

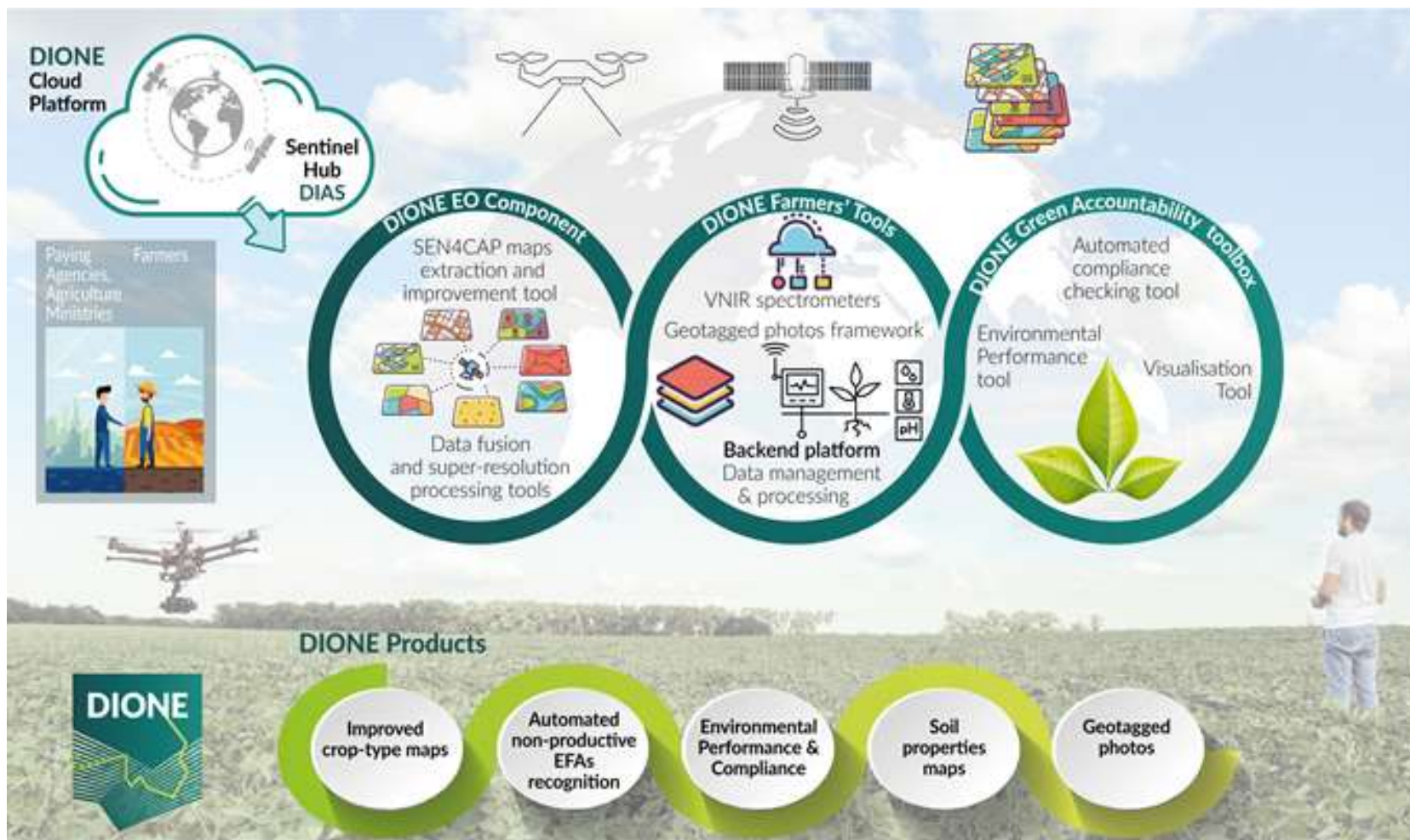


# **DIONE: an integrated EO-based toolbox for modernizing CAP area-based compliance checks and assessing respective environmental impact**



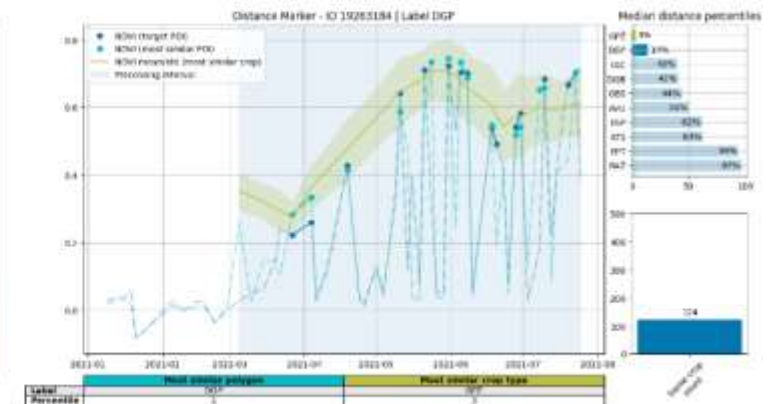
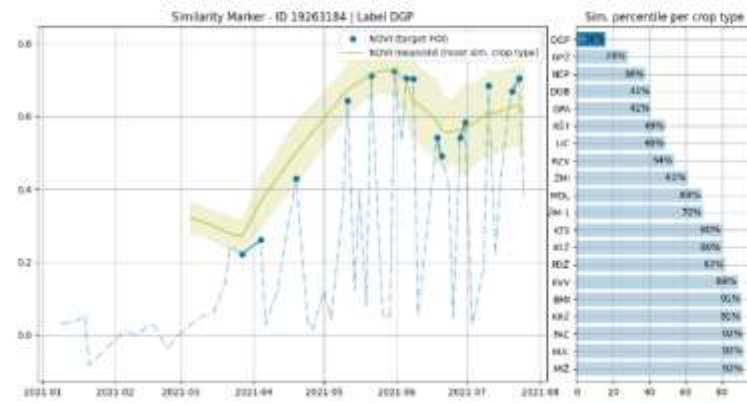
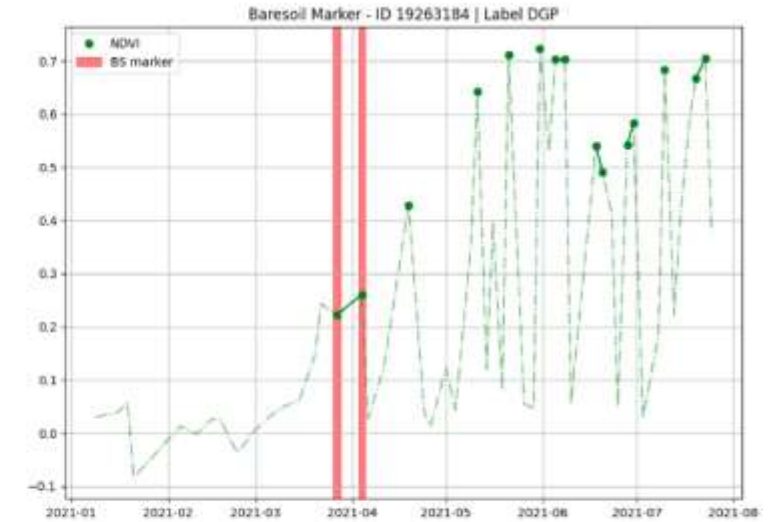
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.870378.

# DIONE CONCEPT



# EO BASED AREA MONITORING SYSTEM

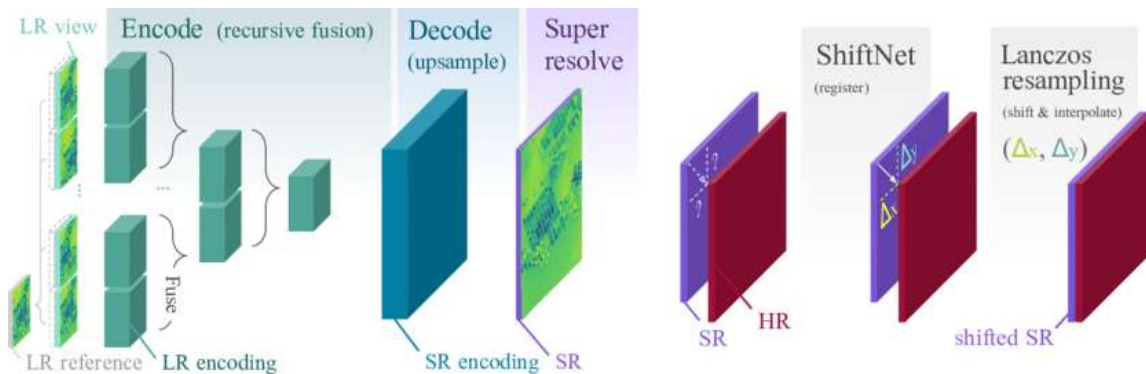
- Area monitoring markers
- ✓ Homogeneity marker
  - ✓ Similarity and distance scores
  - ✓ Bare soil marker
  - ✓ Mowing marker
  - ✓ Crop marker
  - ✓ Land marker
  - ✓ Mean NDVI marker





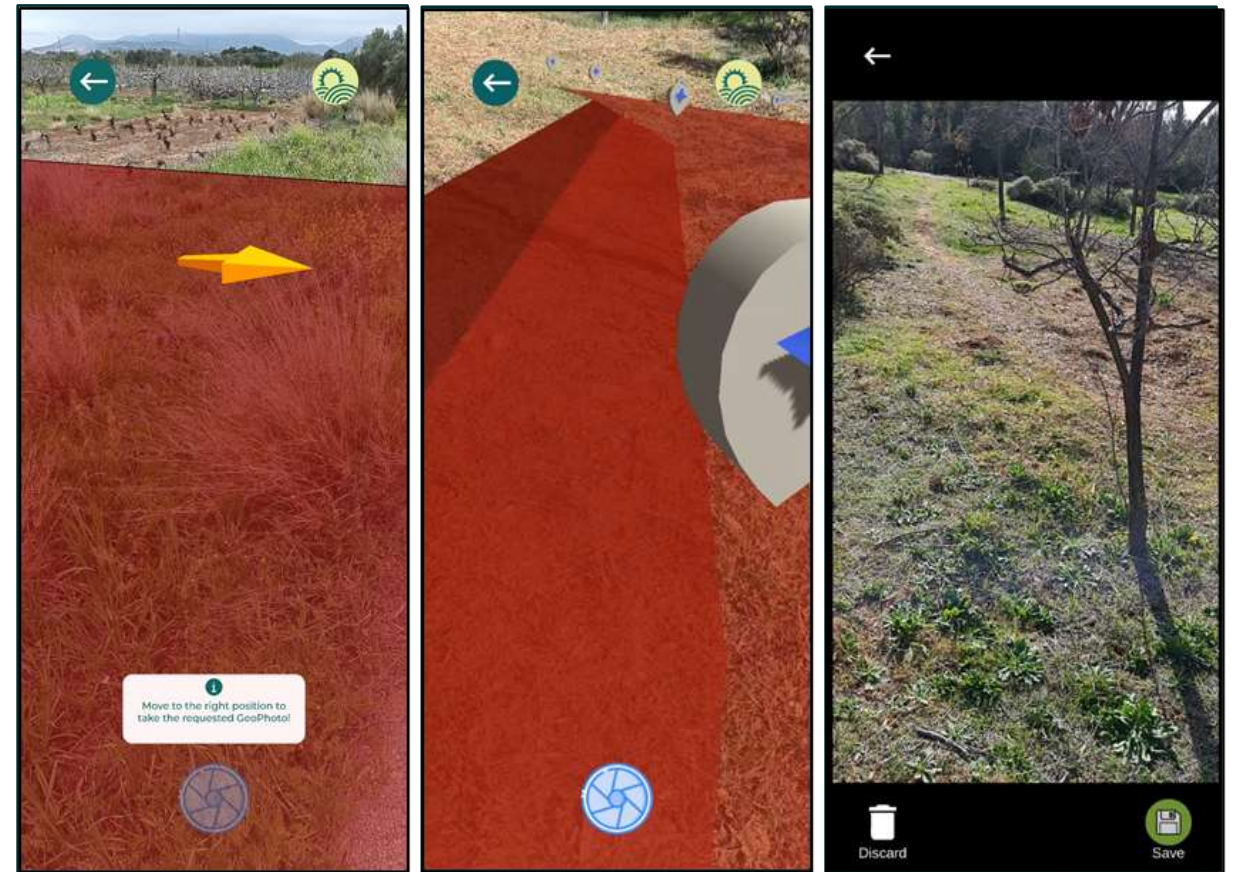
# EO BASED AREA MONITORING SYSTEM

- ✓ Deep learning network architectures that enable the augmentation of the coarser resolution bands of Sentinel 2 bands (20, 60m) to the resolution of the finer bands (10m);
- ✓ Combine free and open Sentinel data with high resolution drone and commercial data, using data fusion and super-resolution technologies so that EFA types of increased environmental impact are considered.

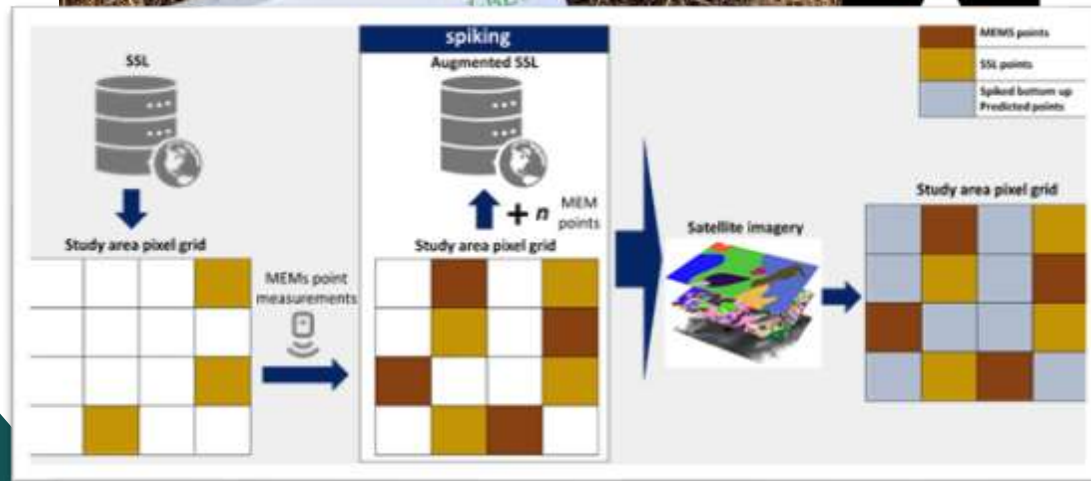


# GEOTAGGED PHOTOS FRAMEWORK

- ✓ Navigation to parcel and defined spots
- ✓ Augmented Reality based user guidance
- ✓ Improved location accuracy (i.e. multiple location differentiators, EGNOS Data Access Service)
- ✓ Direct communication with PAs via push notifications - Supporting offline operations
- ✓ Lightweight digital signature scheme, image forensics (i.e. steganography, etc)
- ✓ Time and location integrity (EGNSS clock, OSNMA)
- ✓ Anonymisation of private data in the photos



# PORTABLE SOIL SCANNING SYSTEM

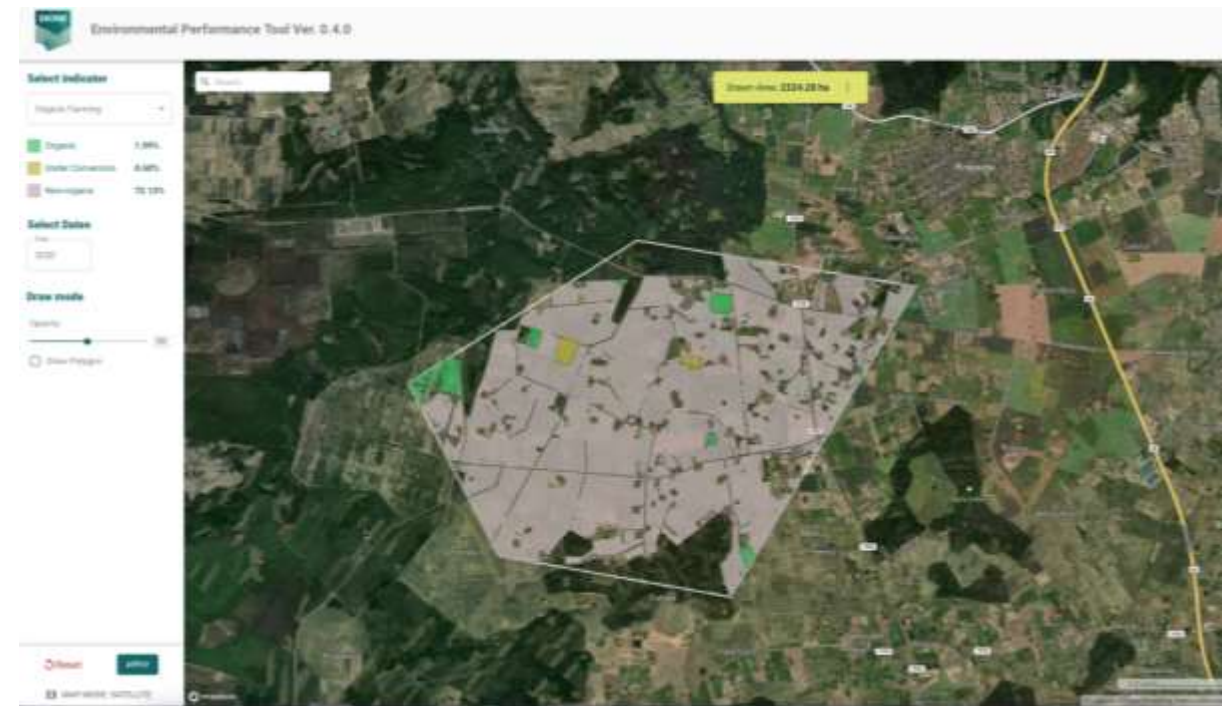


- ✓ Low-cost & portable spectral sensor (1750 to 2150 nm)
- ✓ Preprocessing of collected spectra including spectral standardization and outlier and novelty detection
- ✓ Machine learning tools which will transform the raw data collected through the in-situ soil scanning system to appropriate soil properties: SOC, clay, pH and CaCO<sub>3</sub>
- ✓ Combination of point measurements with EO imagery towards the delivery of spatially explicit maps (spiked bottom-up approach)



# ENVIRONMENTAL PERFORMANCE TOOL

Environmental priorities	Agri-environmental indicators	Short definition (unit)
Land and soil	Land cover change	Changes in land cover classified by type and size (%)
	Soil erosion	Estimated mean soil erosion rate in ( $t\ ha^{-1}\ yr^{-1}$ )
	Soil organic matter	Mean organic matter concentration in arable land (g/kg)
	Organic farming	Area under organic farming as a ratio of the total utilized agricultural area (UAA)
Water	Water quality	Chl- $\alpha$ , TSM, Temperature ( $^{\circ}C$ )
	Land irrigation	Irrigated land (ha)
Air quality and climate change	Greenhouse gases emissions	methane ( $CH_4$ ), nitrous oxide ( $N_2O$ ) and carbon dioxide ( $CO_2$ )
Protected/vulnerable	HNV farmland	Agricultural areas (ha) under HNV areas
	Natura 2000 areas	Agricultural areas (ha) under Natura 2000 areas



The selected indicators can be used to show progress towards fulfilling the EU standards on good agricultural and environmental condition of land (Good Agricultural and Environmental Conditions)

# DIONE



 DIONE Project

 DIONE Project

 DIONE\_EU

DIONE-PROJECT.EU



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.870378