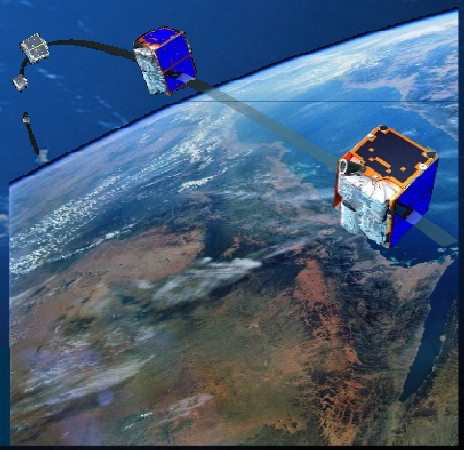
MASS PROCESSING OF REMOTE SENSING DATA FOR ENVIRONMENTAL EVALUATION IN EUROPE

BlackBridge
Delivering the World



Lic. Adrián González| Applications Research

PROJECT BACKGROUND

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2012 - “GIO land” (Copernicus Initial Operations land program)

- Contracted by EU – Technical coordination European Environmental Agency (EEA)
- Methodology and generation of 5 thematic High Resolution Layers on Land Cover characteristics: impervious areas, forests, wetlands, water bodies and grassland of 39 European countries
- Our consortium (Indra, Eurosense and BlackBride) won the bid for Permanent Grassland generation

OPPORTUNITY AND CHALLENGE

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- Start of project: March 2012
- Number of countries to be processed: 39
- Area to be covered: about 6 millions km2
- Requested overall minimum accuracy: 80%
- Project time: 30 months
- Time for process development and server set up: 8 month
- Real working time less than 18 months
- Only chance: **automation**

GRASSLAND MONITORING IN EUROPE

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Permanent grassland HRL product across Europe

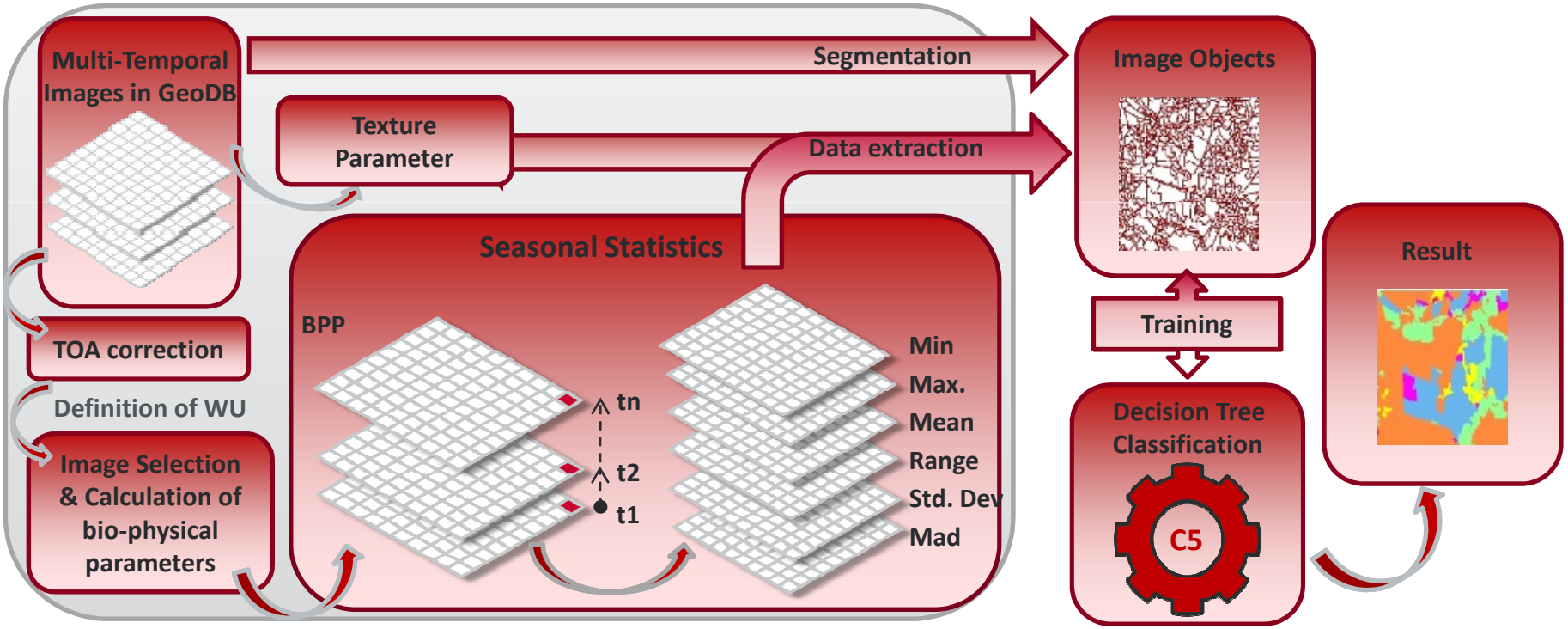


Grasslands are highly important for Europe, … and highly variable !!!

PROCESSING SCHEMA

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Permanent grassland HRL product across Europe

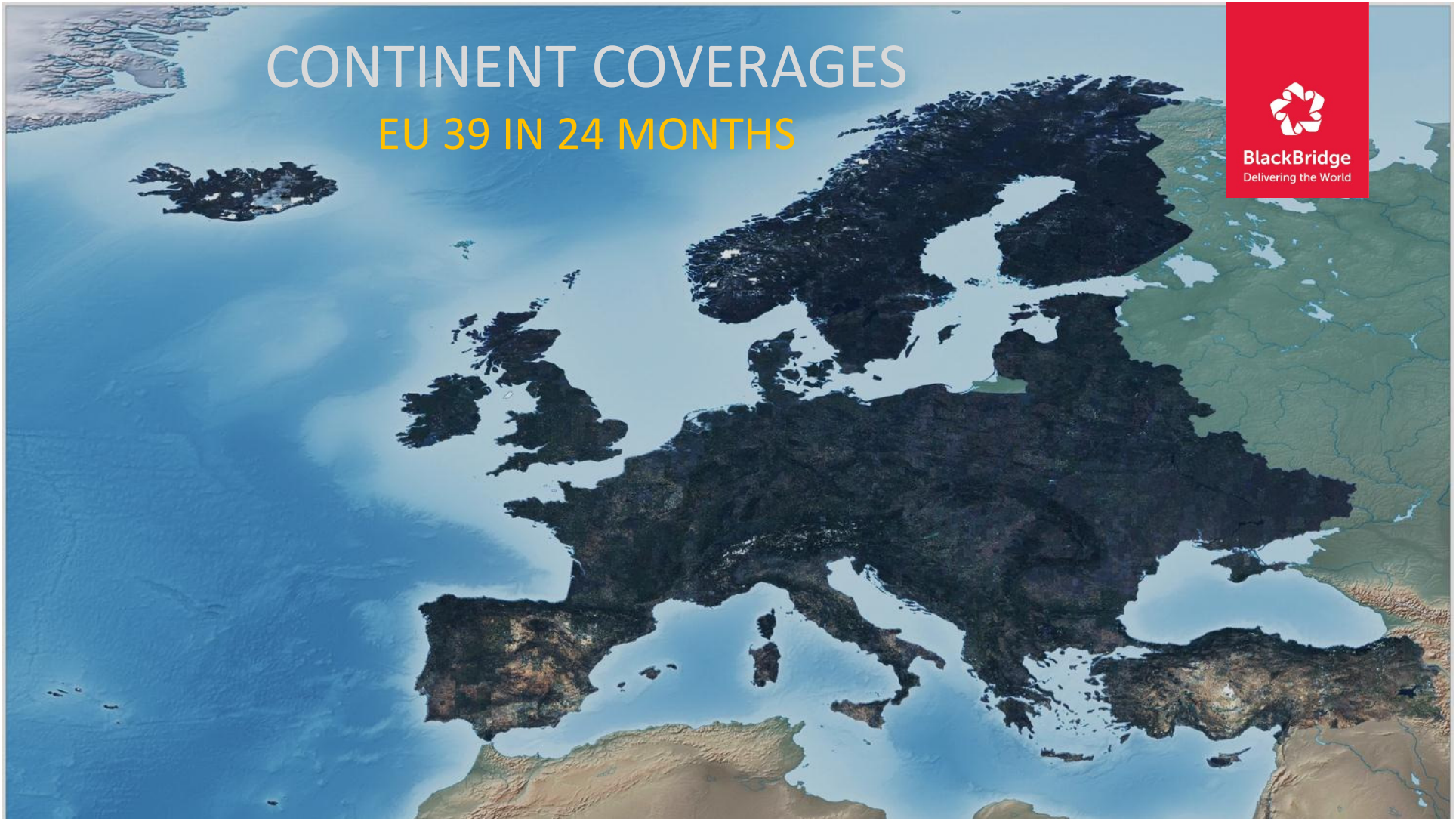


TECHNICAL DESCRIPTION OF THE MASS PROCESSING (1)

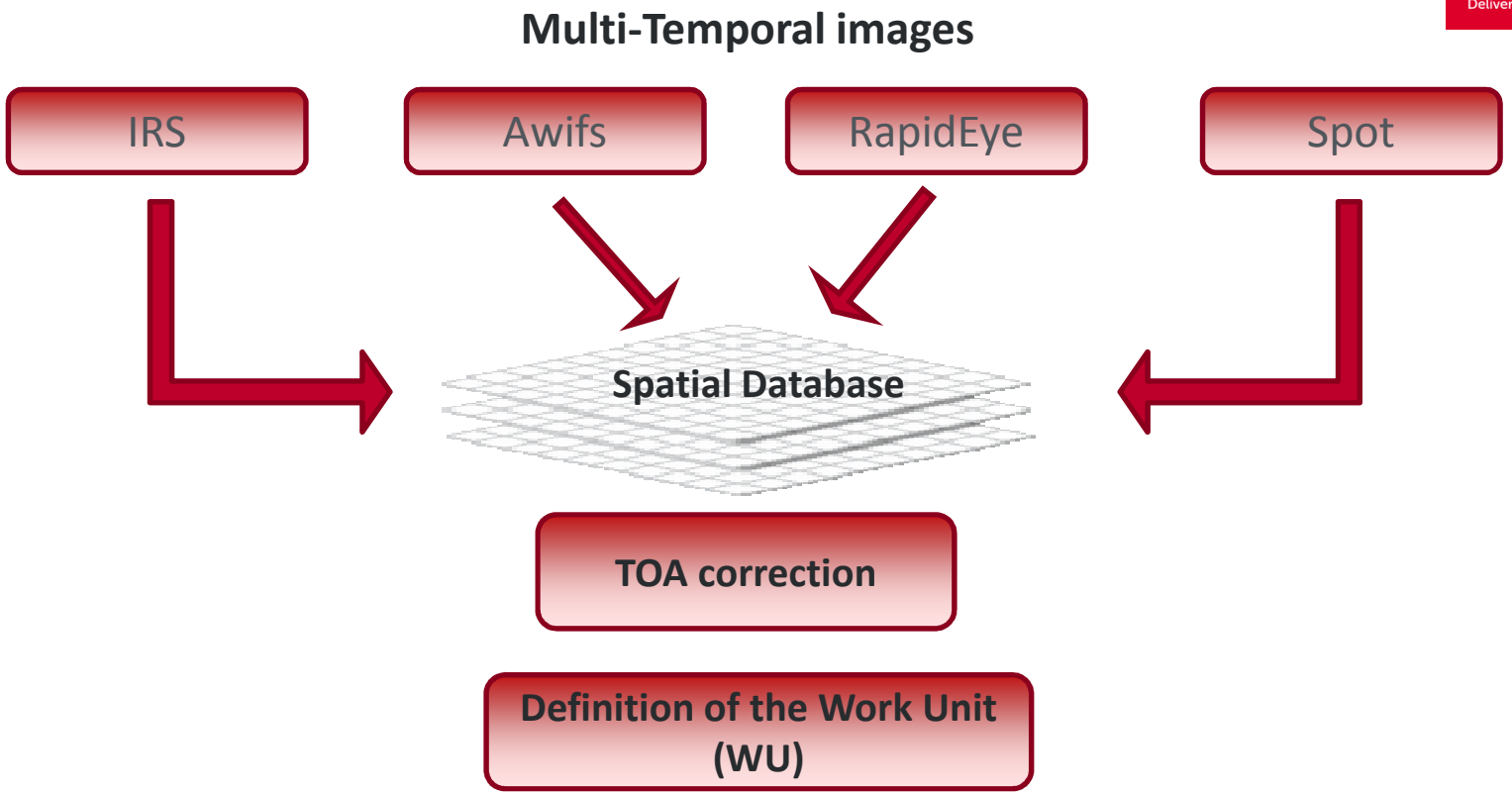
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INPUT DATA

- Remote sensing image repository over 39 countries
  - IRS images – Spatial resolution 20 meters – 140x140 km
  - Awifs images – Spatial resolution 60 meters – 370x370 km
  - RapidEye images – Spatial resolution 20 m – 25x25 km
  - RapidEye images – Spatial resolution 5 m – 25x25 km
  - Spot images – Spatial resolution 20 m – 60x60 km
  - All images parameters and geometries stored in a Spatial Database to optimize performance

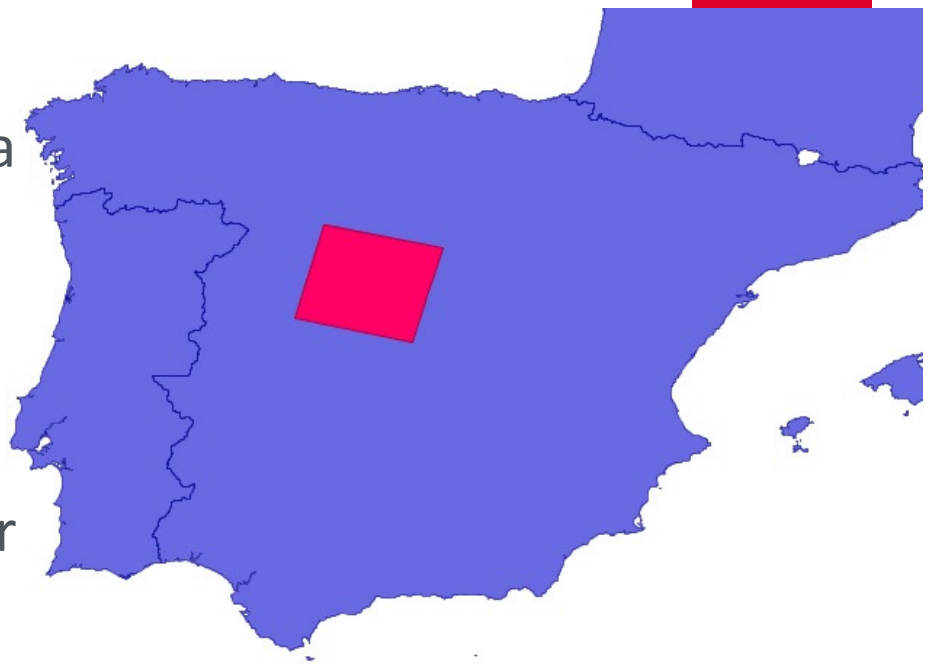

CONTINENT COVERAGES
EU 39 IN 24 MONTHS
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PROCESSING (1)



PROCESSING (2) – DEFINITION OF THE WORK UNIT

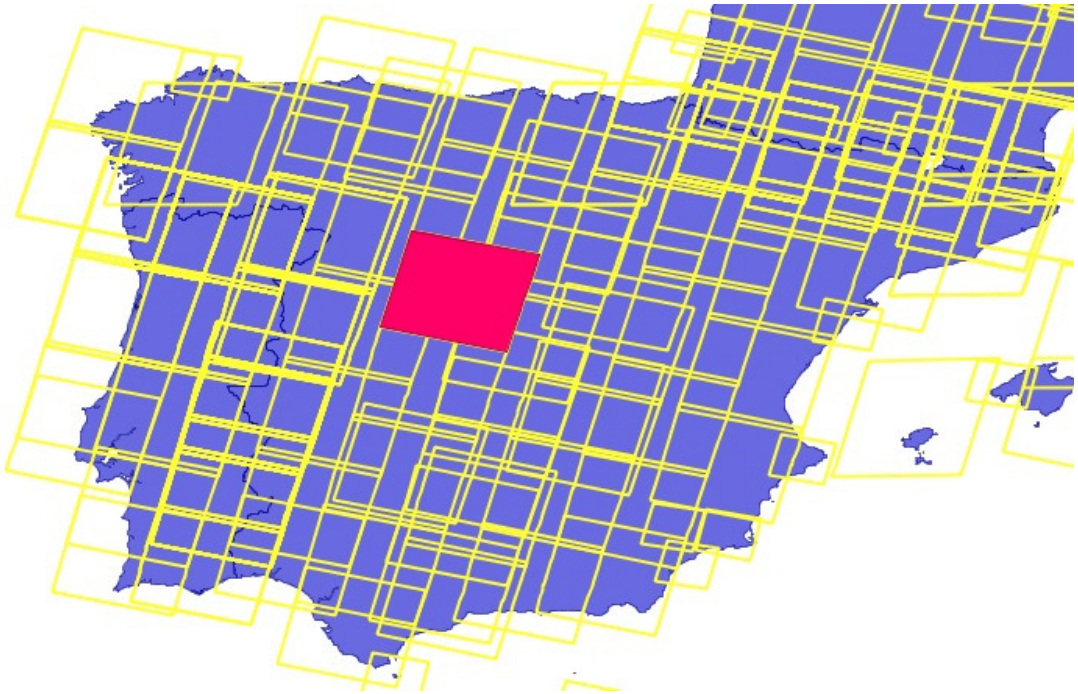
- Europe divided in Work Units
- Core of the processing schema
- Work Unit = IRS image from 2012
- National projection system used
- Boundary used to clip all other images



OVERVIEW ON WORK UNITS - SPAIN

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- Example: Spain – Approx. 120 Work Units



PROCESSING (3)

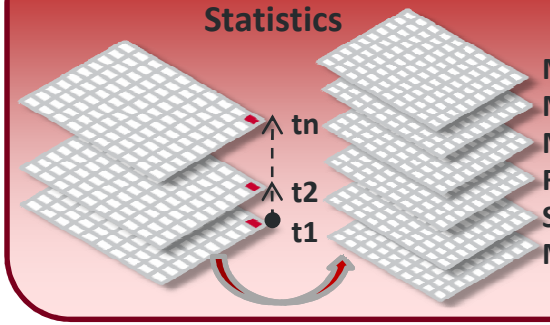
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Image Selection & Calculation of vegetation parameters

Texture parameters

- NDVI
- PSRI
- WI
- Brightness
- Ground Coverage
- NDII
- NDVSI

Seasonal Statistics



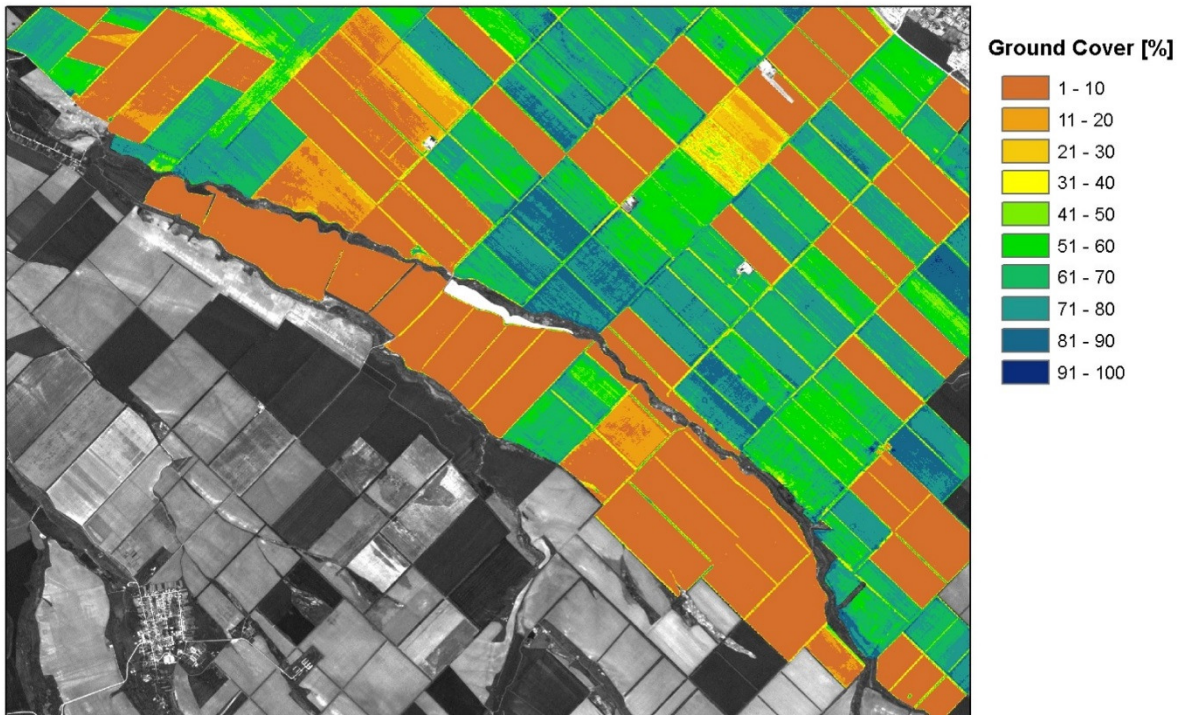
Min
Max.
Mean
Range
Std. Dev
Mad

LARGE AREA MAPPING OF VEGETATION PARAMETERS

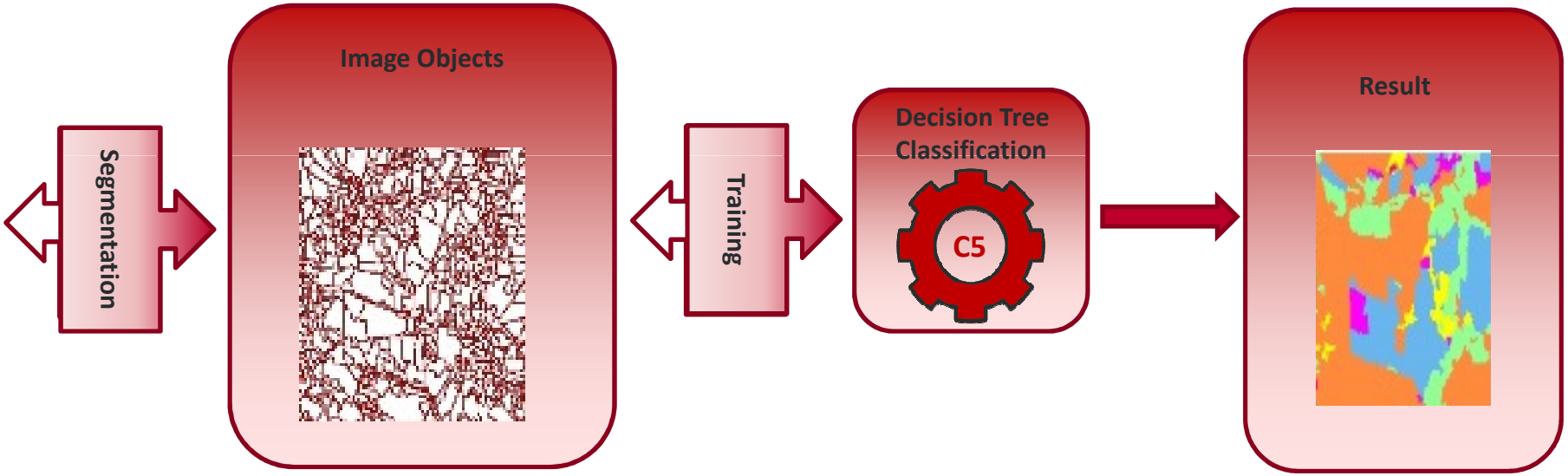
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NDVI

Ground Cover



PROCESSING (4)



TECHNICAL DESCRIPTION OF THE MASS PROCESSING (2)

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PROCESSING ENGINE

- Hardware
  - Dedicated server (16 cores – 32 Gb RAM)
  - 20 Tb Online storage – 40 Tb Stand by storage
  - Production requirements: 24x7
  - Dedicated delivery server – Delivery method FTP
  - Daily incremental backups

TECHNICAL DESCRIPTION OF THE MASS PROCESSING (3)

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PROCESSING ENGINE

- Software
  - Programming language: Python
  - Base on Open Source Libraries (Gdal and OGR)
  - About 5000 lines of code in seven different modules
  - All software programmed in house

CONCLUSIONS

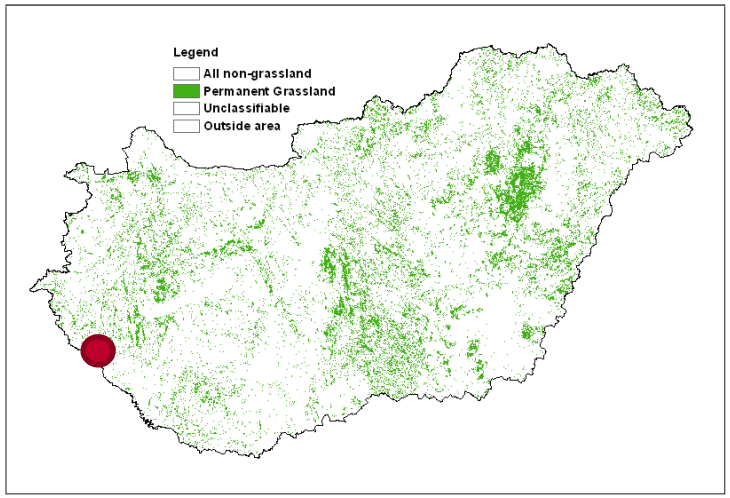
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- All 39 countries in Europe processed
- All overseas territories processed
- Total project time shortened: from 18 to 14 months
- Second run to cover image gaps performed
- On site country verification in progress

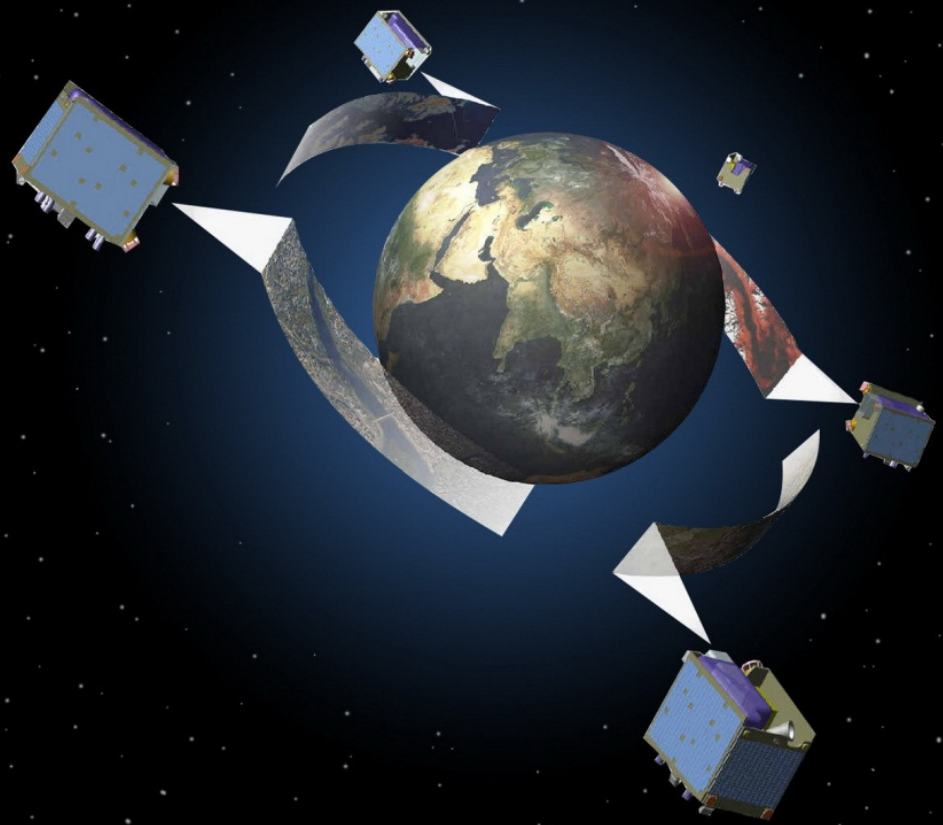
GRASSLAND MONITORING IN EUROPE



- Overall accuracy for Hungary = 92 %



Thanks for your attention



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