ALFA
H2020 PROJECT:
SafeShore – ALFA common dissemination

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Community Of Users On Secure, Safe And Resilient Societies

4 December 2018, Brussels

Advanced Low Flying Aircrafts Detection and Tracking

Advanced Low Flying aircrafts detection and tracking

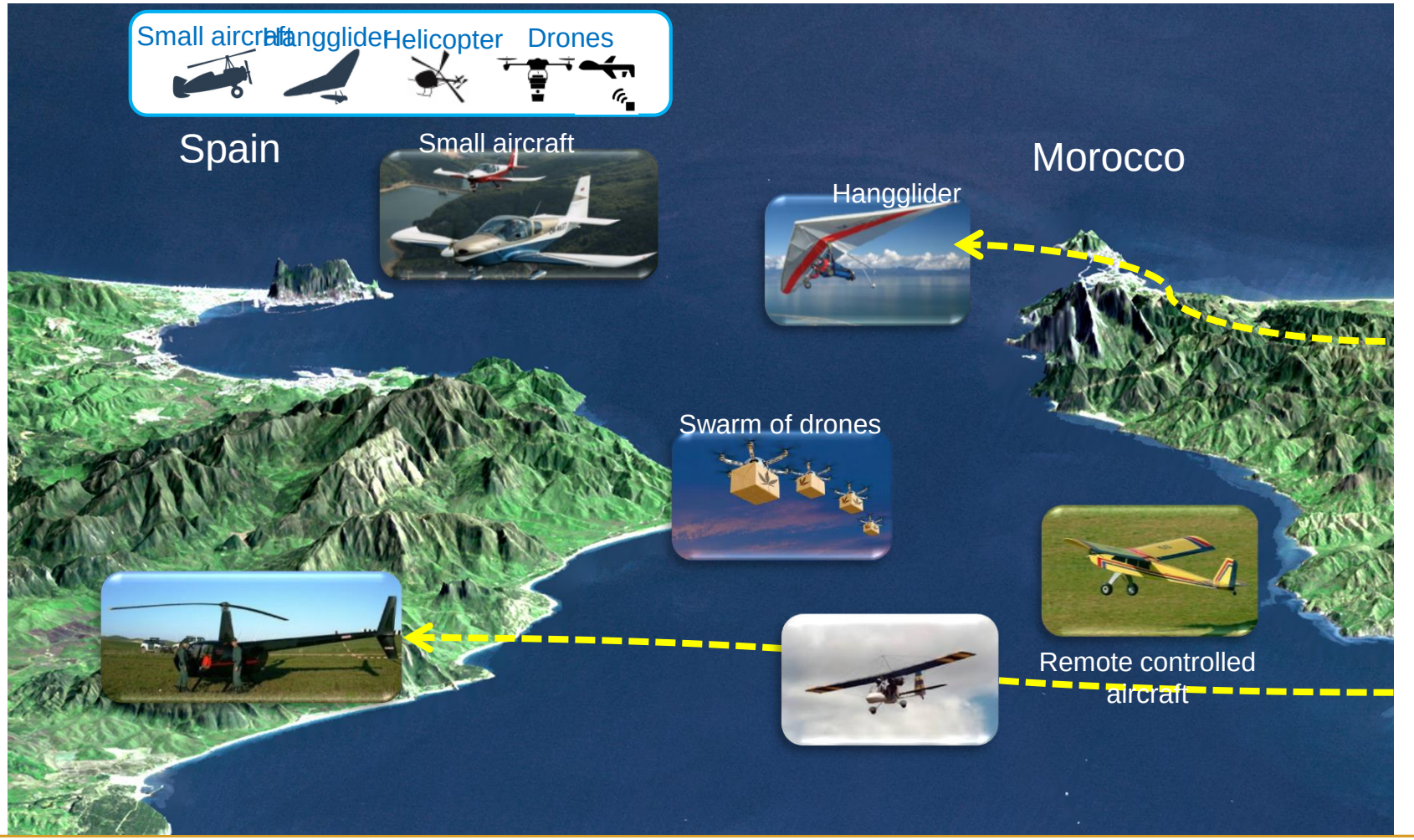
Contents

- The problem
- ALFA solution
- ALFA concept “how does it work”
- Our upcoming demonstration

The problem

GUARDIA CIVIL – MAIN THREAT

Airborne smuggling



The problem

Three levels in Architecture

- Operational
  - Already shown
- Functional
  - Detection of suspicious low flying small aircraft
- Technical
  - High background clutter
  - Sensitivity
  - Radar/optical horizon
  - Unsuspected flights
  - Natural objects
    - Birds
    - Fans

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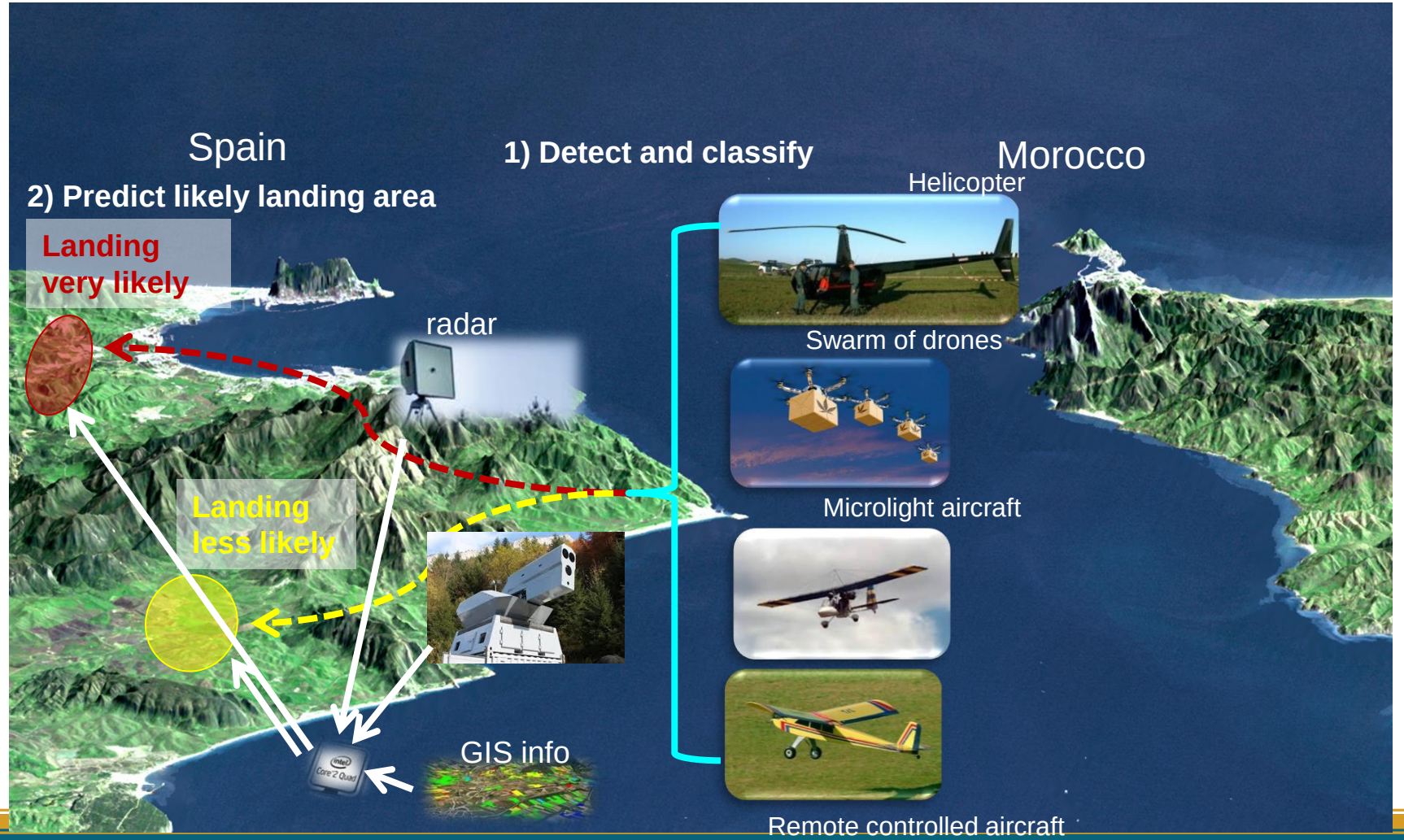
ALFA Solution - Interoperability

ALFA Solution - Technology



Alfa Operational concept

Key technologies

- Active radar
- Electro optical sensors
- Radio location / passive RF









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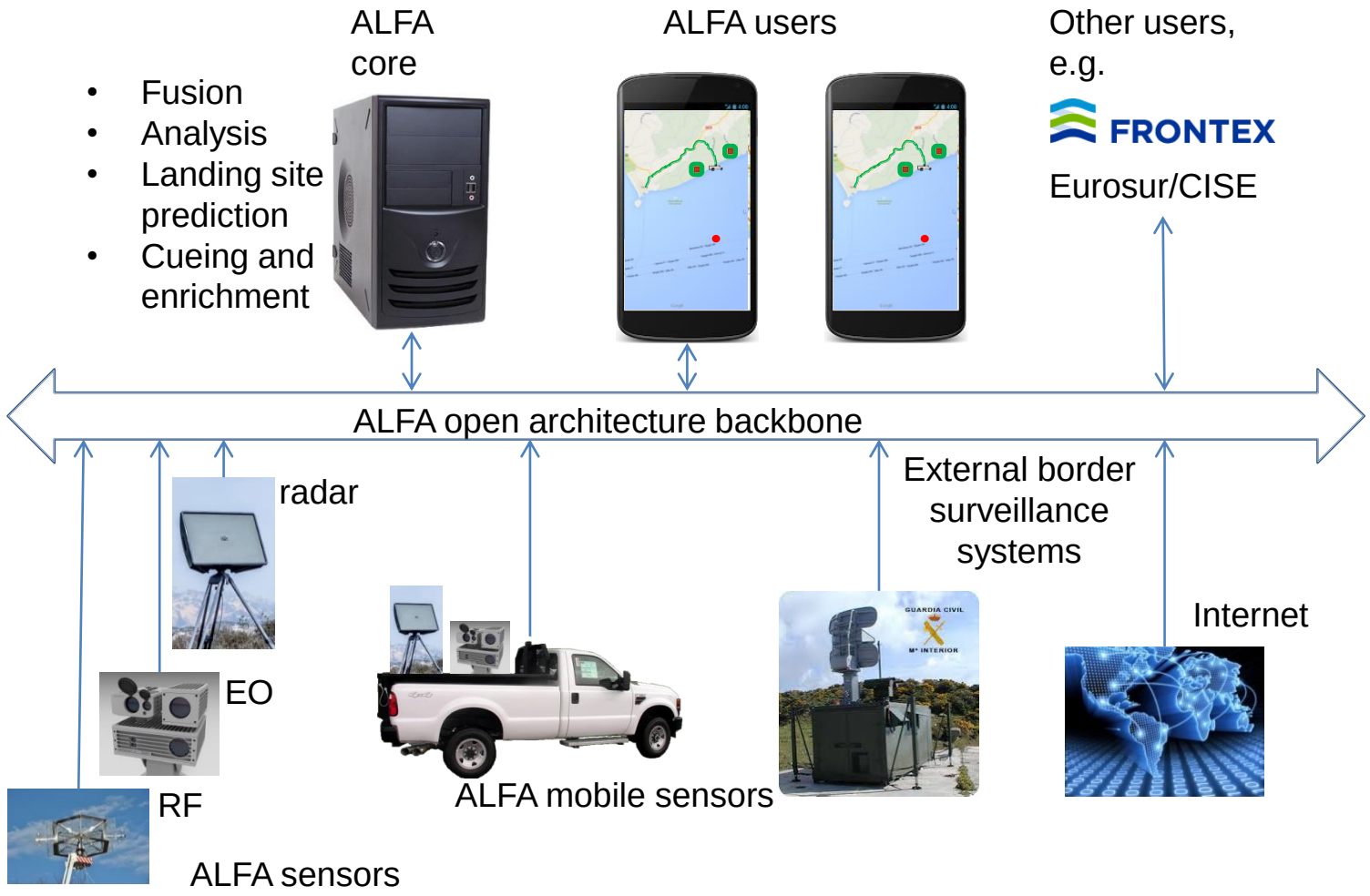
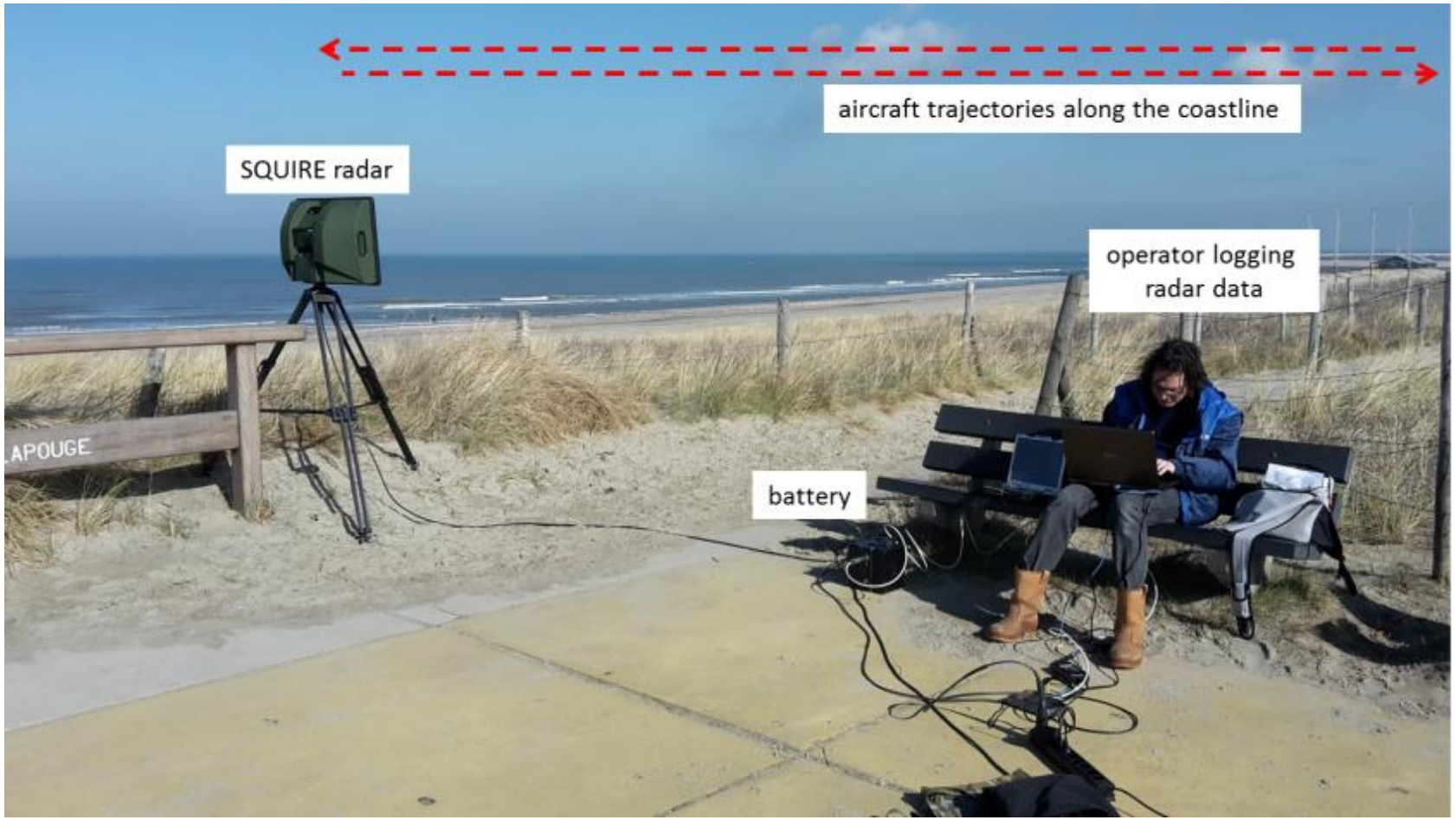
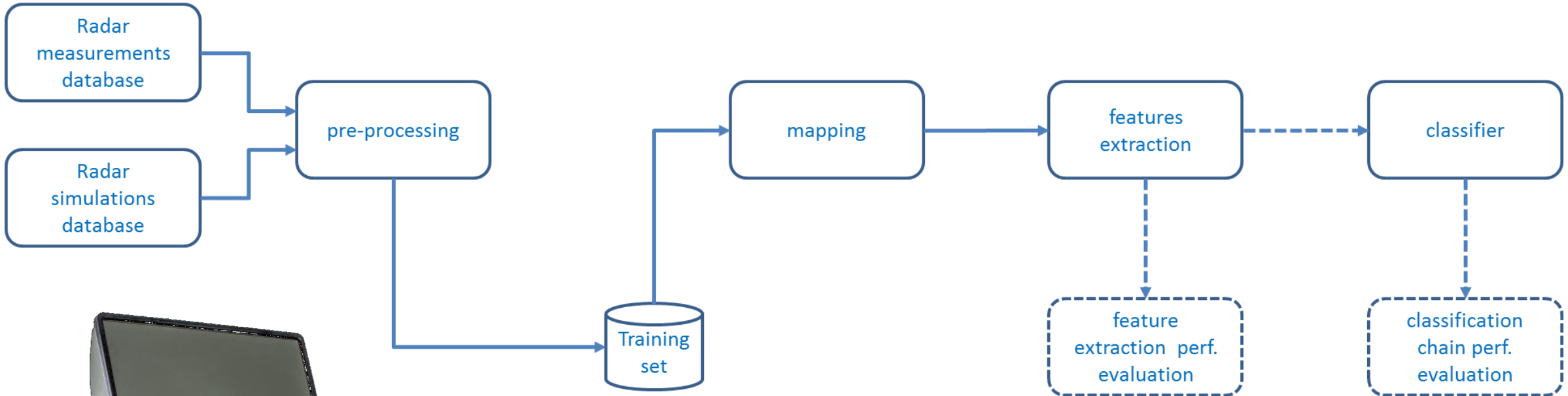
ALFA Concept



Sensors - radar

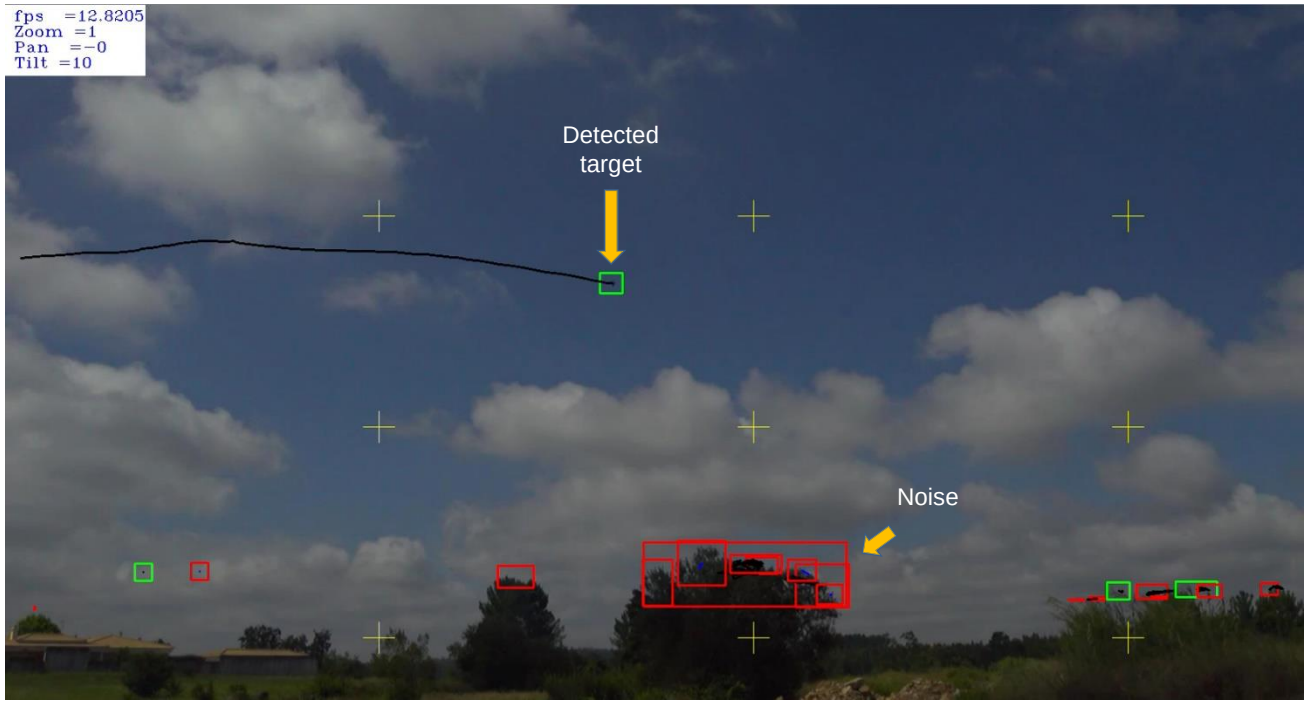


Radar classifier



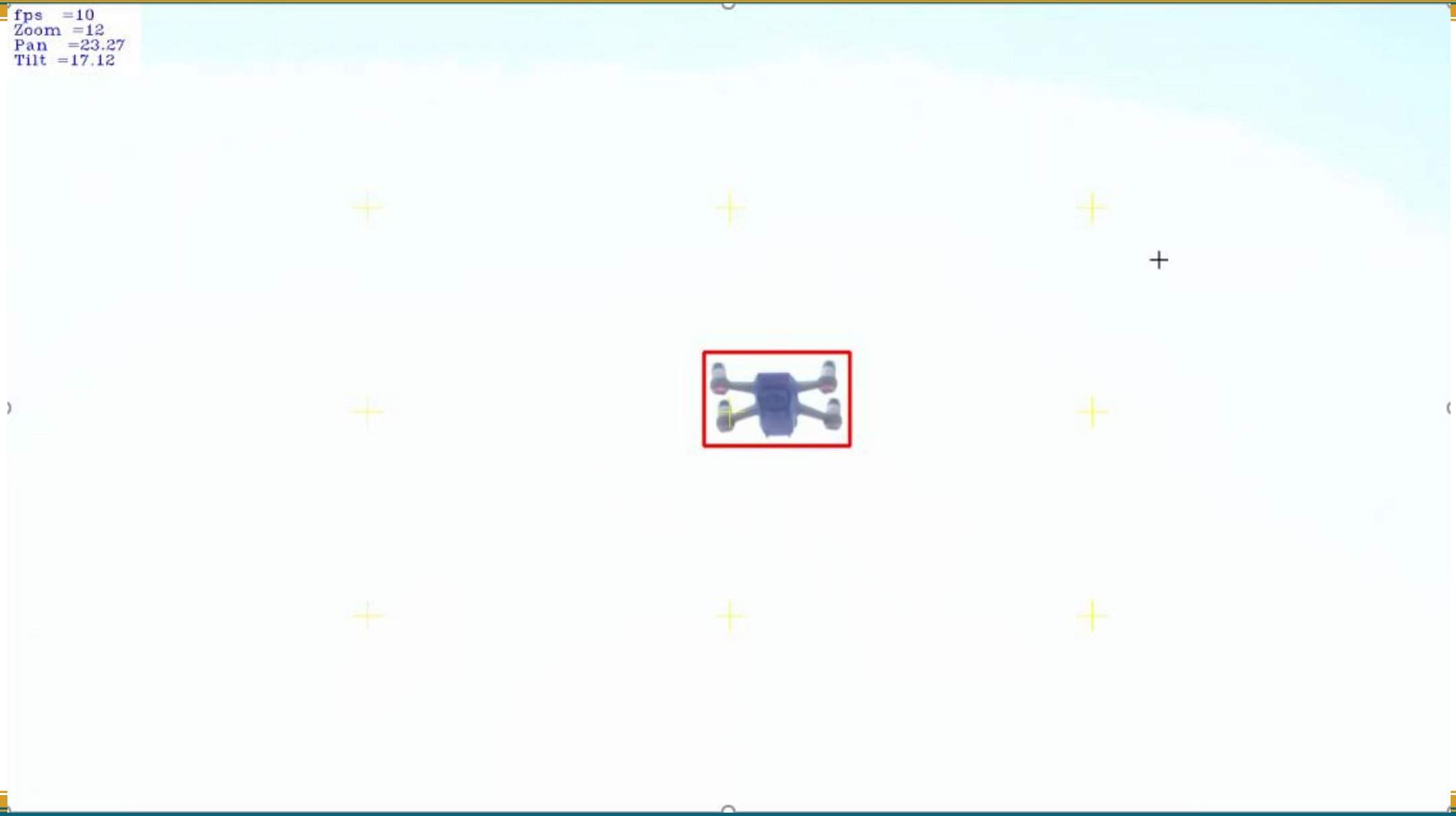
Electro Optical Sensor field tests

- Testing the detection and tracking phases
- Using real UAVs in order to test
- The performance of the algorithms in filed situations

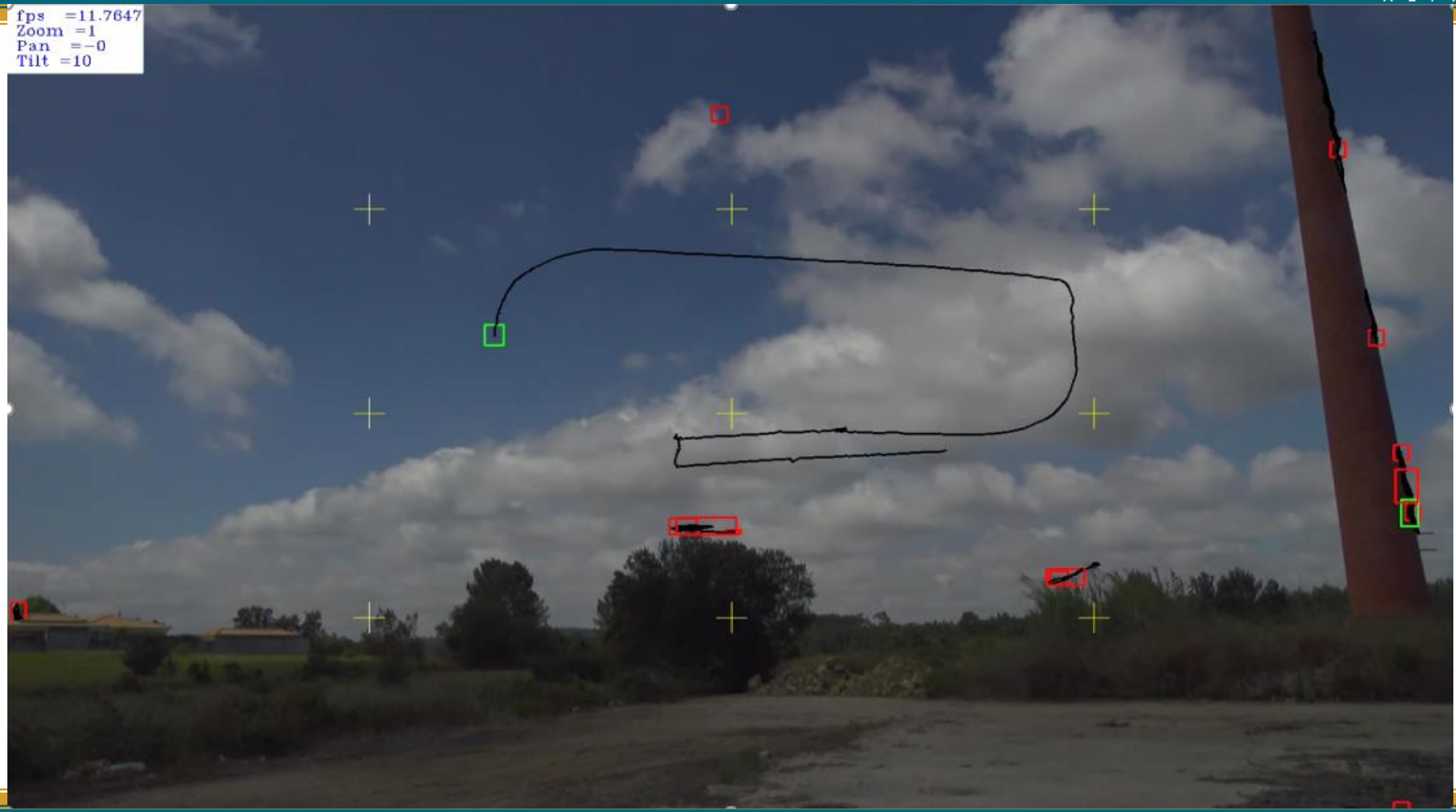


User interface

Detect and track



Detect

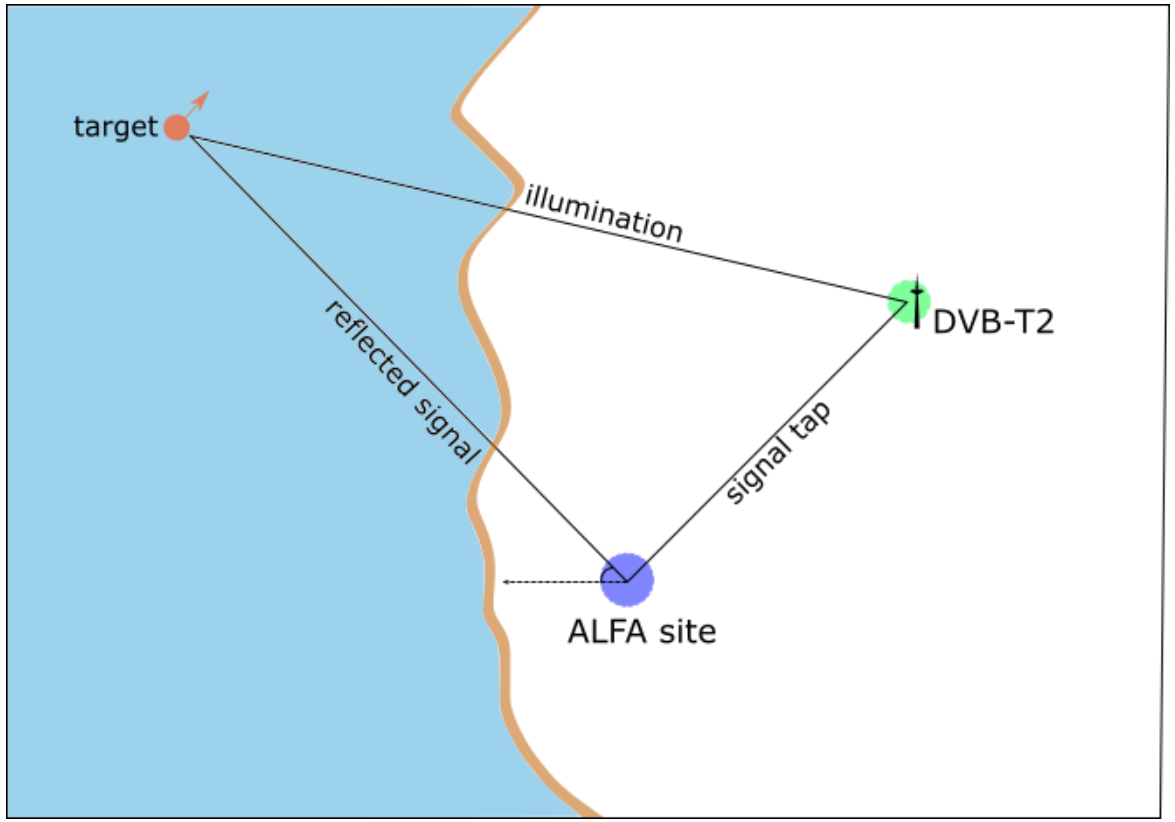


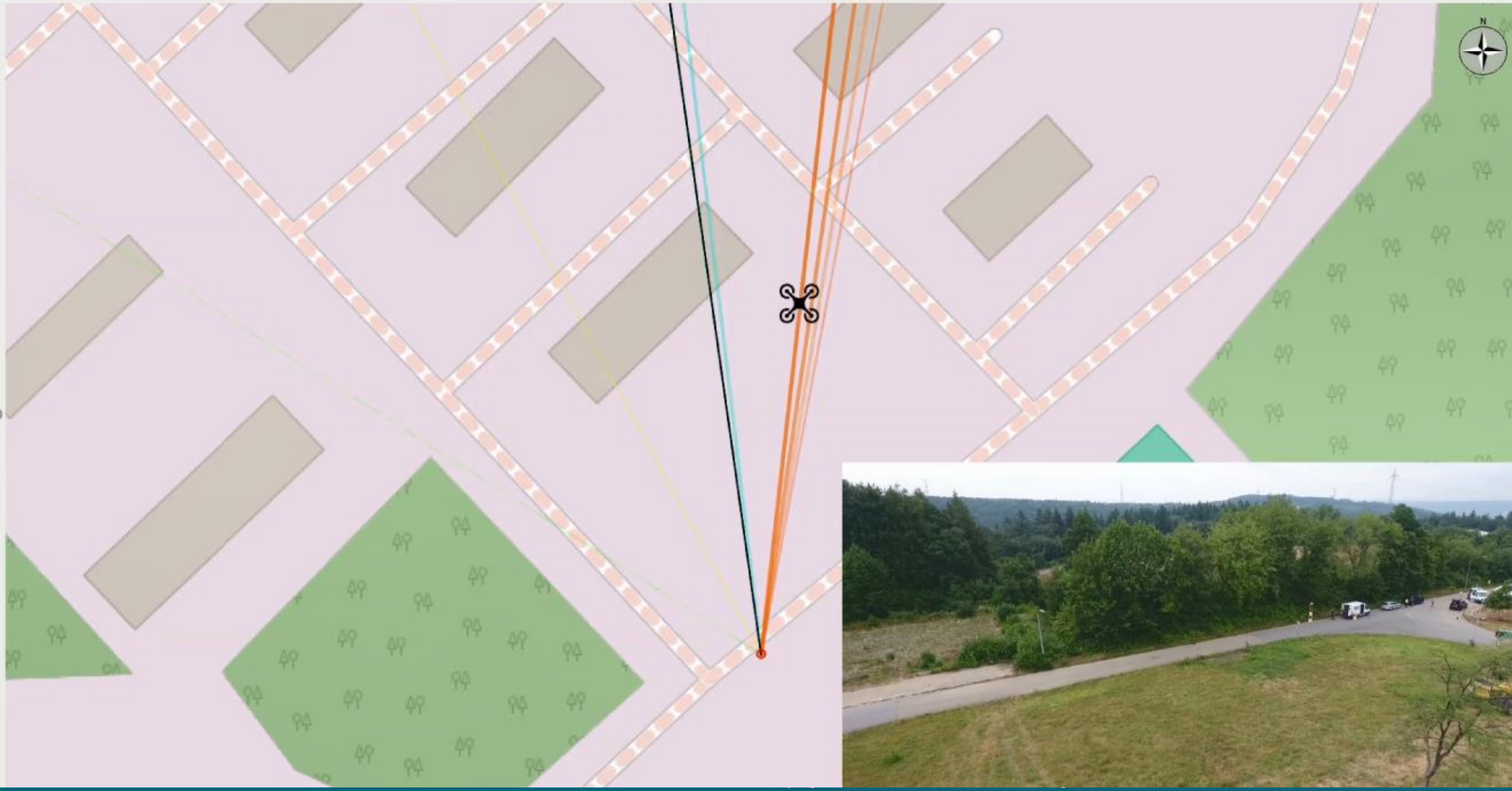
Tracking

Passive RF sensor

What is it?

- Detect emissions (LAN, GSM, Control) from the platform (Drone, aircraft)
- Detect reflections on the platform from DVB-T or FM transmissions



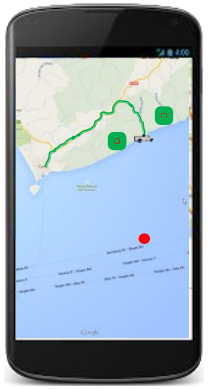


Processing

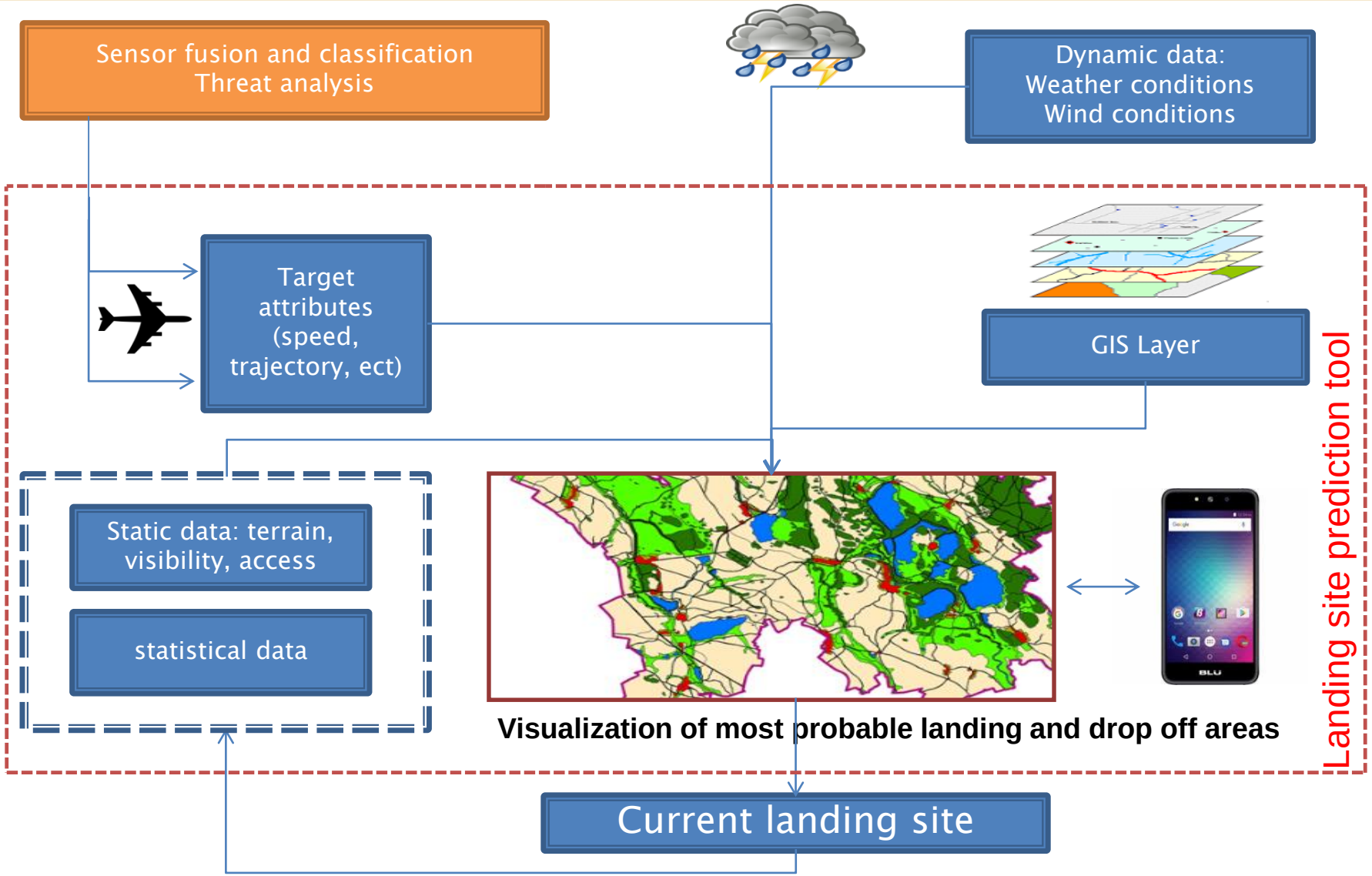
Two demo's:

- Threat analysis
  Not shown yet on the ALFA HMI

- HMI



Landing site prediction tool. Diagram



Landing prediction (Landing and drop off)

1. **Static elements**
   - Terrain is divided in areas
   - Weighed values based on: Access, visibility, terrain, time of the day, lunar cycle, frequency of use, etc.
2. **Dynamic elements**
   - Extra data (user feedback)
   - Detection data (radar) and possible identification
   - Weather data (specially wind)

Resulting prediction (I)

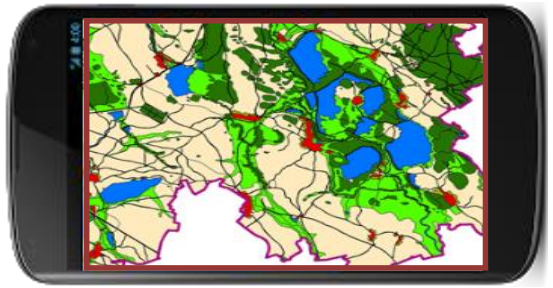
In “traditional PC”

- Final result will be a GIS with probabilities for the different areas with separate predictions for
  - Landing
  - Drop off

Resulting prediction (II)

In smart-phones

- Final result will be a GIS with probabilities for the different areas with separate predictions for
  - Landing
  - Drop off
- Additionally there will be:
  - Distance to the closest (as the crow flies)
  - Time of landing/drop off



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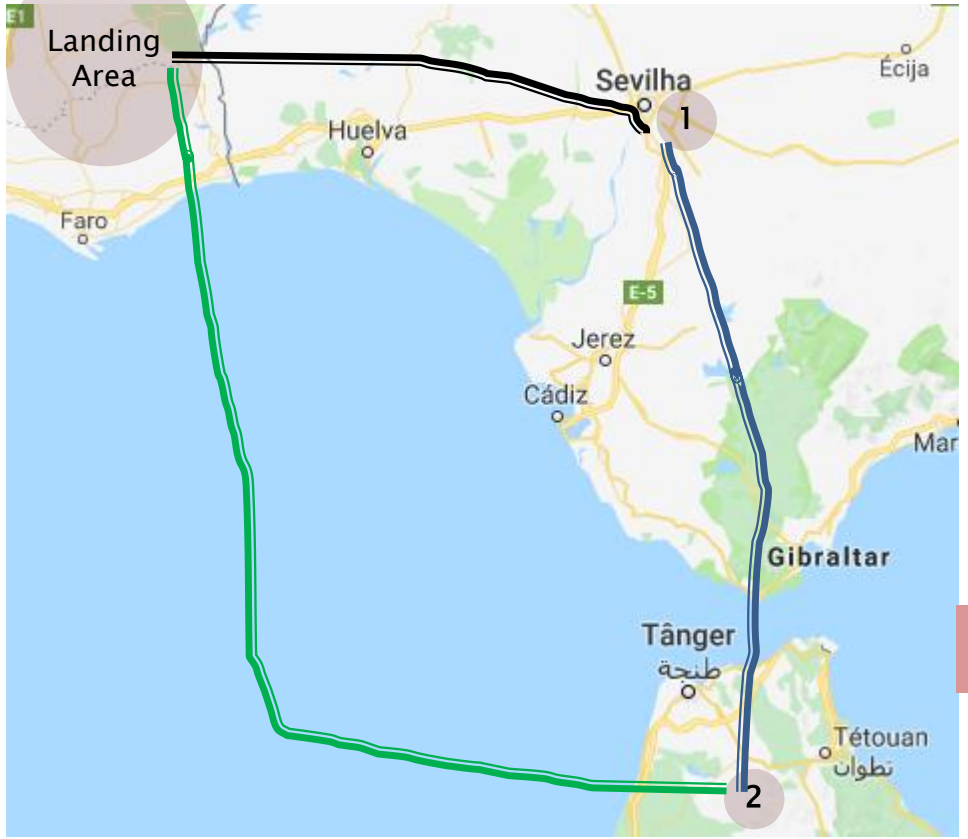
Demonstration

- In the south of Portugal, on the Spanish border
- Early autumn 2019
- Open to end-users and other interested parties
- Keep an eye on the ALFA website https://alfa-h2020.eu/

Demonstration at VRSA área (Cacela Velha)

Demonstration

- Scenario – 1 (Flight route)



12nm

- Scenario – 2 (Drone route)

Vehicles

- Airplane (light aircraft)

- Small Helicopter (light helicopter)

- Large UAV
(simulated by a ultra-light aircraft – max. 450Kg)

- Small UAV (30 to 40Kg)

ALFA Grant Agreement No. 700002

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