

# Integrated, timely relevant application of Sentinel data fusion in agricultural sector

## SCERIN-6 Capacity Building Workshop

11-14 June 2018, Zagreb, Croatia

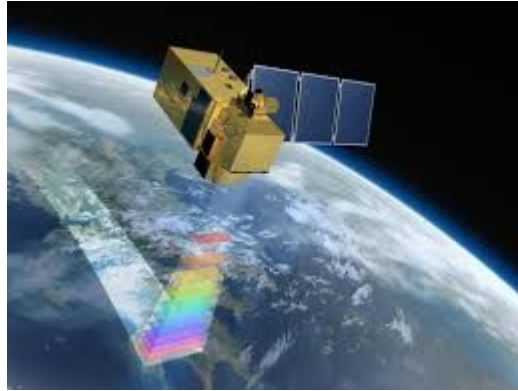


# Outline

- General project description
- Previous results
- Partners
- Workflow
- Expected results

# History

There was a specific demand from Dalmand Corporation to review the integration of Earth Observation data into the the crop production sector, with a special focus on Precision Farming support.



# Project formulation

One year ago a proposal was submitted by partners to ESA:  
**Integrated, timely relevant application of Sentinel data fusion in agricultural sector**

**24 months**

**200k Euro**

**3 partners (University of Pécs main contractor / Dalmand Corporation and sarmap SA subcontractors)**

**Kick off: 01.06.2018**



# Partners

## Dalmand Corporation - Hungary

- Member of the Bonafarm Group, which is the largest and one of the best Hungarian company in agricultural sector.
- Cultivates 35 000 hectares of arable land
- Dalmand Corporation
  - Nearly 9 000 hectares arable land
  - Traditional crop growing (winter wheat, oily plants and corn)
  - More than 1000 hectares precision farming was introduced



## sarmap SA -Switzerland

More than 20 of experience in SAR software development and RS projects



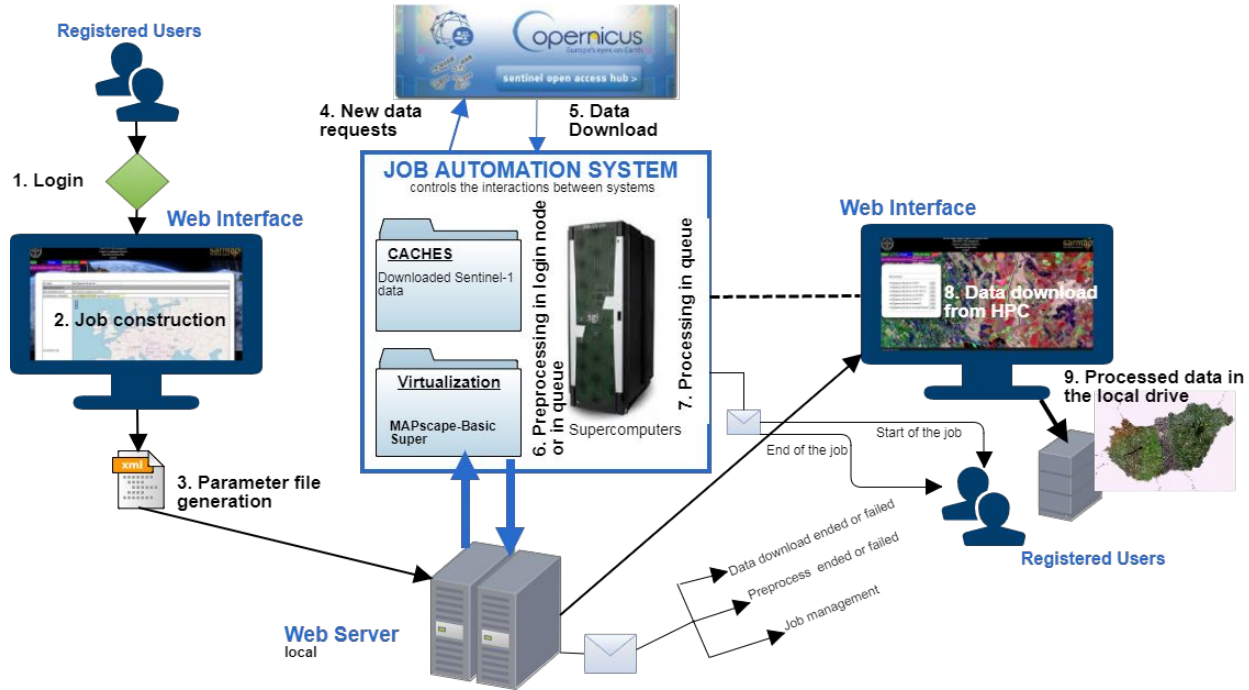
## University of Pécs - Hungary

Interdisciplinary research team formulated and already implemented an ESA tender:


***Dedicated supercomputer based Sentinel-1 processing chain***




# Dedicated supercomputer based Sentinel-1 processing chain - System review



# Web interface

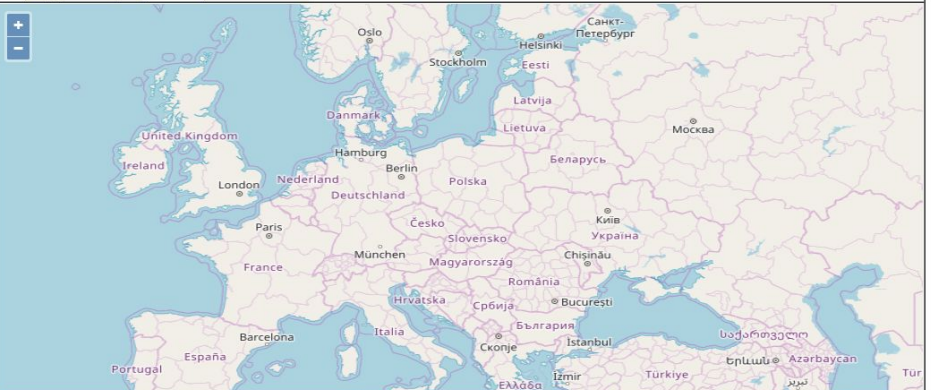
 **MAPscape-Basic Super webinterface**  
ESA PTE-TTK sarmap SA  
Logged in: ora@gamma.ttk.pte.hu  
login.debrece2.hpc.niif.hu  
prod-phi

 **sarmap**  
your information gateway

settings cleanup queue info help logout  
start job download preprocessing submit to view  
HPC queue results

job name	ora@gamma.ttk.pte.hu-
input data parameters:	
data download site url	https://scihub.copernicus.eu/dhus/
download site credentials	user:ora@gamma.ttk.pte.h password:*****

coordinates map



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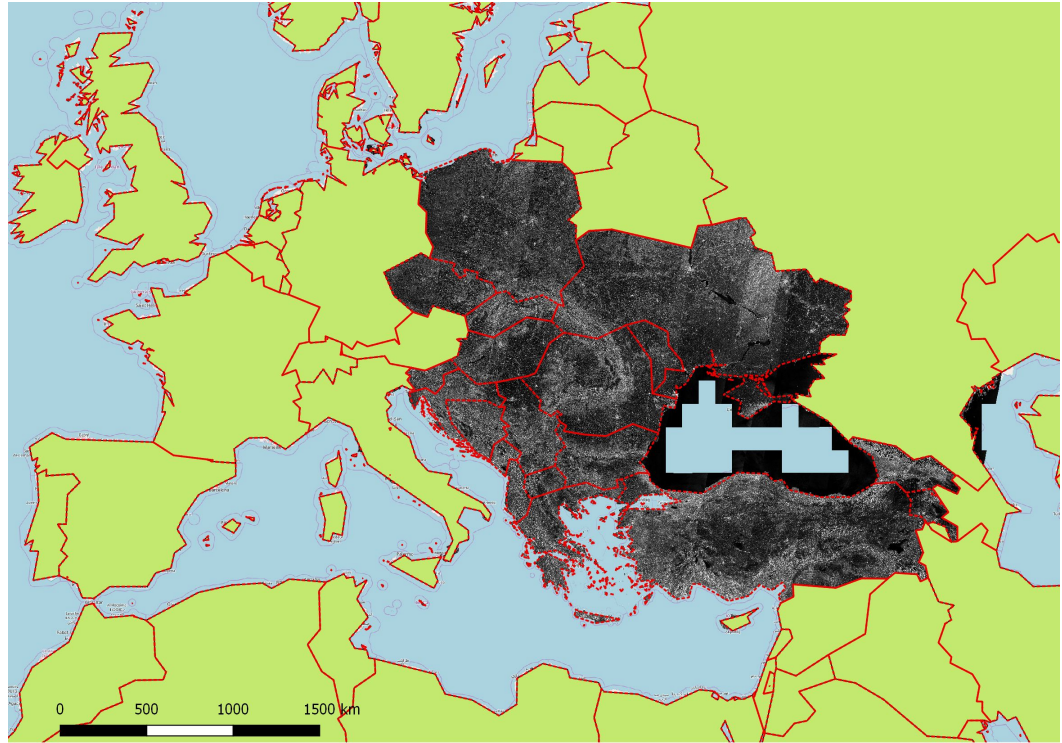
# Results: SCERIN region Sentinel-1 VV image mosaic

> 2.75 mill. Km<sup>2</sup>

> 3 TB data

> 6.875 billions of pixels

20\*20 m spatial resolution

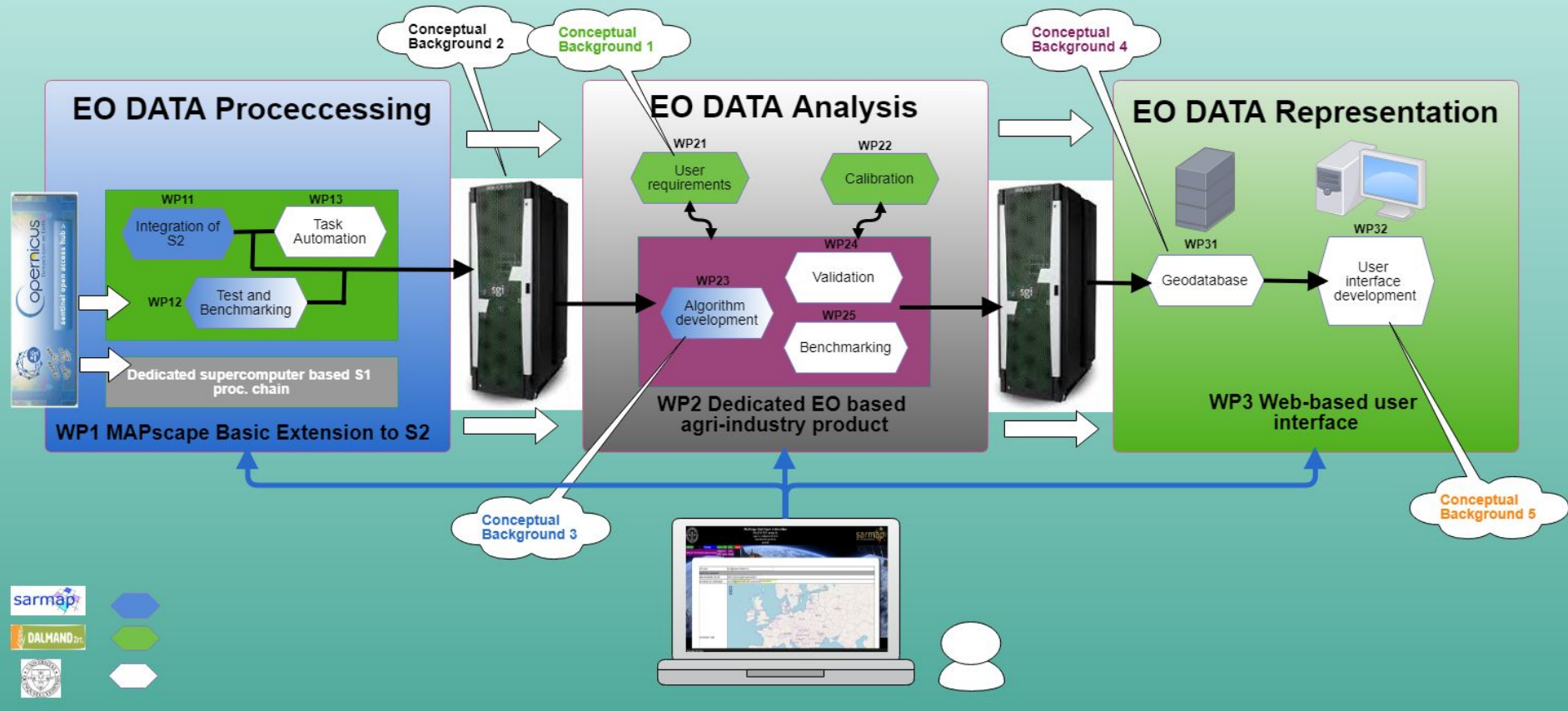




# Results

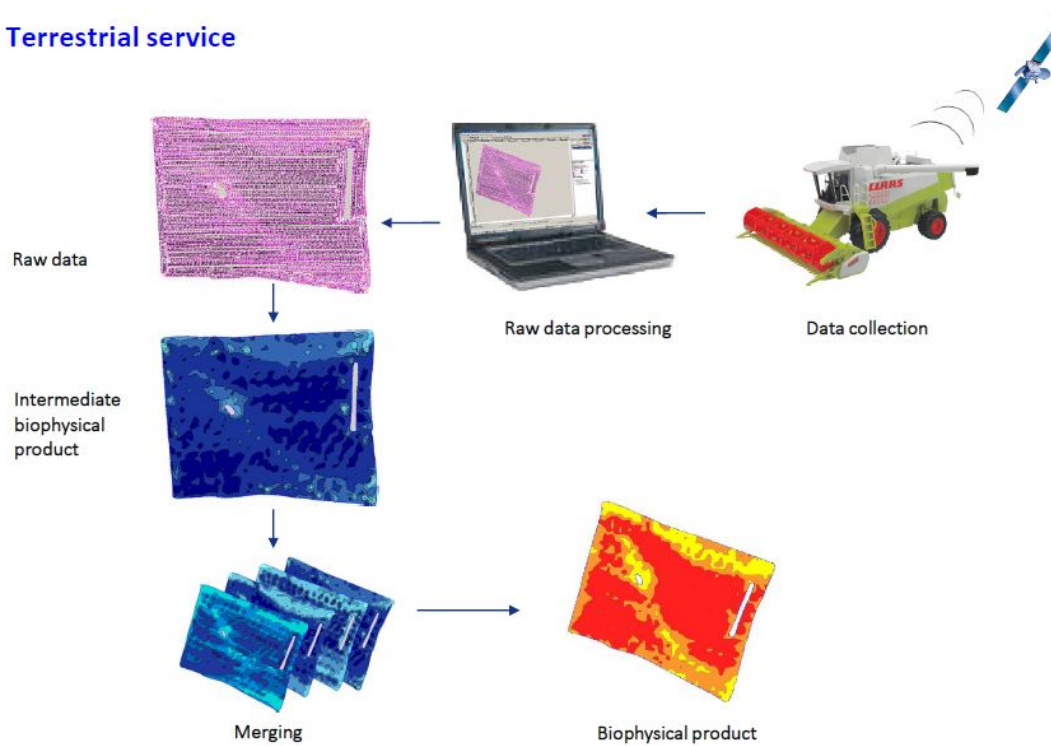


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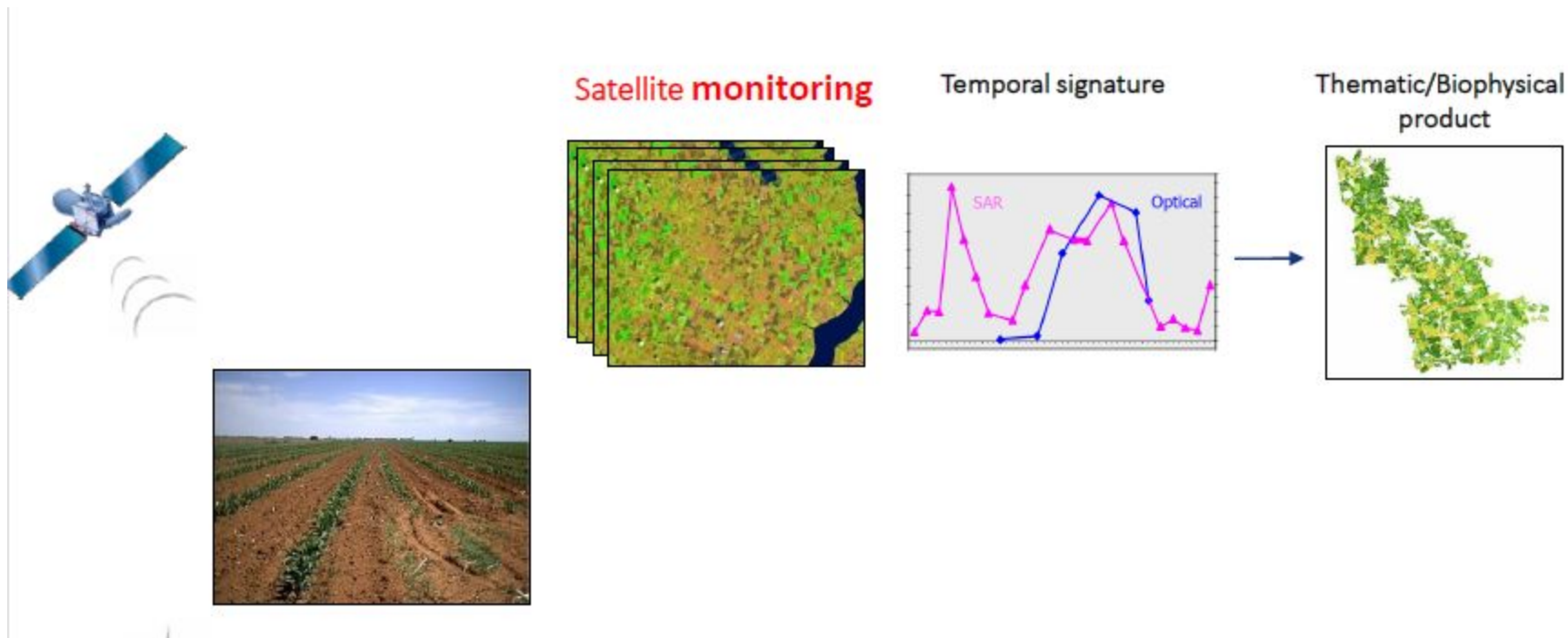


# Dalmand corporation > Grand control data collection

## Terrestrial service



# Satellite monitoring system



# RS data to fuse

## Sentinel-1

### Intensity

Co-registration including DEM;  
Multi-temporal speckle filtering;  
Terrain geocoding radiometric  
calibration/normalization;  
Anisotropic Non-Linear Diffusion filtering;  
Temporal filtering

### Coherence

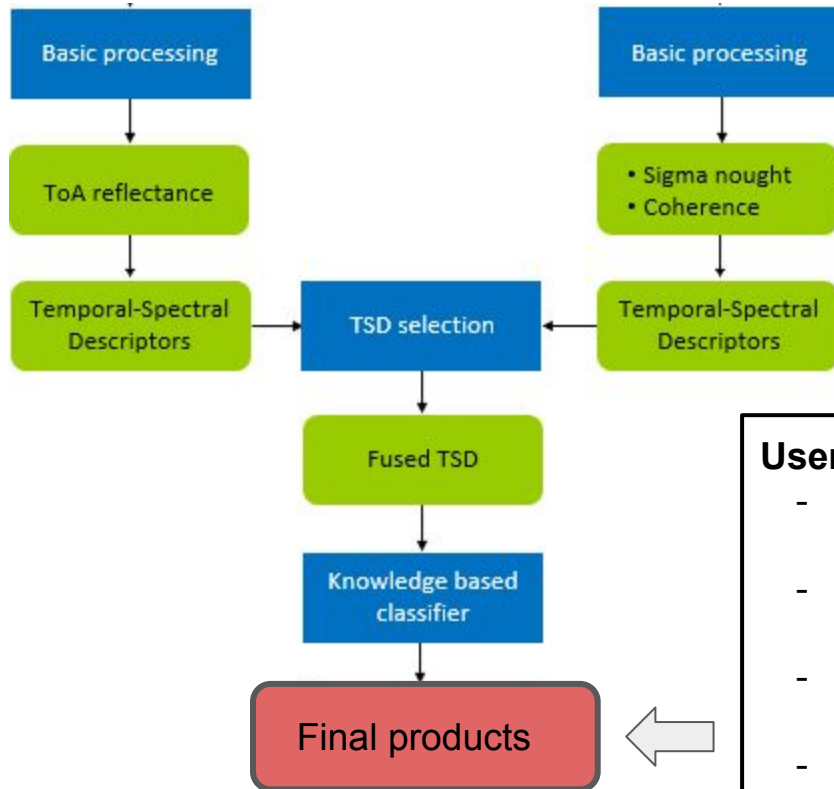
Co-registration including DEM;  
Generation of coherence including  
DEM;  
Terrain geocoding;  
Anisotropic Non-Linear Diffusion  
filtering;

# RS data to fuse

## Sentinel-2

Conversion to ToA reflectance;  
Radiometric topographic induced illumination correction;  
Cloud and cloud-shadow masking;  
General water mask extraction;  
Derivation of Vegetation, Water, and Bare Soil Indexes;  
Temporal filtering;

# Method



## User request:

- Interannual homogeneity detection of the parcels,
- Monitoring seasonal environmental stresses,
- Supporting sowing seeds production,
- Soil moisture monitoring



# Future Challenge

HOW to form EO Big data into timely relevant products for end users?  
Next SCERIN meeting in Novi Sad, Serbia I will return to this issue.





# Thank you for your attention

