Bringing together the knowledge
for better Agriculture Monitoring

EO4AGRI Project Overview

www.EO4AGRI.eu

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Exchange meeting on Copernicus projects
related to agriculture in the context of IACS

Valladolid, 09/04/2019

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Content

- Project details
  - Consortium
  - Main project objectives
  - Planning
- Stakeholder segments – impact areas – outcomes expected
- Focus of today's presentation:
  - CAP post-2020 reform – checks by monitoring – in IACS context
  - Role and utility of DIAS
- Possible involvement and/or benefits for Member State Administrations
- Next events

Project details & consortium

- **Project details**
  - **Title:** Bringing together the knowledge for better Agriculture Monitoring
  - **Topic:** LC-SPACE-02-EO-2018: Copernicus evolution – Mission exploitation concepts
  - **Start:** 01/11/2018
  - **Duration:** 24 months
  - **Total cost:** EUR 2,762,01
  - **EU contribution:** EUR 2,
  - **Coordinator:** ATOS SPAI
  - **Website:** www.EO4AGRI

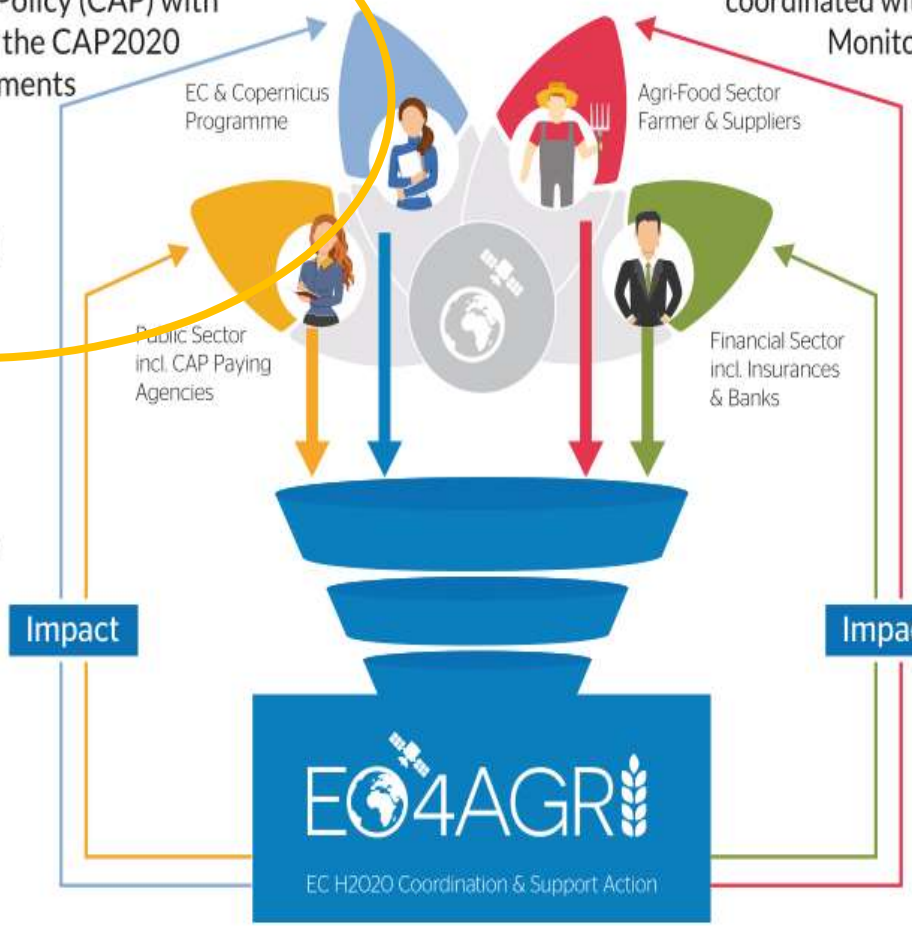
- **Consortium**
  - **Research: & Academy:** CRA-W, PLAN4ALL, WRLS
  - **EO Data Providers:** E-GEOS
  - **Industry:** ATOS (ES, FR)
  - **SMEs:** EOX, GEOVILLE, PROGIS
  - **Public Administration:** NPA

- **Main Objective:** EO4AGRI is a Coordination and Support Action that aims to prepare a European capacity for improving agriculture monitoring.

Stakeholders

IACS Context

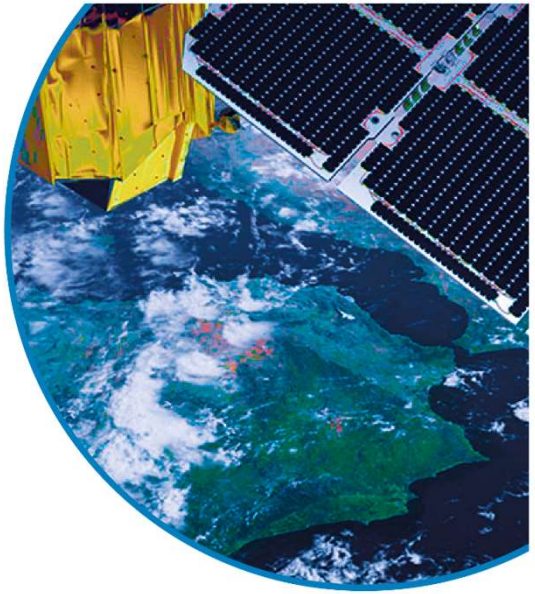
- **EO4AGRI assists** the implementation of the EU Common Agricultural Policy (CAP) with special attention to (a) the CAP2020 reform, (b) the requirements of Paying Agencies, and (c) the Integrated Administration and Control System (IACS) processes.
- **EO4AGRI works** with farmers, farmer associations and Agri-Food industry on specifying data-driven farming services with the aim at promoting EC investments based on Copernicus Data and Information Services (DIAS).



- **EO4AGRI addresses** the global food security challenges coordinated within the G20 Global Agricultural Monitoring initiative (GEOGLAM) capitalizing on Copernicus Open Data as input.
- **EO4AGRI assesses** information about land-use and agricultural service needs, offering these to financial investors and insurances. It also highlights how added value can be created by supporting these services with Copernicus information.

The EO4AGRI project methodology is a combination of community building; service gap analysis; technology watch; strategic research agenda design and policy recommendations; dissemination (incl. organization of hackathons).

Main Impact Areas



Data Driven Farming

- Best Practice Services - Agri-Apps
- Service Fueling with Copernicus Data?

Investing into Value Adding

- Incentives for financial investors and insurances
- Game changer Copernicus?

Global Food Security

- G20 Global Agricultural Monitoring (GEOGLAM)
- Capitalizing on Copernicus Open Data?

Public Sector Responsibilities

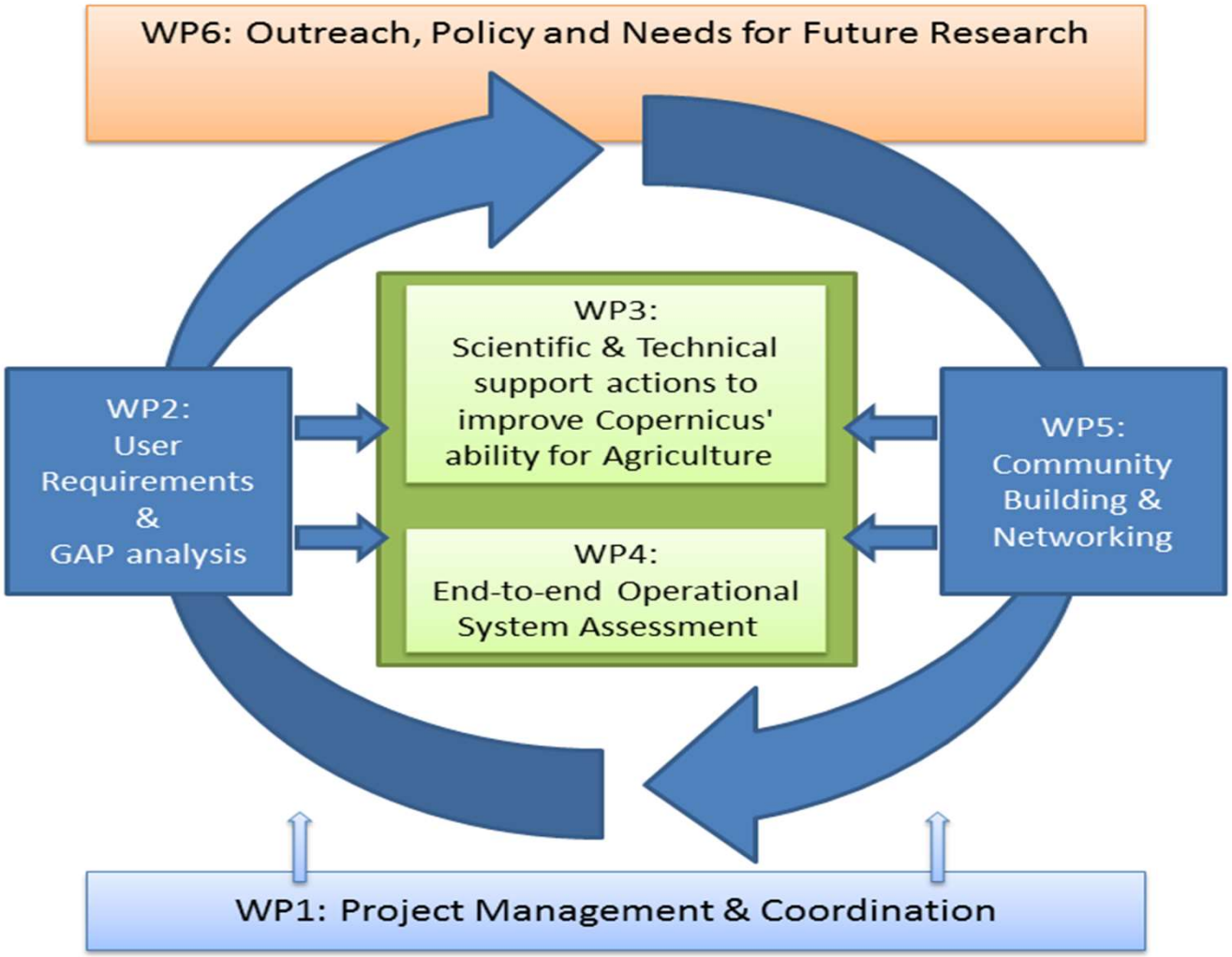
- H2020 - research agenda guiding Copernicus exploitation
- CAP “checks by monitoring” – better targeting of aids – game changer Copernicus

Promoting Copernicus DIAS

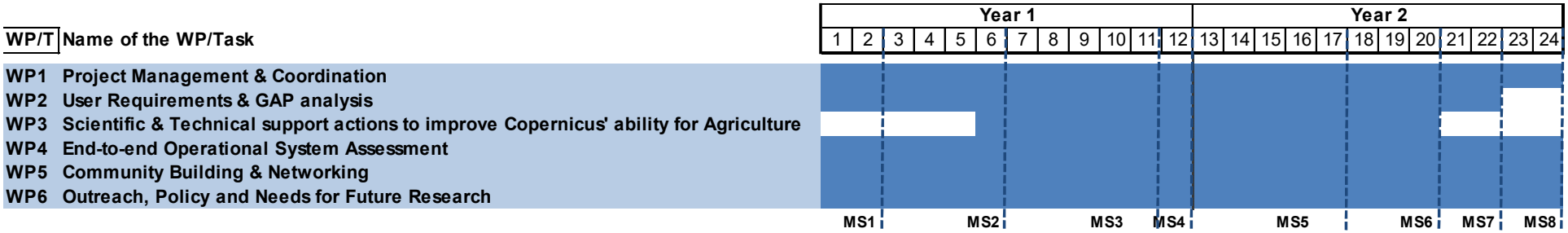
- Role and utility in the above impact areas
- Consolidating requirements and use cases

IACS Context

Implementation



Expected results & Milestones



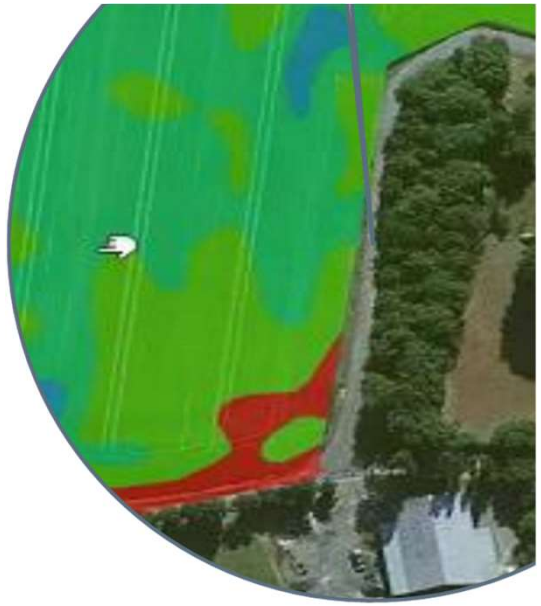
- **M6 (April 2019)**
  - D2.1 Requirements Collection Methodology
  - D4.1 Overall architectural model from Copernicus Components to specific Agri-Apps
- **M7 (May 2019)**
  - D2.2 Initial Workshop - User Requirements and Gap Analysis in Different Sectors Report
- **M11 (September 2019)**
  - First set of Guidelines from WP3 (D3.1, D3.3, D3.5, D3.7 and D3.9) concerning improvements in
    - precision agriculture
    - monitoring for crop extension and composition
    - forecasts of agricultural yields
    - future missions for thematic applications
    - EO ICT
- **M12 (October 2019)**
  - D4.2 Catalogue of EO and Agri service systems and components (Web portal) v1
- **M24 (October 2020)**
  - D6.5 Policy roadmap how Copernicus should influence future CAP development
  - D6.6 Strategic Research Agenda Report

Checks by Monitoring

Implementation of Monitoring as substitute of the OTSC
(Common Agricultural Policy post-2020 Reform)

- Correctness of “eligible area” component (LPIS, GSAA)
- Area monitoring (new IACS element)
  - Specificities of the agricultural landscape
    - parcels size, agronomic conditions
    - region-specific farming activities/local realities
  - Crop/land use types discrimination at country/region level

Related EO4AGRI study focus:
- Utility of satellite observations (Sentinel/equivalent)
- Copernicus data exploitation platforms:
  - DIAS infrastructure (big data cloud), CARD
  - Work-flow, analytics (machine learning)



OTSC – On The Spot Controls
LPIS – Land Parcel Identification System
GSAA – Geo-Spatial Aid Application
DIAS – Copernicus Data and Information Access Service
CARD – Copernicus Application Ready Data

Land Parcel Identification System

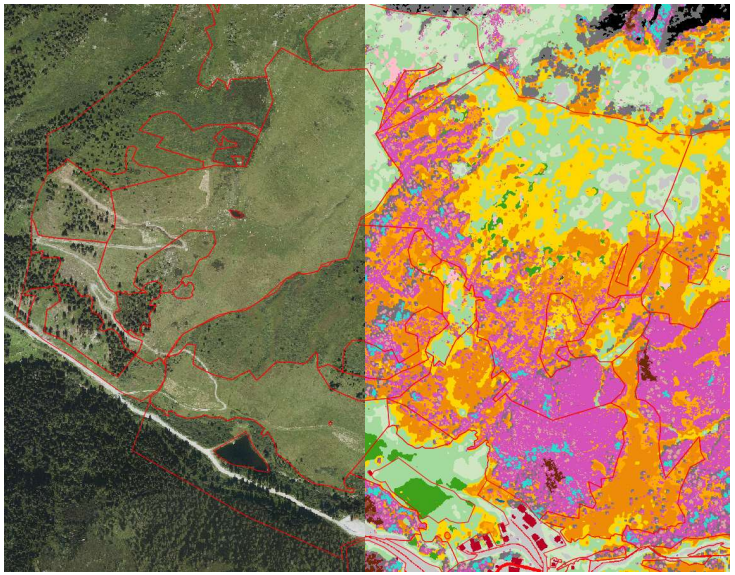
Prerequisite for monitoring/tracing

(of agricultural activity - or absence thereof - declared by farmer via GSAA)

- **LPIS input reference data** permit for each scheme/measure unique identification and correct localization of agricultural parcels and non-agricultural areas eligible for aid

? **LPIS quality and automation of updating**

- ? By use of satellite EO (VHR or HHR)
  - ? Requirements for Copernicus Contributing Missions' data and storage/access/processing platforms, if any
- ? State-of-the-art / experience
- ? Recommendations about good practice



Forage areas on Alpine pastures - eligible area determination based on PlanetScope satellite data rule- and sample-based classification.

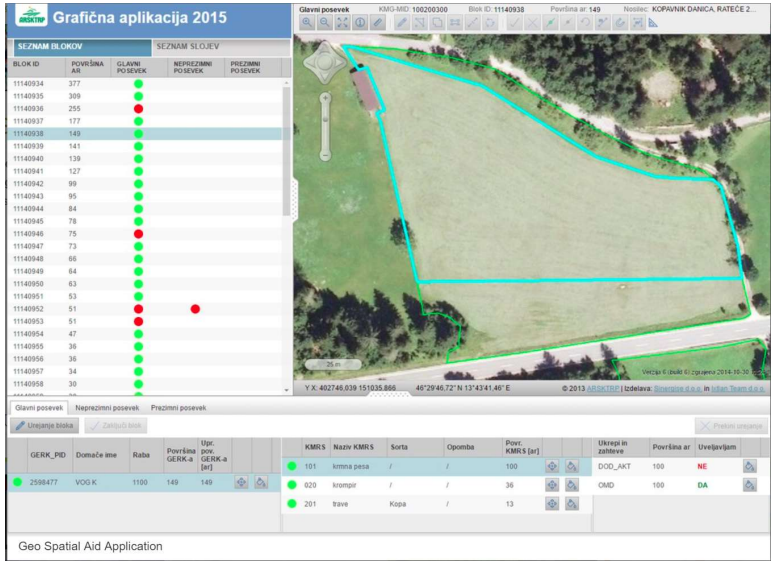
Shown example is © AgrarMarkt Austria

EO – Earth Observation VHR – Very High Resolution (< 10m)
HHR – High High Resolution (<= 1m resolution on ground)

Geo-Spatial Aid Application

- **Interface for the farmer to prepare and submit correct electronic declaration**
  - Pre-filled applications (beneficiary may modify the pre-filled data)
  - Claimless system (beneficiary cannot modify the pre-filled data)
- ? **Evolution towards Web GUIs**
  - ? Pre-filling and better up-to-dateness by use of satellite EO (VHR or HHR) – JRC tenders new time stacks
    - ? Requirements for Copernicus Contributing Missions' data and storage/access/provisioning platforms, if any

GUI – Graphical User Interface

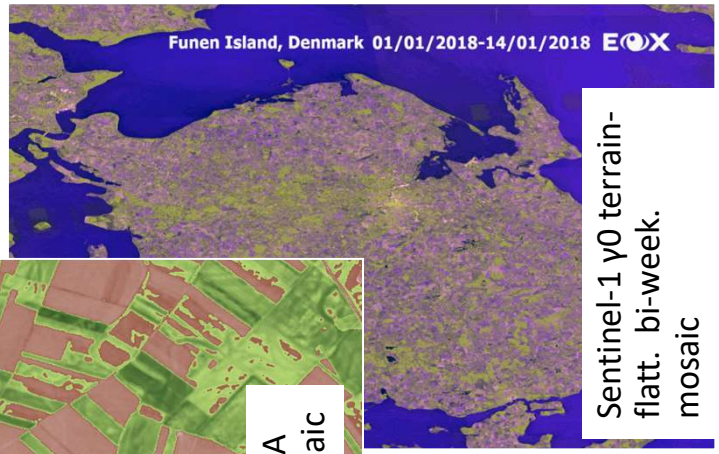


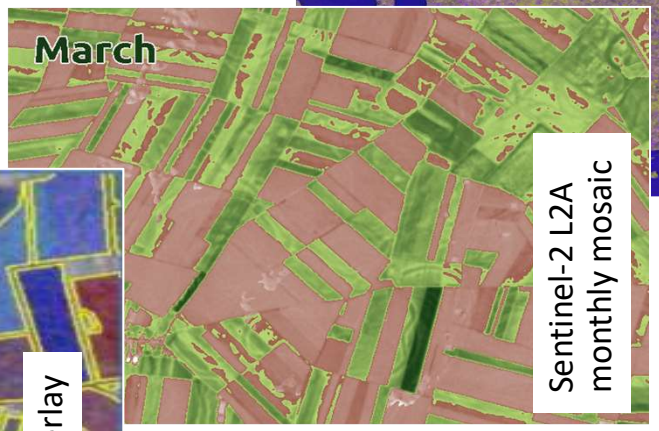
Web application that includes the basic GIS tools and managing data through intuitive GUI. Backdrop map is aerial orthophoto mosaic.

Shown example is ©

Area Monitoring

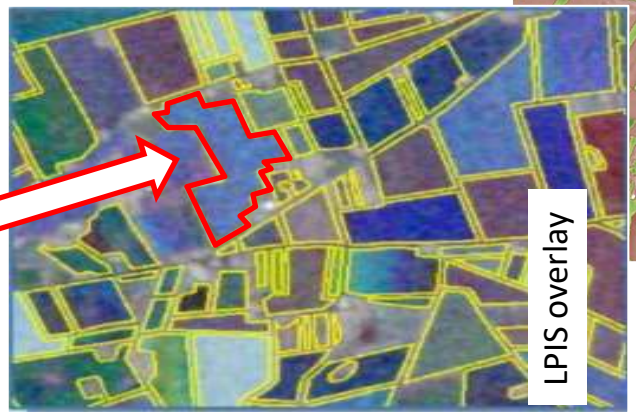
- **Big data analytics – technical challenges**
  - Country-wide high cadence satellite observations (< weekly)
  - High-throughput / large volume processing to generate pre-requisite CARD
  - Automation & tasking APIs between EO-based platforms and IACS / PAs' IT environments





CARD time-series

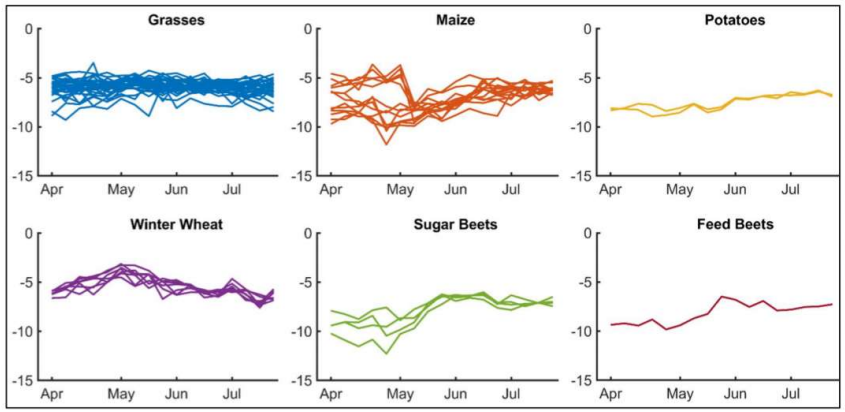
Feature



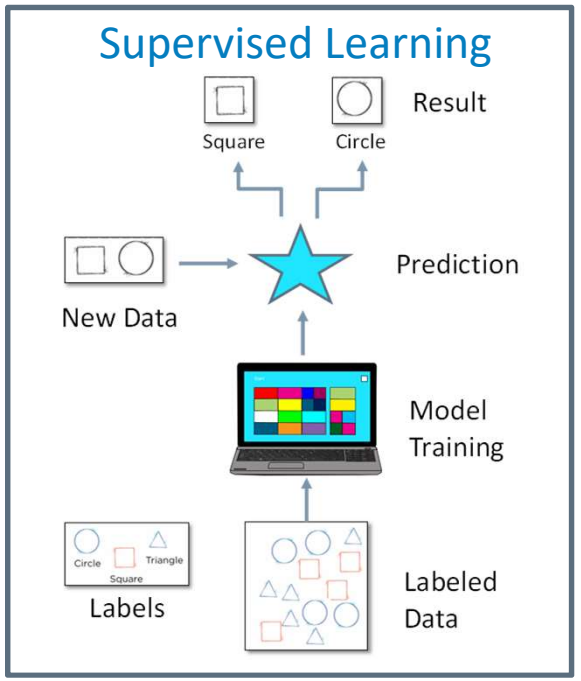
Processing by EOX on mundi WEB SERVICES

Area Monitoring (cont'd)

- **Big data analytics – technical challenges**
  - Orders of 100.000 – 5 Mio. parcels / features per PA
  - Sophisticated analytics data reduction algorithms e.g. machine learning (classification; checks of declared crop; yield forecast, etc.)



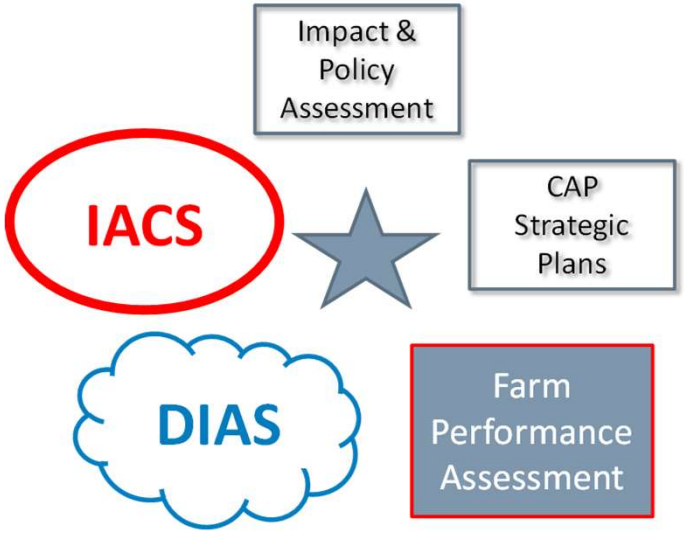
Temporal profiles of Sentinel-1 backscatter for the parcels of a single holding (W. Devos et al., JRC Technical Reports, DS/CDP/2018/17).



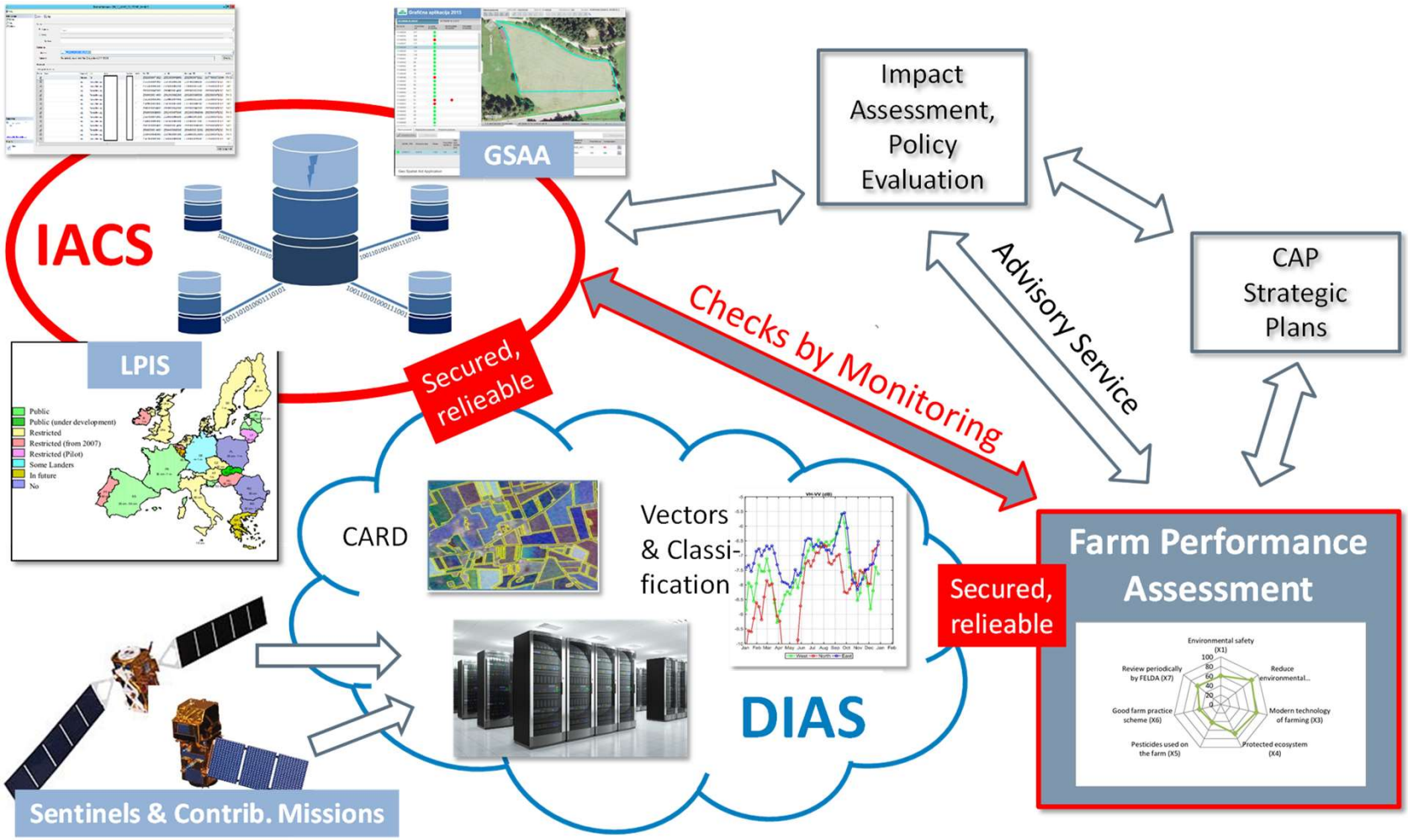
Scheme of machine learning which can be applied to crop type (label) classification in satellite time-series.

Checks by Monitoring & PAs

- **Organisational challenges / paradigm shifts**
  - PAs roles and responsibilities – new governance - from controls to tailored interventions and towards farm advisory services - ambitious environmental and climate objectives
  - MS CAP Strategic Plans to include section about digital technology for area monitoring & control
    - EO-derived information - a “commodity” for PAs - terms and conditions of provisioning
    - Electronic databases and geographic information systems enabling the exchange and integration of data



Area Monitoring (cont'd)



Announcement

Possible involvement and/or benefits for Member State Administrations

1st day; 13:30 – 14:30 Workshop 1:

Replacing the On- the-spot checks (OTSC) with Area monitoring system – the only valuable product of Copernicus for Paying Agencies?

Organizer: EO4AGRI partner NPA, Lithuania

- Survey of workshop subject
- Discussion
- Presentation of further EO4AGRI results

Panta Rhei
EUROPEAN AGRICULTURE PAYING AGENCIES PLATFORM

55th Conference
Copenhagen (Denmark)
22nd - 24th May 2019

Summary

- Game changer Copernicus through provision of high cadence satellite observations?
- Utility for PAs of EU-funded Data and Information Access Services (DIAS)?
  - Copernicus big data cloud – provider of CARD
  - Commodity for area monitoring – provider of feature analytics service (machine learning)
  - APIs for integration with IACS
- The EO4AGRI Project
  - Combines multiple stakeholder opinions and technical facts in careful investigations
  - Is underway to bring light to the above questions

Next events

Name	Date	Place
Hackathons		
1st EO4AGRI hackathon	8-10 May 2019	Nairobi (Kenya)
2nd EO4AGRI hackathon	July 2019	Patras (Greece)
3rd EO4AGRI hackathon	September 2019	TBD
4th EO4AGRI hackathon	October 2019	Bari (Italy)
5th EO4AGRI hackathon	Nov-Dec 2019	Argentina
Workshops		
IACS Workshop	10-11 April	Valladolid (Spain)
EGU Conference/Webinar	9 April	Vienna (Austria)
EO4AGRI workshop at OGC Technical Meeting (Agriculture domain group)	June 2019	Leuven (Belgium)
Stakeholders workshop	24-25 September 2019	Pilsen (Czech Republic)
External Events		
ESA Living Planet Symposium	13-17 May 2019	Milan (Italy)
Conferences of the EU Directors Paying Agencies	15-17 May 2019	Bucharest (Romania)
Panta Rhei Conference	22-24 May 2019	Copenhagen (Denmark)
World Soils 2019 User Consultation Meeting	02-03 July 2019	Frascati (Italy)

Thank you for your attention

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