



Prototypes of Future Copernicus Land Monitoring Products: The ECoLaSS Project

living planet
symposium | MILAN
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GAF AG, Munich

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JOANNEUM
RESEARCH



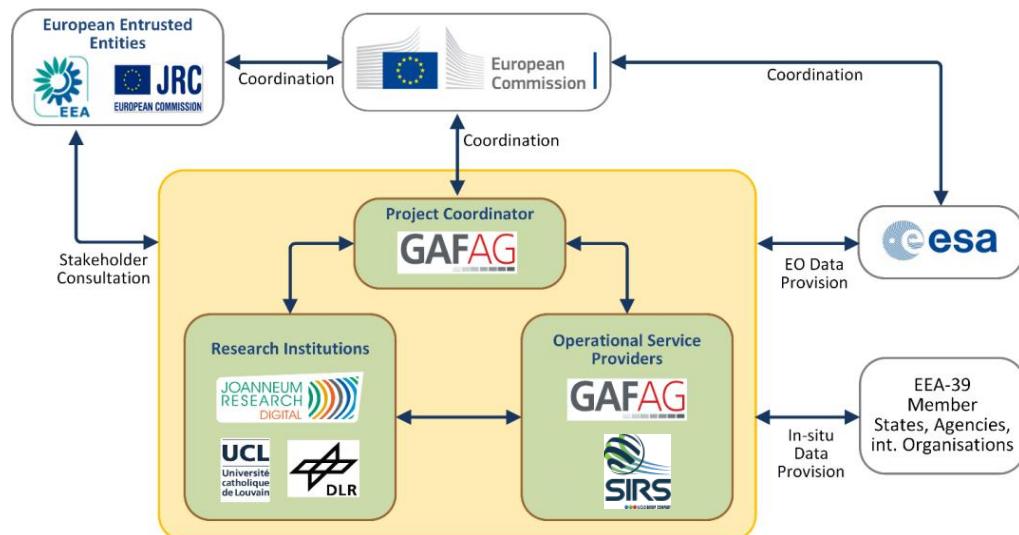
ECoLaSS: “Evolution of Copernicus Land Services based on Sentinel data”

Key Objective = **improve** existing & develop **novel** products/services for future operational pan-European & Global Copernicus Land Components 2020+:

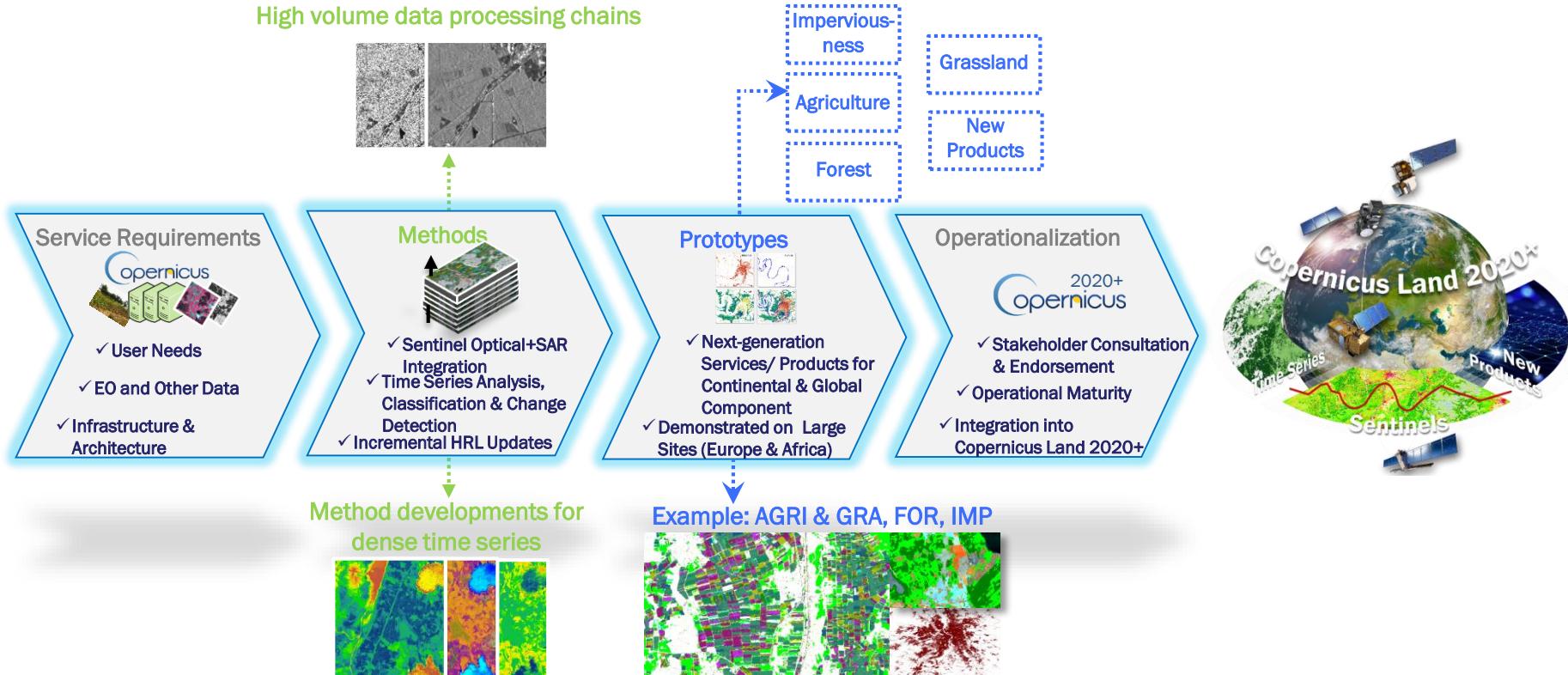
Organisational Setup



Horizon 2020

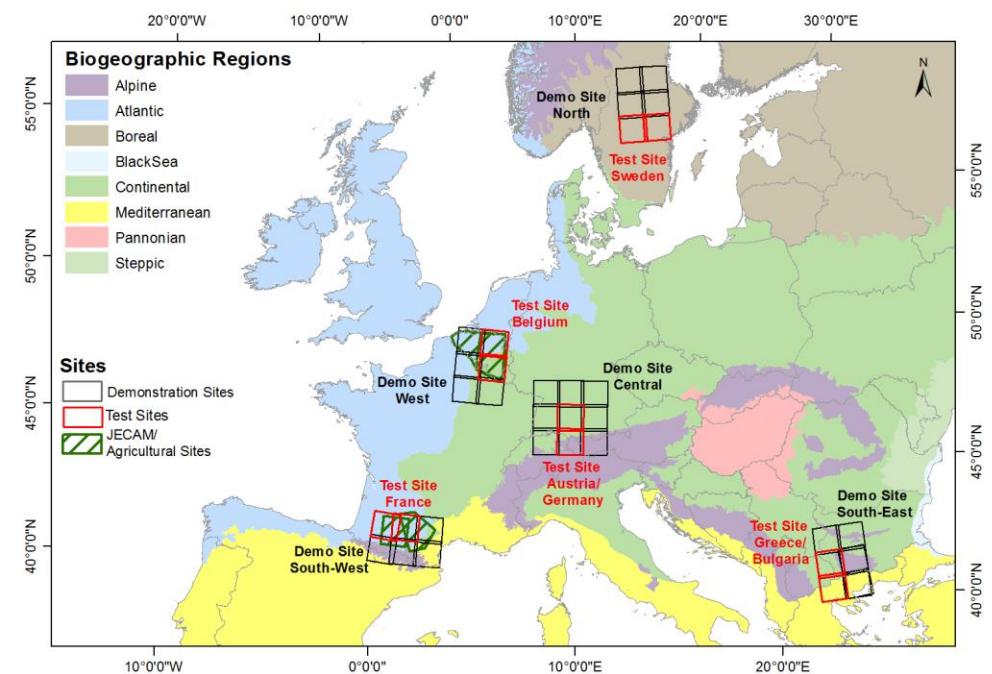


High volume data processing chains

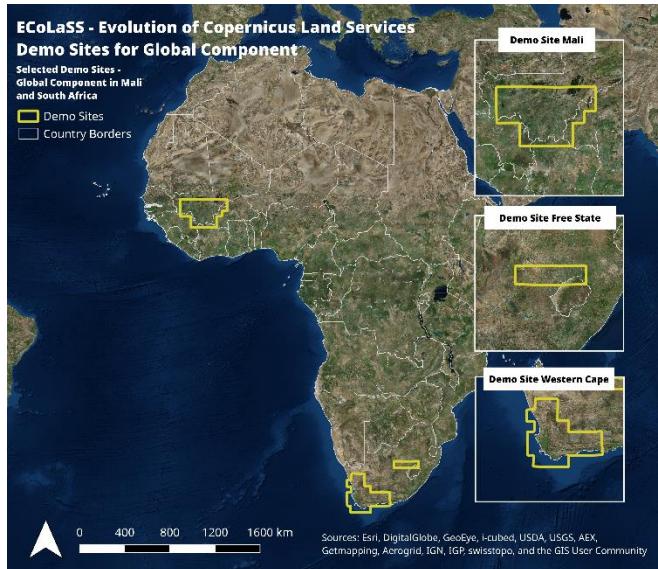


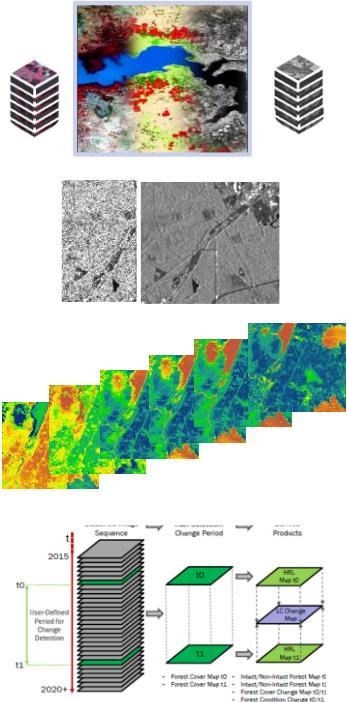
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- **5 demonstration (prototype) sites**
- **5 test sites** within demo sites
- **4 JECAM sites:** specific in-situ data
- **3 African sites**





- Sentinel-1/2/ (3) integration
- Sentinel time series pre-processing, Temporal Features
- Time series classification
- Time series change detection
- Incremental updates
- New CLMS products

Benchmarking
Approach



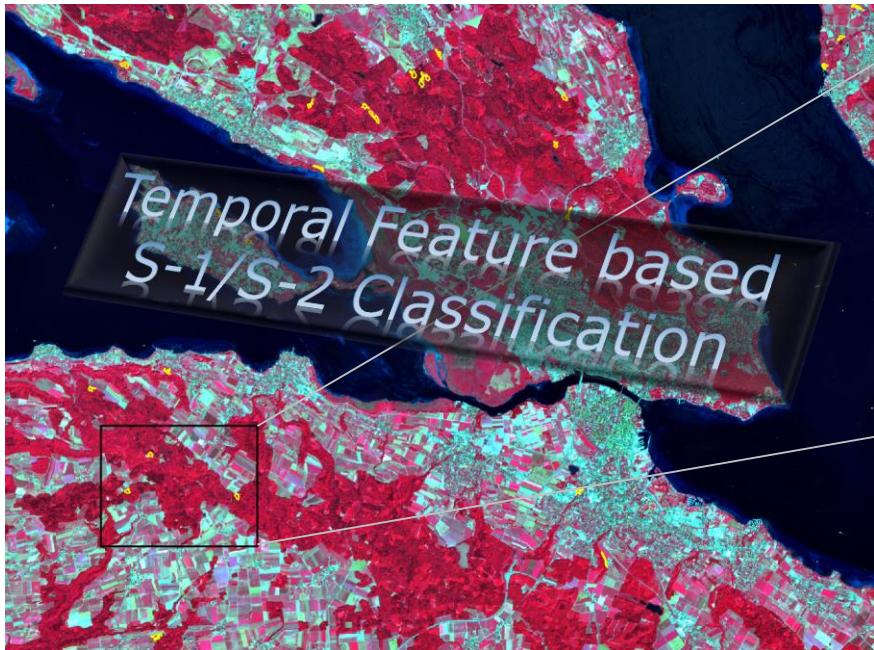
High-volume data
processing chains:
automated, flexible & customizable



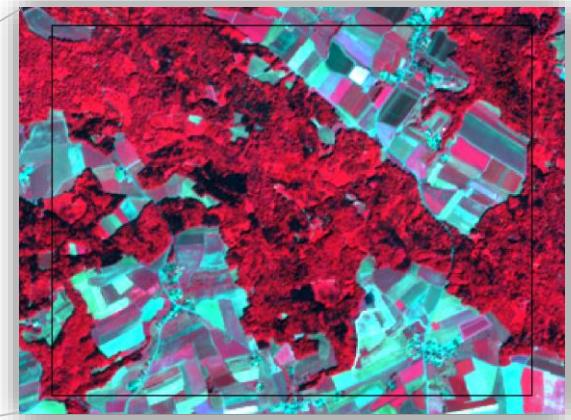
Prototypes:

- Indicators and variables
- HRL incremental updates
- Grassland characterisation
- Crop status/monitoring
- New Products

Demonstration Site: Central (Subset: Bavaria, Germany)



Annual change, 10m resolution, 1 ha MMU



2017

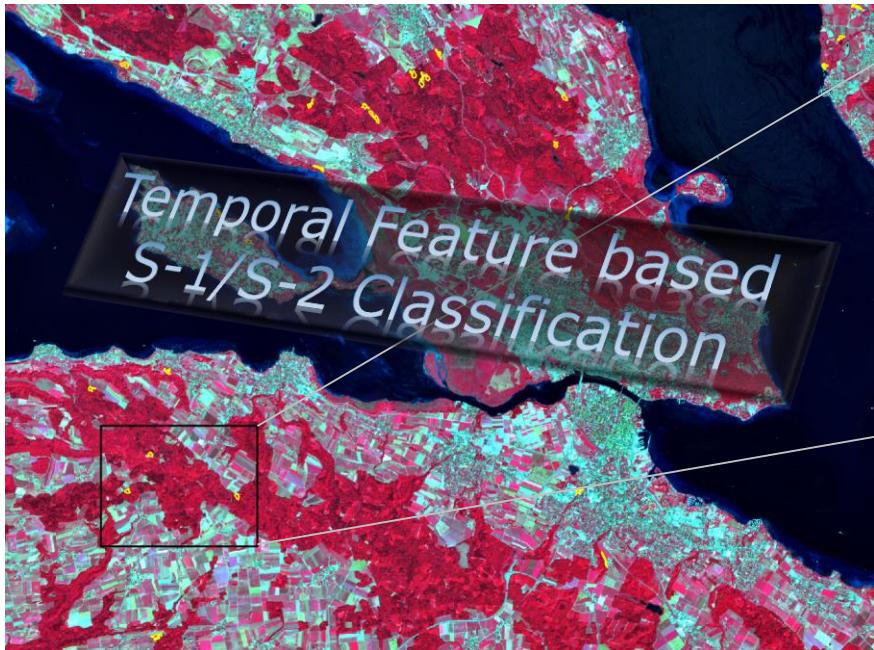
Modified Copernicus Sentinel data [2017; 2018]

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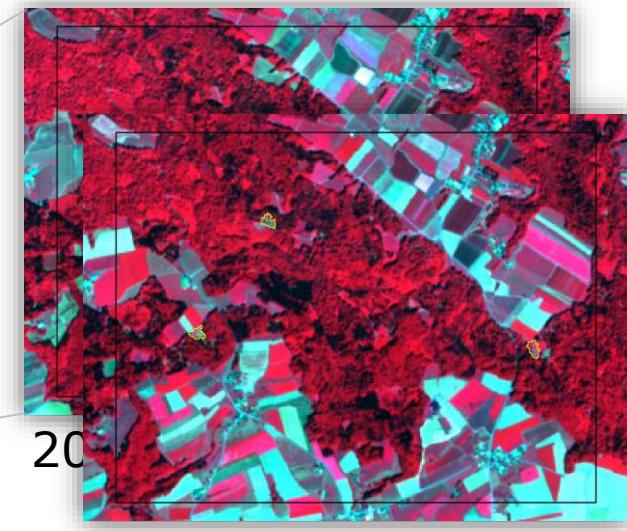
Demonstration Site: Central (Subset: Bavaria, Germany)



Annual change, 10m resolution, 1 ha MMU



Temporal Feature based S-1/S-2 Classification



2018

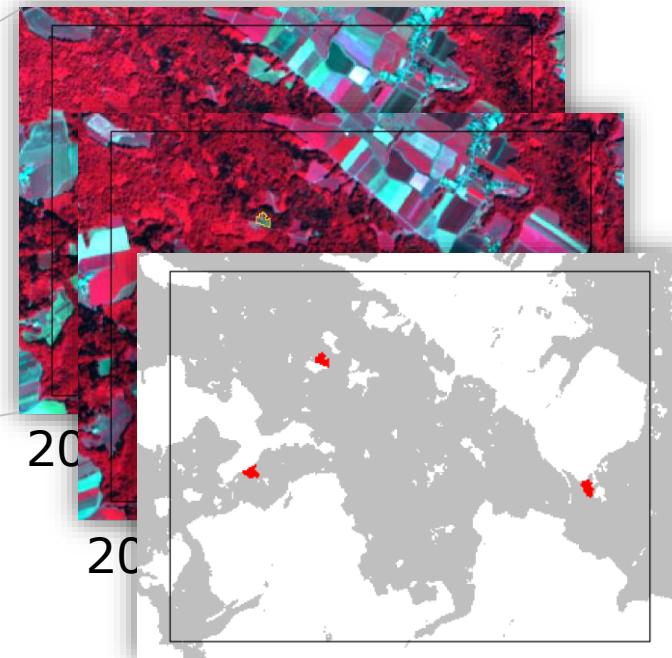
Modified Copernicus Sentinel data [2017; 2018]

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Demonstration Site: Central (Subset: Bavaria, Germany)

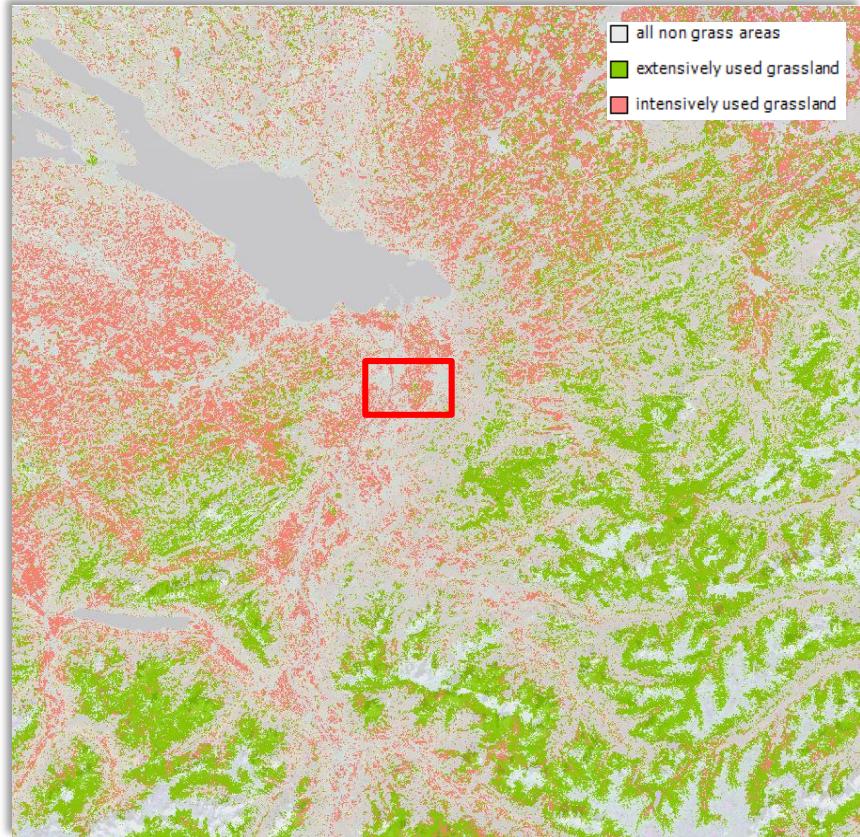


Annual change, 10m resolution, 1 ha MMU



Modified Copernicus Sentinel data [2017; 2018]

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Grassland Intensity layer 2018:

- Based on NDVI time series
- Classification of areas defined as Grassland within the Grassland status layer 2018
- Reference data for validation: IACS data

Produced using Copernicus Sentinel data [2018]

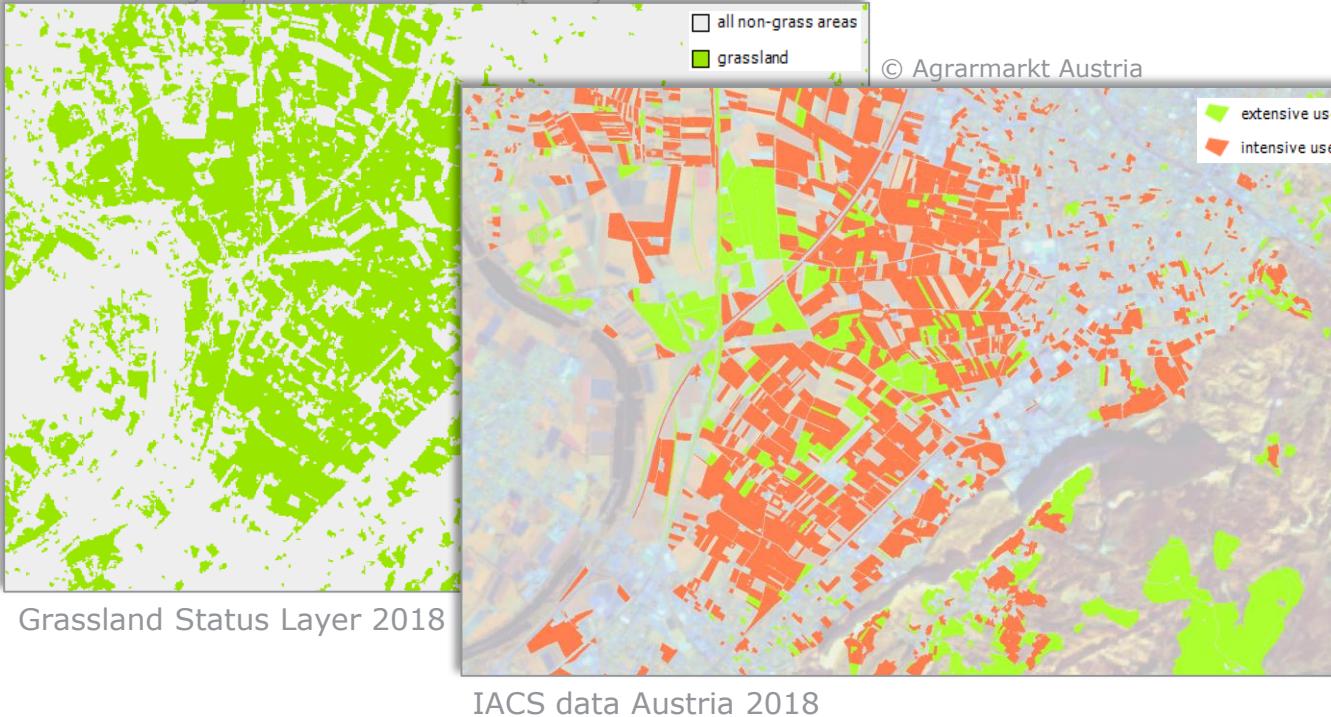
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Produced using Copernicus Sentinel data [2018]



Grassland Status Layer 2018

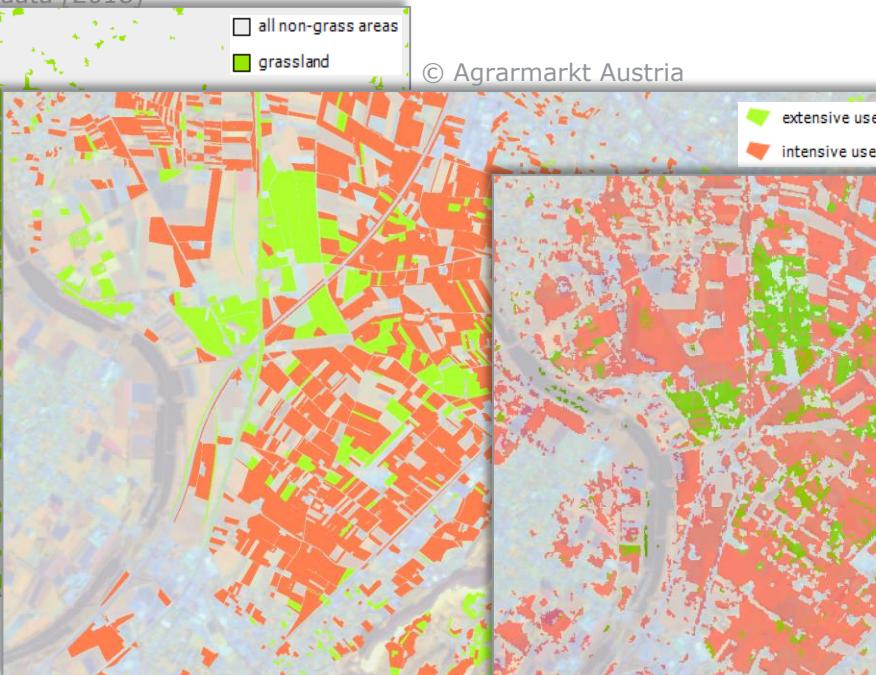
Produced using Copernicus Sentinel data [2018]



Produced using Copernicus Sentinel data [2018]

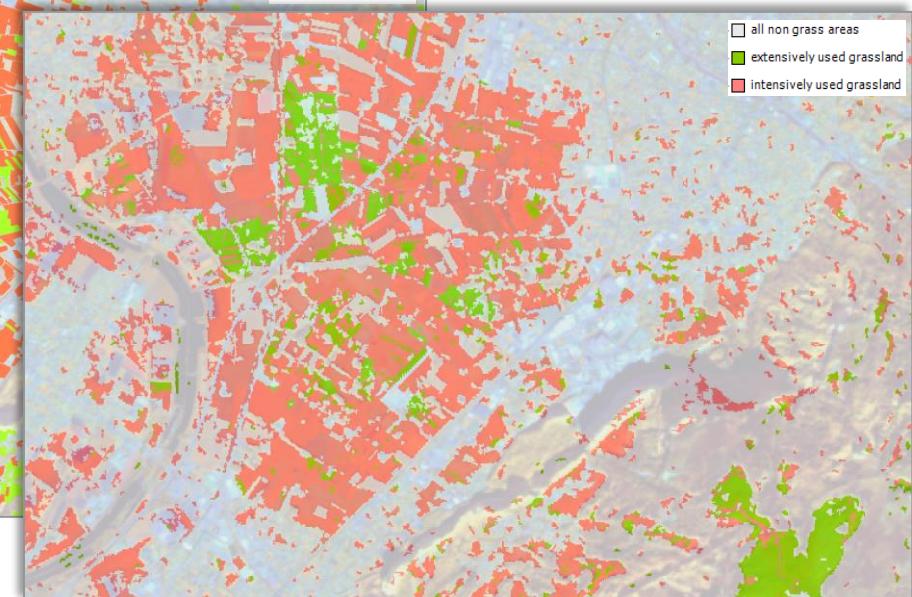


Grassland Status Layer 2018



IACS data Austria 2018

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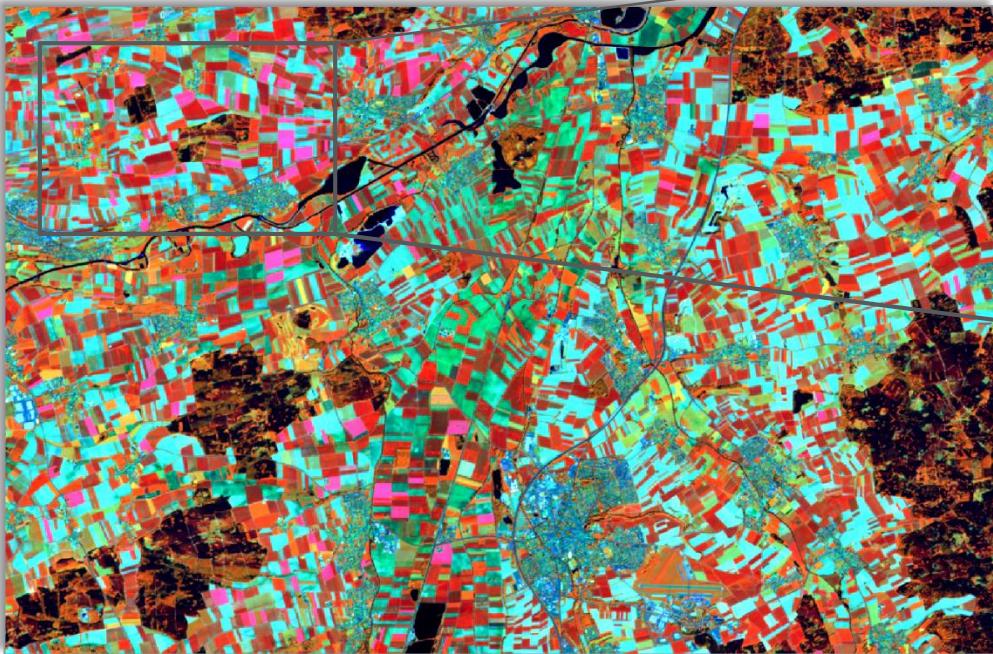


GRA Intensity Layer 2018

Overall Accuracy (based on InVeKoS) = 81,5%

Demonstration Site: Central (Subset: Baden-Württemberg, Germany)

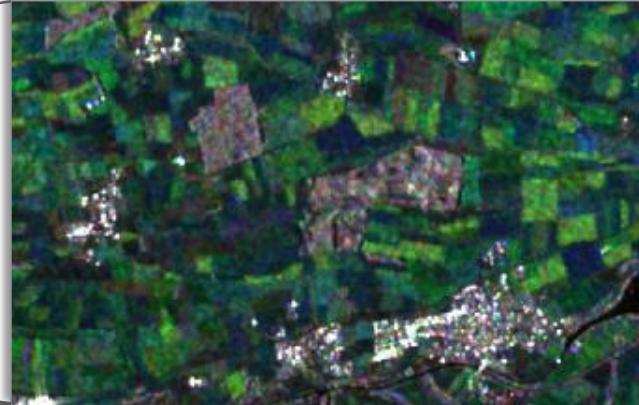
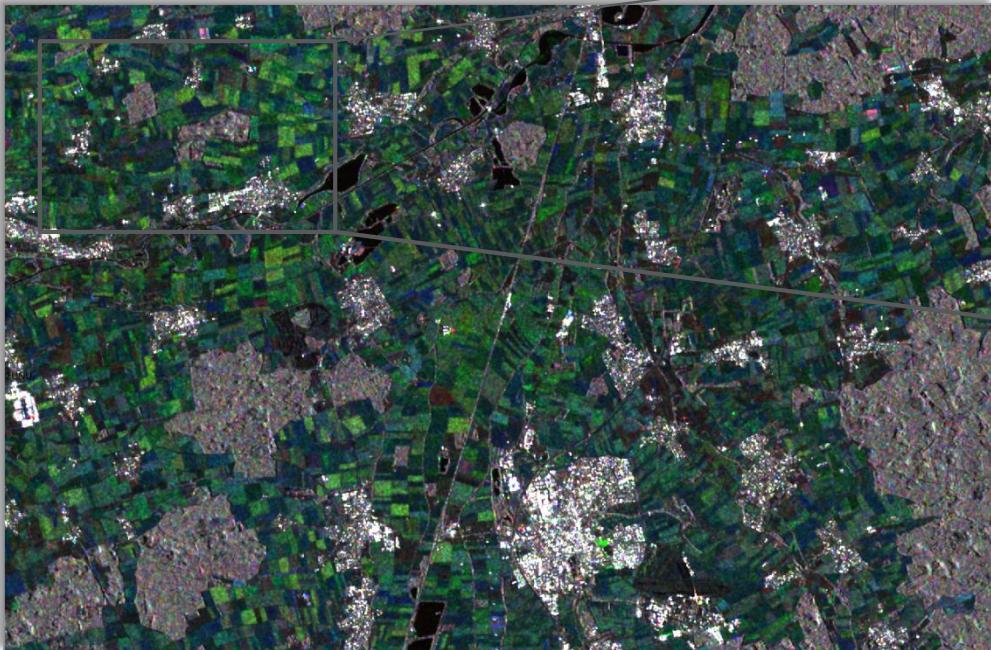
Dense Sentinel-2 time series



Sentinel-2 (2018-05-07)
R: Band 08,
G: Band 11,
B: Band 04

Copernicus Sentinel data [2018].

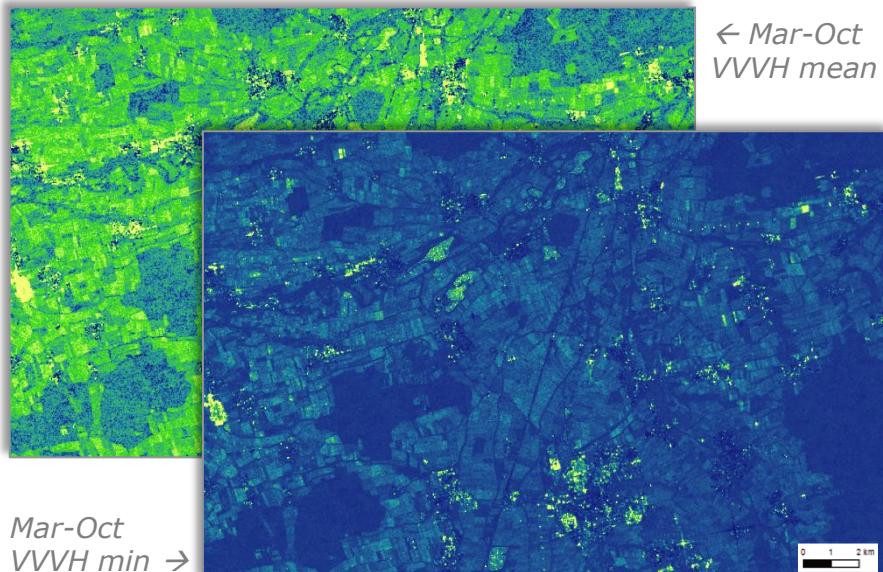
Dense Sentinel-1 time series



Sentinel-1 (VH)
R: 2018-05-06,
G: 2018-06-23,
B: 2018-08-10

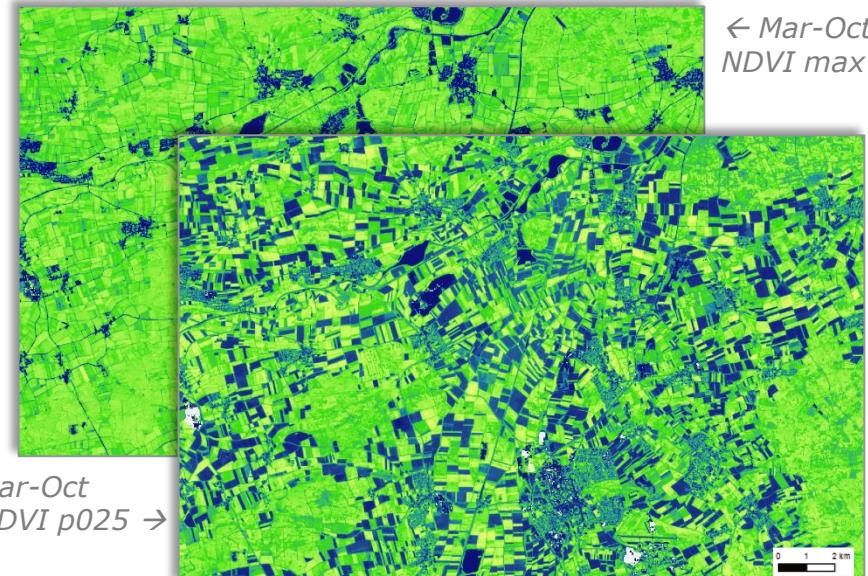
Copernicus Sentinel data [2018].

Retrieval of temporal features



Mar-Oct
VVH min →

← Mar-Oct
VVH mean



Mar-Oct
NDVI p025 →

← Mar-Oct
NDVI max

Temporal features based on various Sentinel-1
based indices/bands.

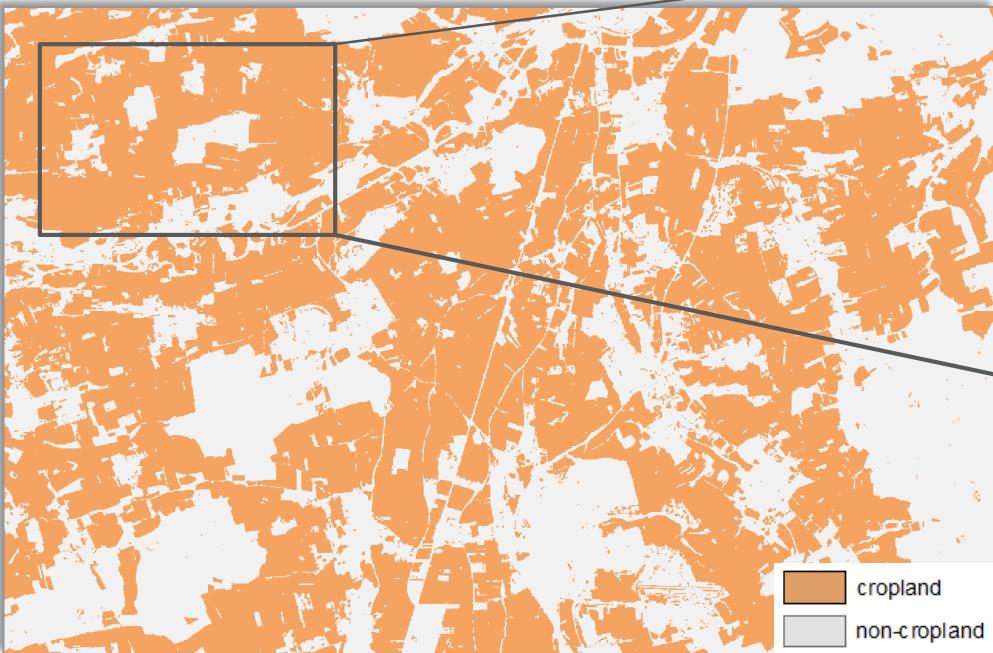
Temporal features based on various Sentinel-2
based indices/bands.

All images produced using Copernicus Sentinel data [2018].

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Demonstration Site: Central (Subset: Baden-Württemberg, Germany)

Crop Mask



Overall Accuracy (based on
LUCAS 2018) = 94%

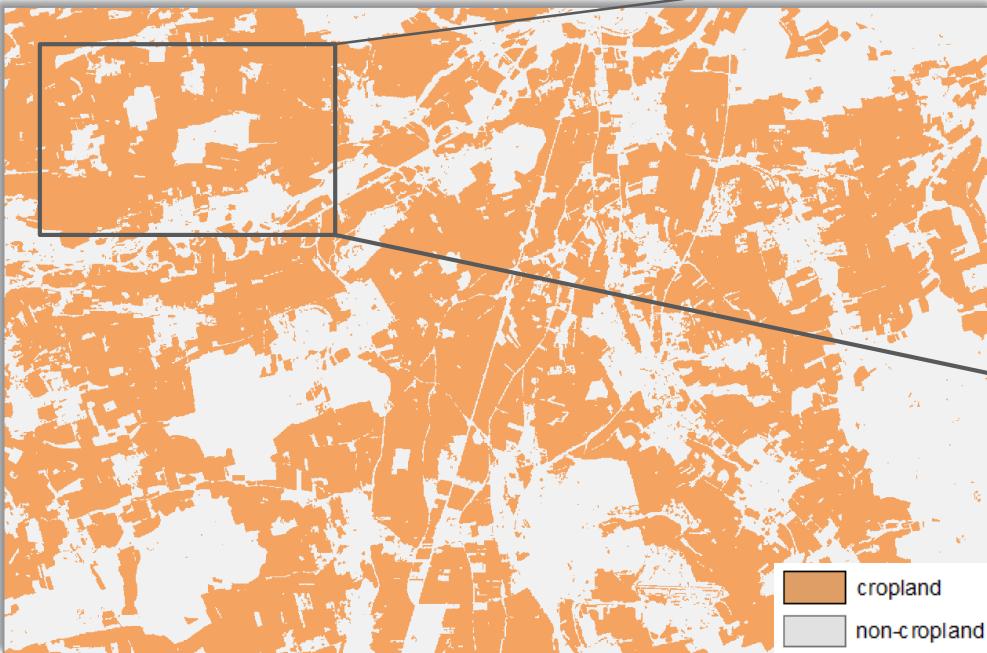
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LPIS data © MLR BW

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Demonstration Site: Central (Subset: Baden-Württemberg, Germany)

Crop Mask



LPIS data © MLR BW



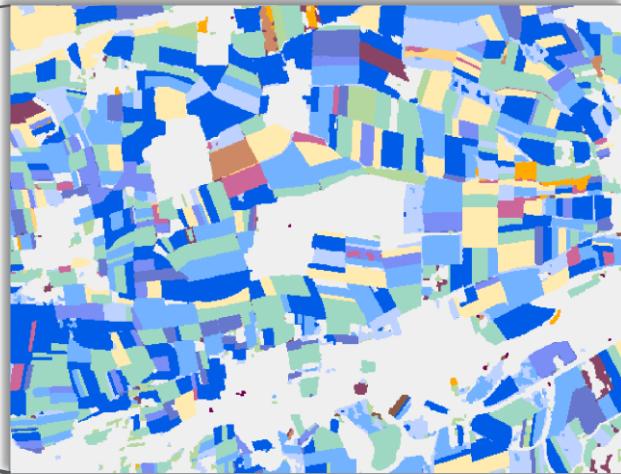
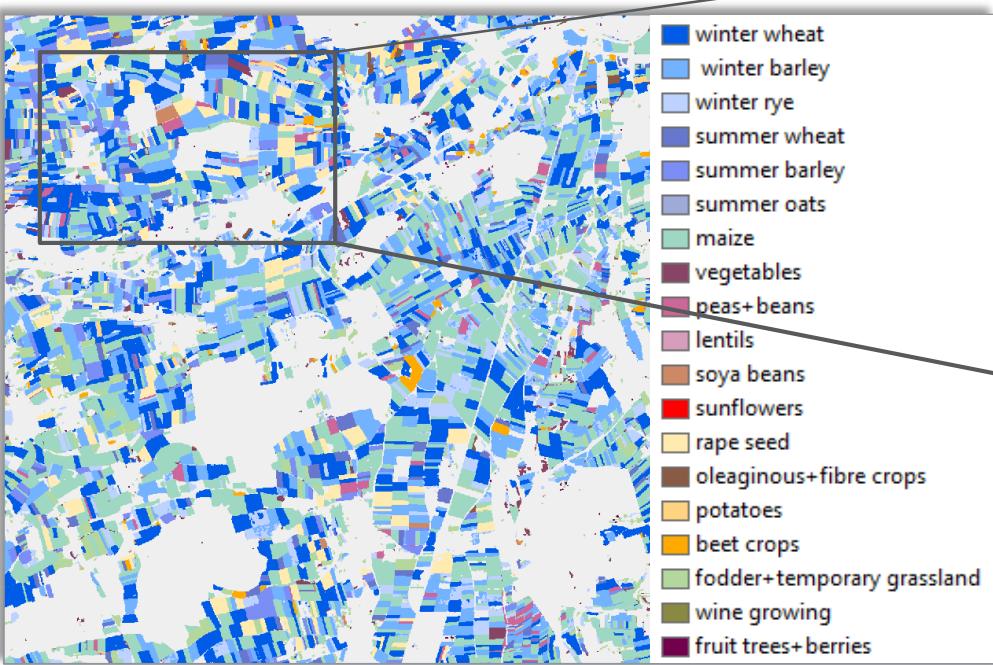
Overall Accuracy (based on
LUCAS 2018) = 94%

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Demonstration Site: Central (Subset: Baden-Württemberg, Germany)

Crop Types Map



Overall Accuracy (based on LPIS/InVeKoS) = 86%

Produced using Copernicus Sentinel data [2018]
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- Since the H2020 Call (late 2015), many investigated developments are operational reality by now!

Next Steps:

- Finalisation of all product prototypes in all demo sites
- Further exchange with key stakeholders
- Final assessment & benchmarking of operational readiness
- All assessments, reports, prototypes available via project website
- White Paper publication by end-2019

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