
- Ensure **trusted communications**

Reinforcing the **ecosystems of drones industry** by providing methodology and a **reference** software **architecture framework** that meets performance and safety requirements

Improving innovation capacity by adopting a **"safe-by-design"** approach covering the activities of specification, design, implementation, and validation & verification

Enabling and easing delivery of **new services using drones in Europe**. The biggest security risk for drone use is not the drone itself, but the technology inside of it

DEMONSTRATORS

Transport	Construction	Logistics	Surveillance & Inspection	Agriculture

SMART AND PRECISION AGRICULTURE FROM DRONE TO ROVER

USER NEEDS, EXPECTED BENEFITS, AND ASSESSMENT SCENARIOS

- **Minimize pesticides usage** → *Proper assessment of health status & on spot interventions*
- **Limit water consumption** → *Precise growth assessment*

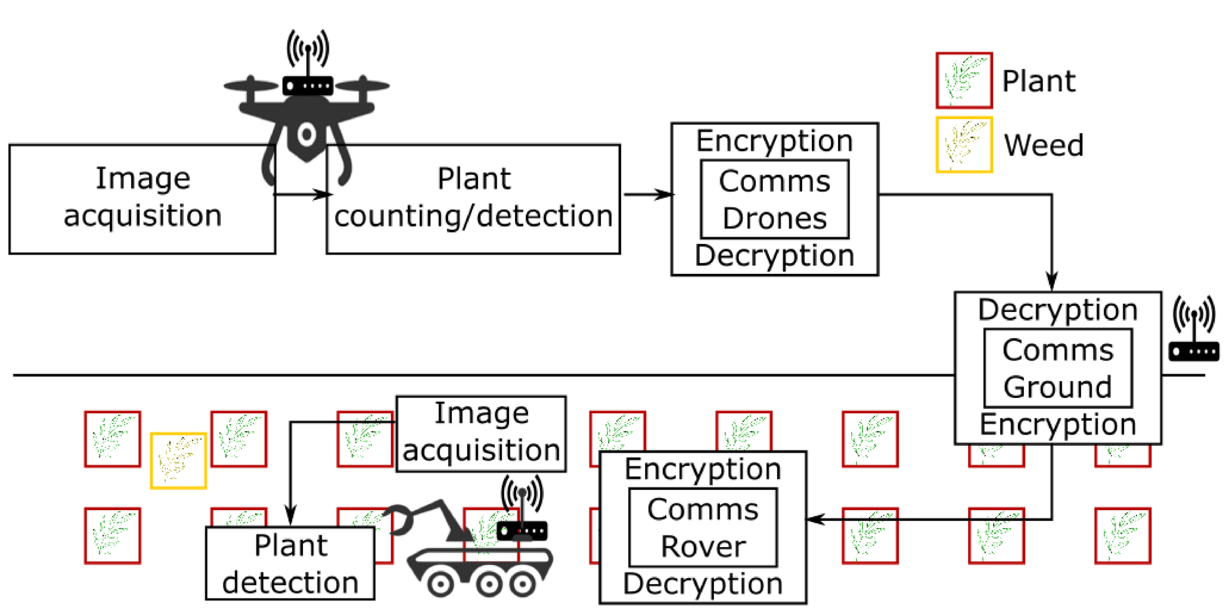
- **Reduced** impact on the environment
- **Reduced** human effort
- **Improved** usability of advanced technologies by non-expert operators

Scenario #1: Non-real-time processing

Scenario #2: Real-time monitoring and inspection

Scenario #3: Cooperative actions for on-field intervention

OVERALL SET-UP



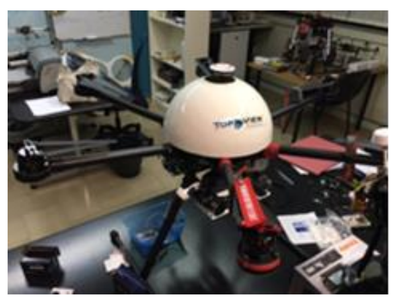
STAKEHOLDER

Dept. of Agriculture, UNISS

Sarciofo SME

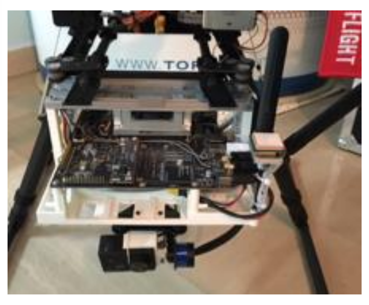
5 ha artichoke fields

ON-GROUND AND ON-BOARD REAL TIME EDGE COMPUTING PROOF OF CONCEPT: INVOLVED TECHNOLOGIES



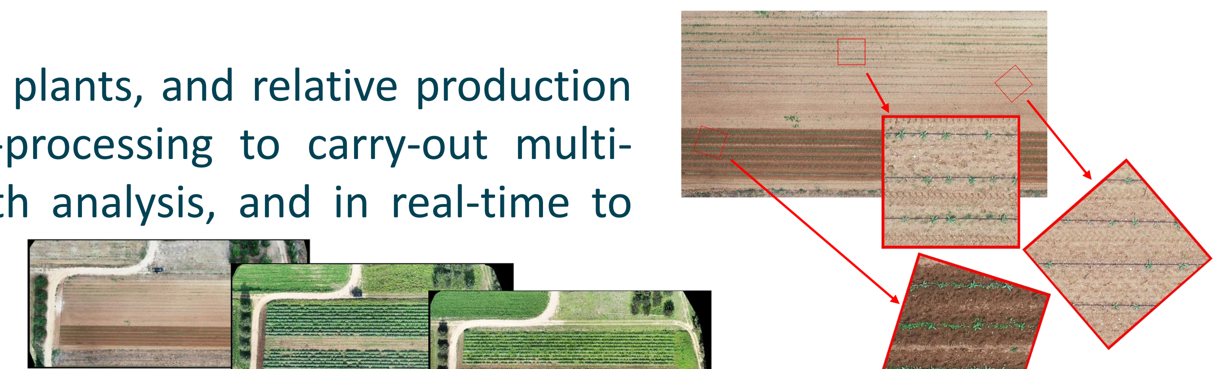
Mantide 900

Fight hexcopter 8,2 Kg + 2,5 Kg payload, approved for flight operations in critical scenarios. Video sensor resolution: FHD 1920x1080 25/30p, video format: MOV/MP4. Foto resolution: 16:9 1920x1080, format: JPEG.



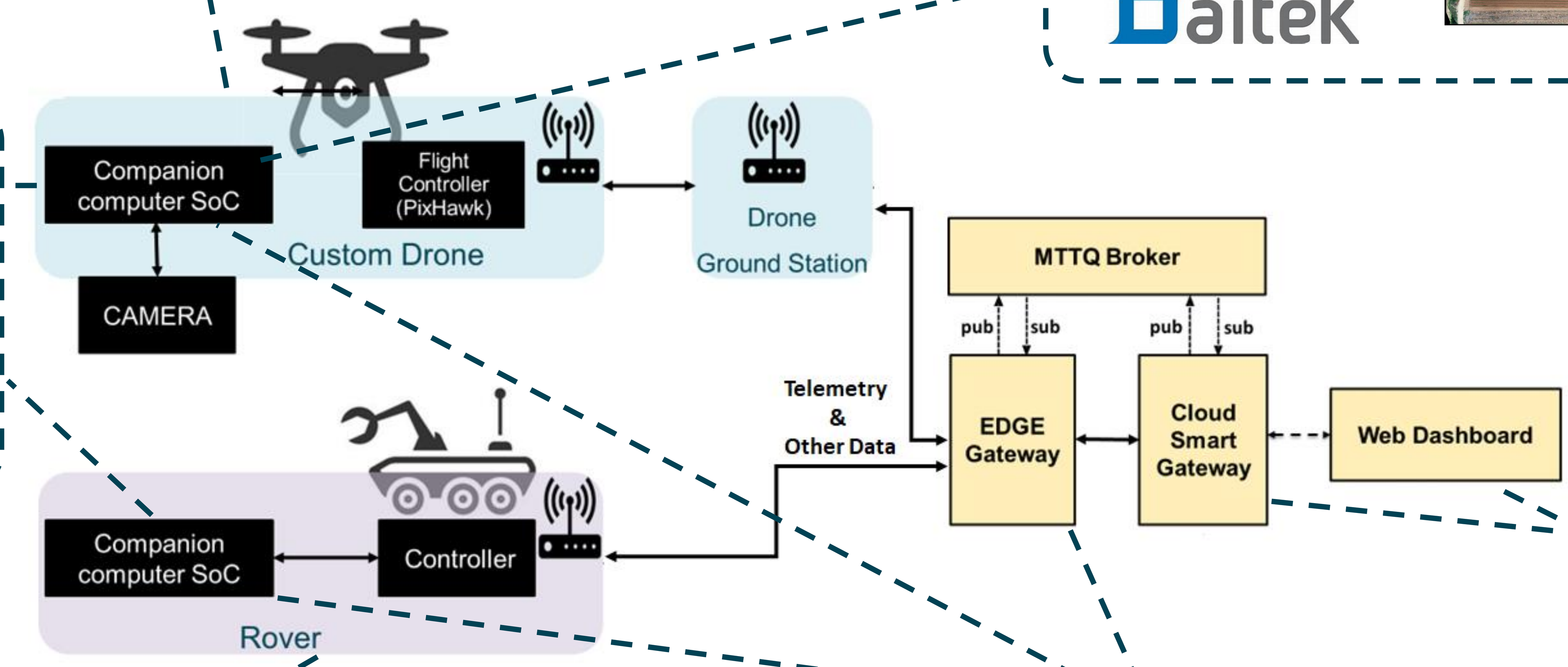
Single Shot Detector

Detection of artichoke plants, and relative production rows. Usable in post-processing to carry-out multi-temporal plants growth analysis, and in real-time to make on field analysis.



Companion Computer

FPGAs Zynq Family from Xilinx compatible with both drone and rover.

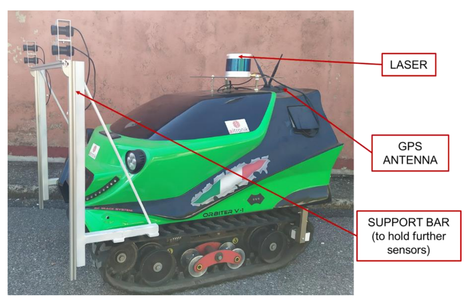


Multisensor Gateway

Support different communication protocols and interfaces, as NVR camera system, Sensors, Drone, HW Accelerators.

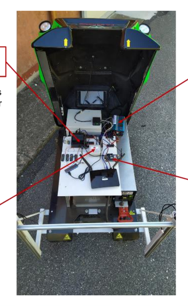
Dashboard

End-users driven interface to present collected data and analyzed information.



ATR-ORBITER Robot

350 kg, 3.0 to 1.8 Km/h speed. Fully radio controlled mobile robot crawler, able to tackle any type of terrain.



Cryptography

Encryption/decryption based on AES.

The C4D consortium would like to thank EU commission for funding the ECSEL-JU Comp4Drones project under grant agreement no 826610

https://www.comp4drones.eu/ @ECSEL_C4D