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# MS Presentation - Norway

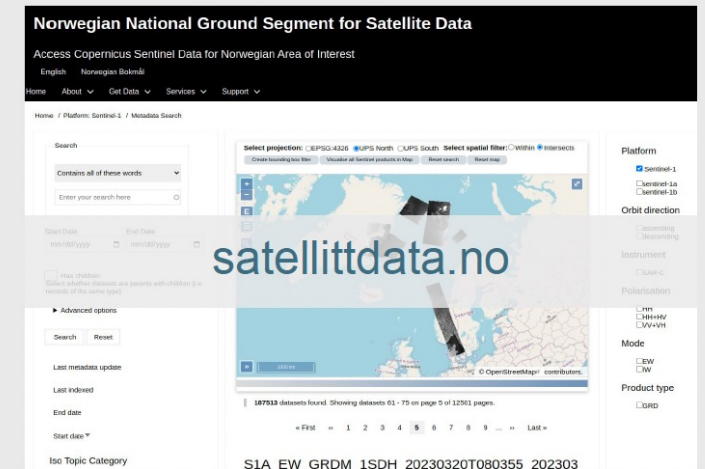
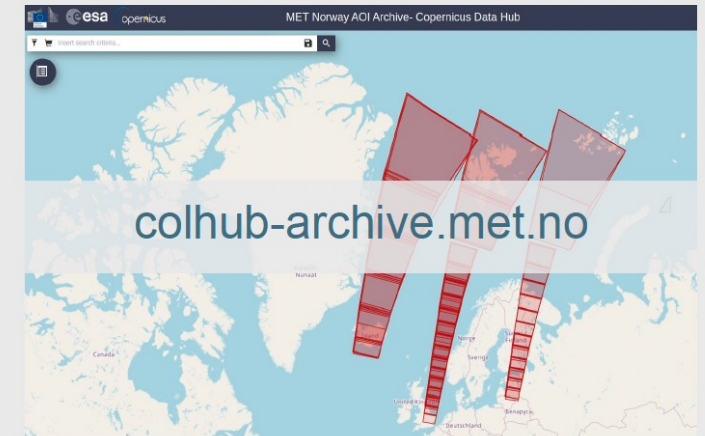
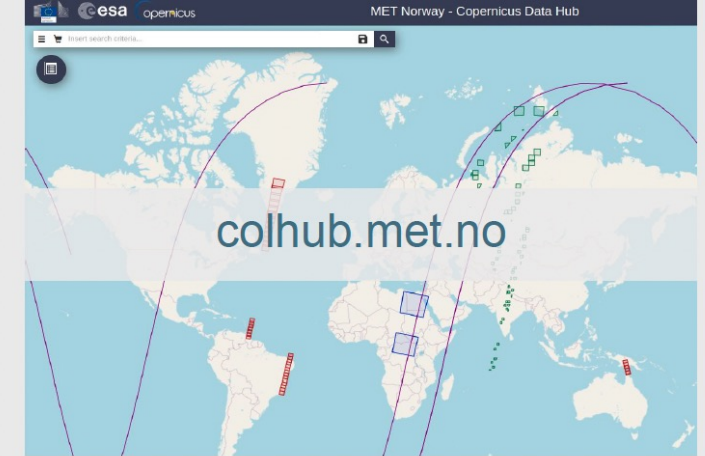
CollGS and ESA DTE Workshop – 4-5 March 2025

# Outline

- Norwegian Ground Segment
- New national activities
- Upcoming opportunities and challenges

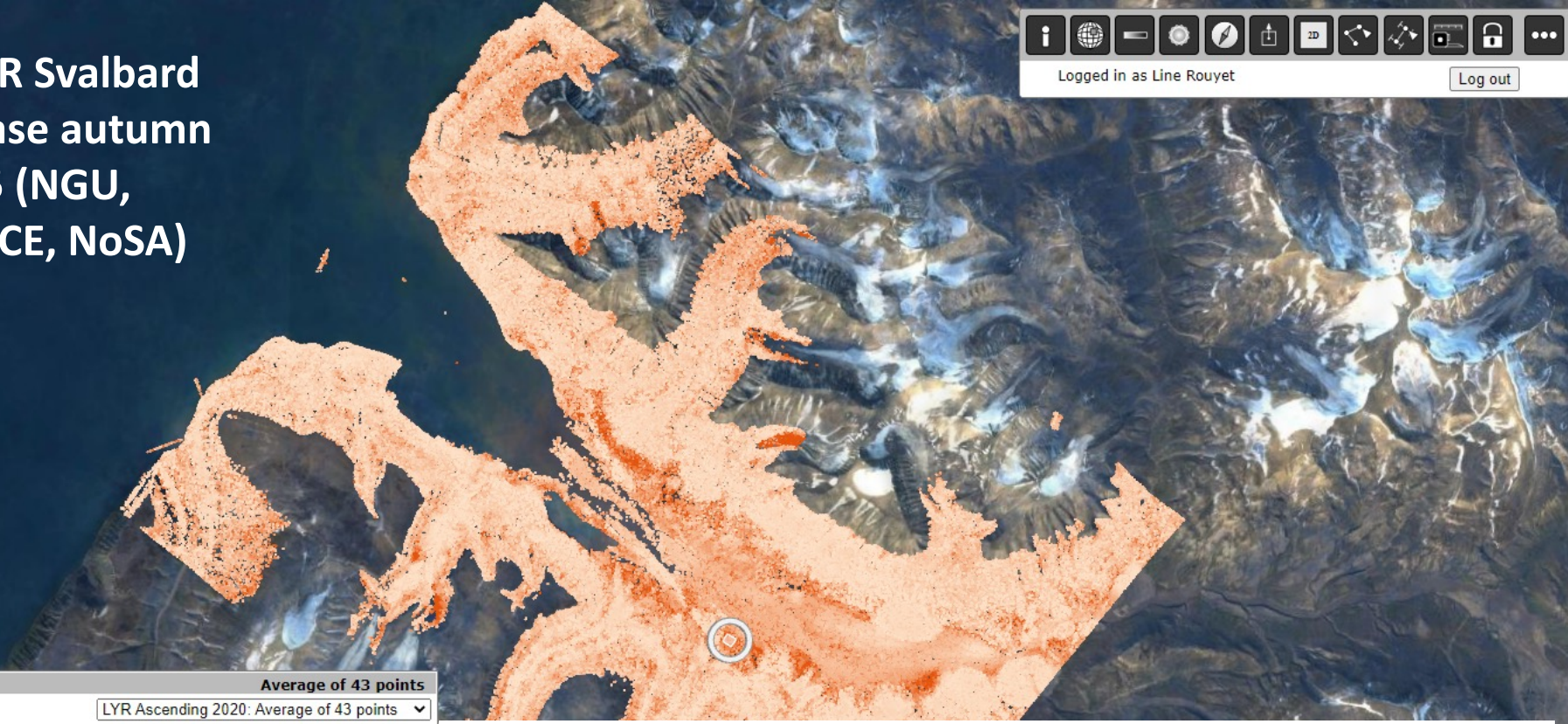
# The Norwegian Ground Segment

- Three separate portals with access to Sentinel data
  - colhub.met.no (DhUS)
    - 30 day rolling archive with latest *global* S1, S2, S3 og S5p **SAFE** products
  - colhub-archive.met.no (DhUS)
    - national archive with **SAFE** products covering *Norw. AOI*
  - satellittdata.no
    - S1 and S2 products in *netCDF* covering *Norw. AOI*
    - S2L2A data cubes
    - supports heterogeneous data
- Operated by MET Norway on behalf of the Norwegian Space Agency
- Total volume about 4.5 PB



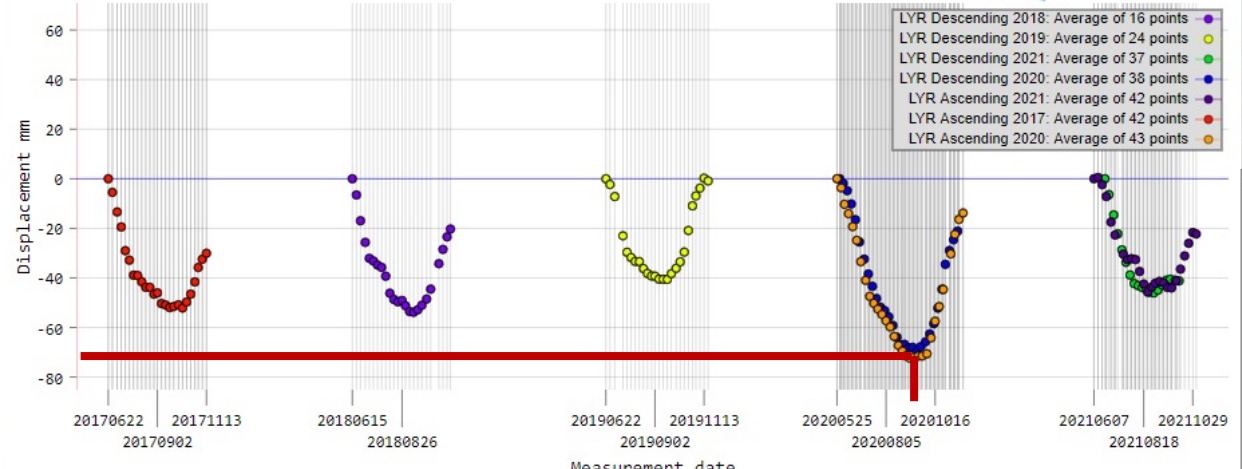
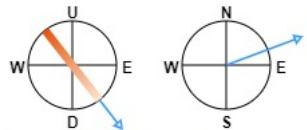
# InSAR Svalbard release autumn 2025 (NGU, NORCE, NoSA)

- ▶ Background Layers
- ▶ Deformation (stacking)
- ▶ Falsnestinden
- ▶ Fornebubanen
- ▶ Iceland
- ▶ InSAR setningsanalyse
- ▼ InSAR-LYR 
  - LYR Ascending 2017  
No attribution
  - LYR Ascending 2020  
No attribution
  - LYR Ascending 2021  
No attribution
  - LYR Descending 2018  
No attribution
  - LYR Descending 2019  
No attribution
  - LYR Descending 2020  
No attribution
  - LYR Descending 2021  
No attribution



Average of 43 points  
 Individual points | Cross-section mean velocity | Cross-section timeseries  
 LYR Ascending 2020: Average of 43 points

Dataset: LYR Ascending 2020  
 Point ID: Average of 43 points  
 Position: 8679043.26 N 520950.99 E 58.10 m  
 Incidence angle: 38.00°  
 Track angle: -20.50°



## New products:

- Maximum seasonal subsidence in flat terrain (amplitude of the seasonal cyclic movement)
- Start time of subsidence (beginning of thawing) and frost heaving (beginning of freezing) and duration of thawing and freezing seasons

LYR Ascending 2017

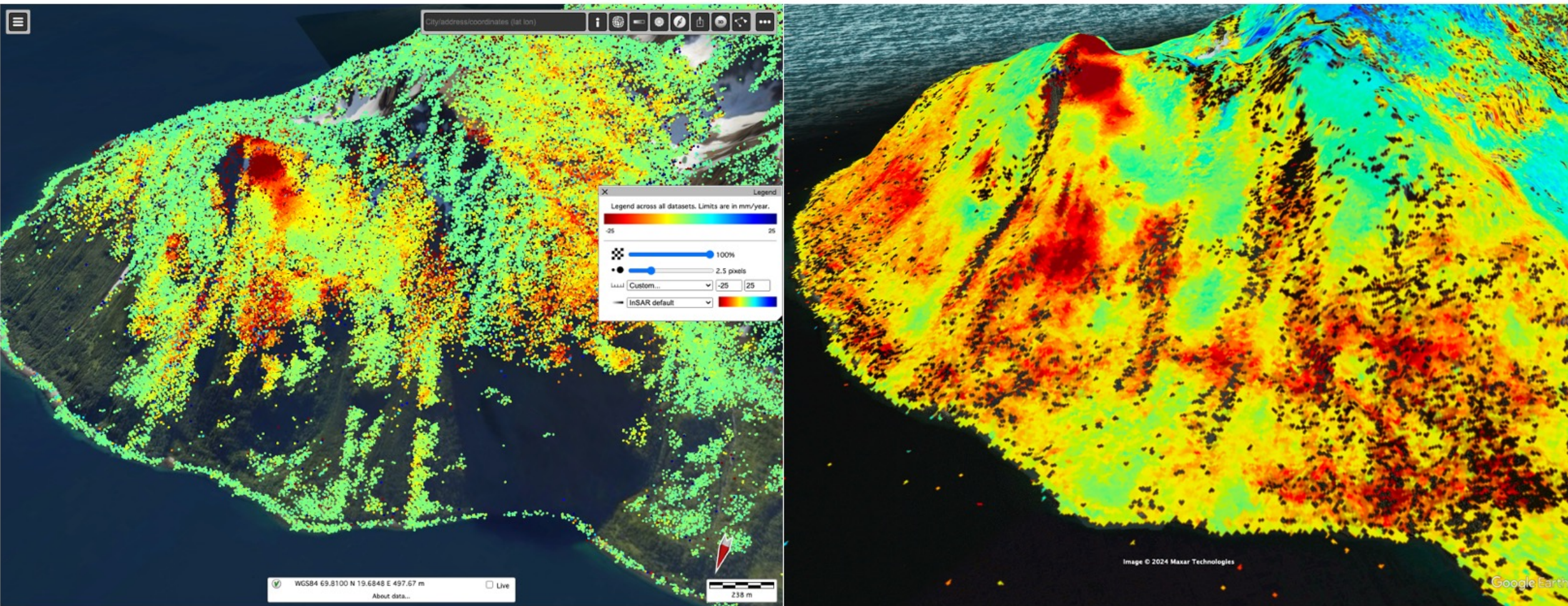
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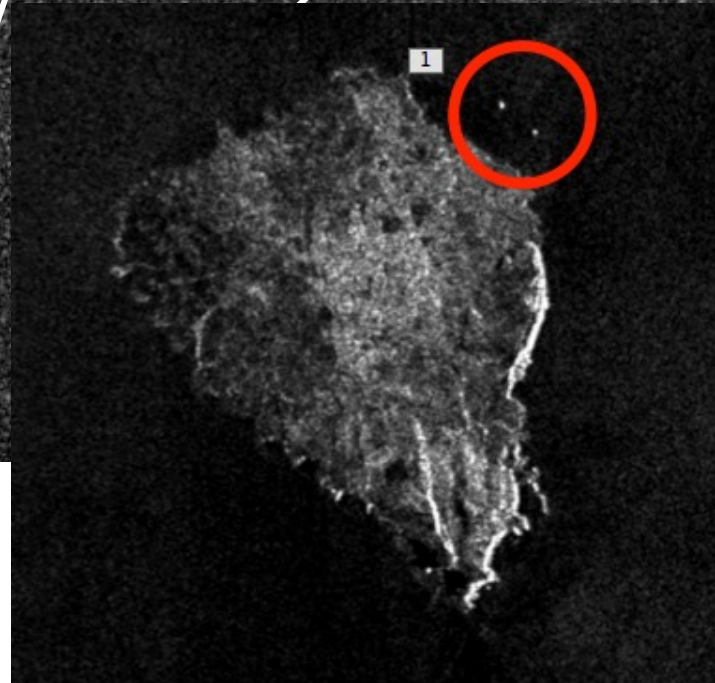
# InSAR Norway L-band development

## Sentinel-1 vs ALOS-2 L-band (NORCE, NGU, NoSA)



*Figure 1. Sammenlikning av InSAR estimert bevegelse fra InSAR Norge (venstre) og ved bruk av ALOS-2 (høyre).*

# New combination of Sentinel-1C SAR, AIS and Norwegian NRD is coming in 2025



Compilation FFI

# Development of Coherence and Backscatter Products from Sentinel-1 Data for Norway

## Project Overview:

•**Objective:** Establish an operational production line for SAR coherence and backscatter products from Sentinel-1 data over Norway, including neighbouring areas in Sweden and Finland.

•**Duration:** August 2024 - July 2025.

•**Partners:** Norwegian Space Agency, Norwegian Geological Survey (NGU), Norwegian Meteorological Institute (MET).

## Scope and Deliverables:

### •Products:

- Co- and cross-polarized backscatter.
- 6-day and 12-day co-polar coherence products.
- 10 m pixel size

•**Formats:** Available in NetCDF and GeoTIFF.

•**Data Availability:** Products made available within 6 hours post Sentinel-1 data acquisition.

•**Applications:** Enhance snow and avalanche monitoring, flood monitoring, land cover change detection and more.

## Identified Users:

•NIBIO (Norwegian Institute of Bioeconomy Research): Agricultural and forestry monitoring, including detecting clear-cut areas, snow and wind damage to forests, autumn ploughing, and flood monitoring.

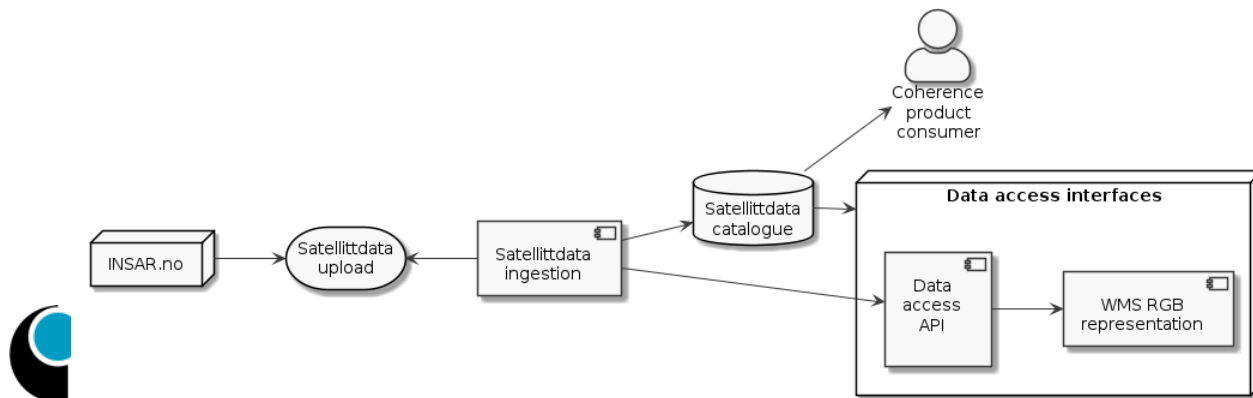
•NVE (Norwegian Water Resources and Energy Directorate): Uses SAR images for detecting snow avalanches, flood areas, and testing methods for detecting ice coverage on lakes and measuring glacier extent. They also have potential use in monitoring changes in water levels in reservoirs.

•NGU (Geological Survey of Norway): Focuses on geological applications/landslide mapping.

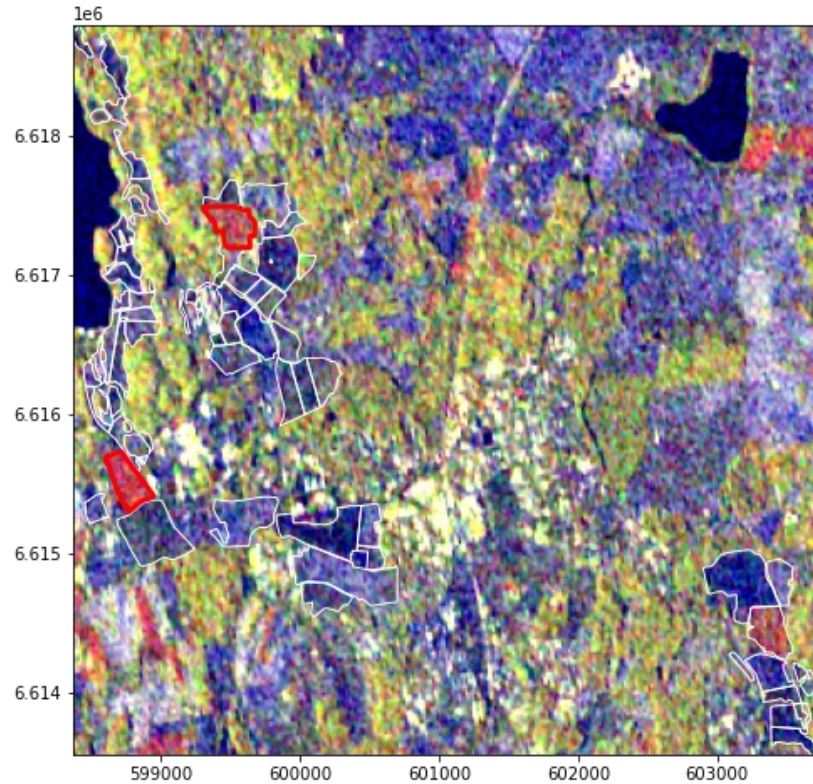
•NGI (Norwegian Geotechnical Institute): Involved in landslide mapping and other geohazard-related applications.

•Meteorologisk Institutt (Norwegian Meteorological Institute): Uses the data for weather and climate-related research and monitoring.

•FFI (Norwegian Defence Research Establishment): Uses data for defence and security applications, including terrain analysis and monitoring.



## S-1 coherence example from NIBIO - agriculture



### Ploughing:

Visualization with RGB: VV before ploughing, VV after ploughing, and coherence from before to after.

The dates are 19-25 October 2021, and the ploughing, indicated by red polygons, occurred on 22-23 October.

Sentinel-1 backscatter will feed avalanche detection processing line, which is input to avalanche prediction model



Article

### Near-Real Time Automatic Snow Avalanche Activity Monitoring System Using Sentinel-1 SAR Data in Norway

Markus Eckerstorfer <sup>\*</sup>, Hannah Vickers, Eirik Malnes and Jakob Grahn  
Earth Observation Group, NORCE—Norwegian Research Centre, 9019 Tromsø, Norway;  
havi@norceresearch.no (H.V.); eima@norceresearch.no (E.M.); jgra@norceresearch.no (J.G.)  
<sup>\*</sup> Correspondence: maec@norceresearch.no

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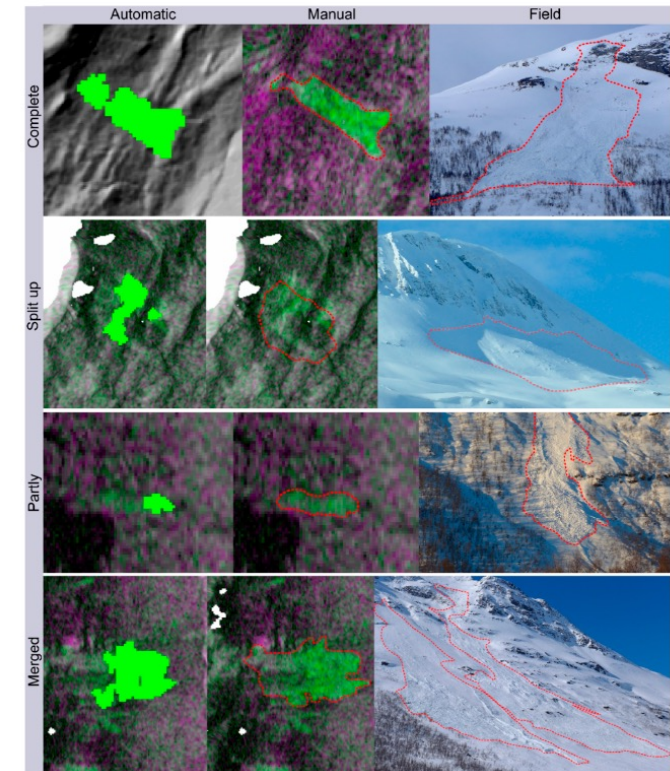
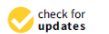


Figure 10. Outline accuracy of automatic detections compared to manual interpretation of RGB change detection images and field photographs.



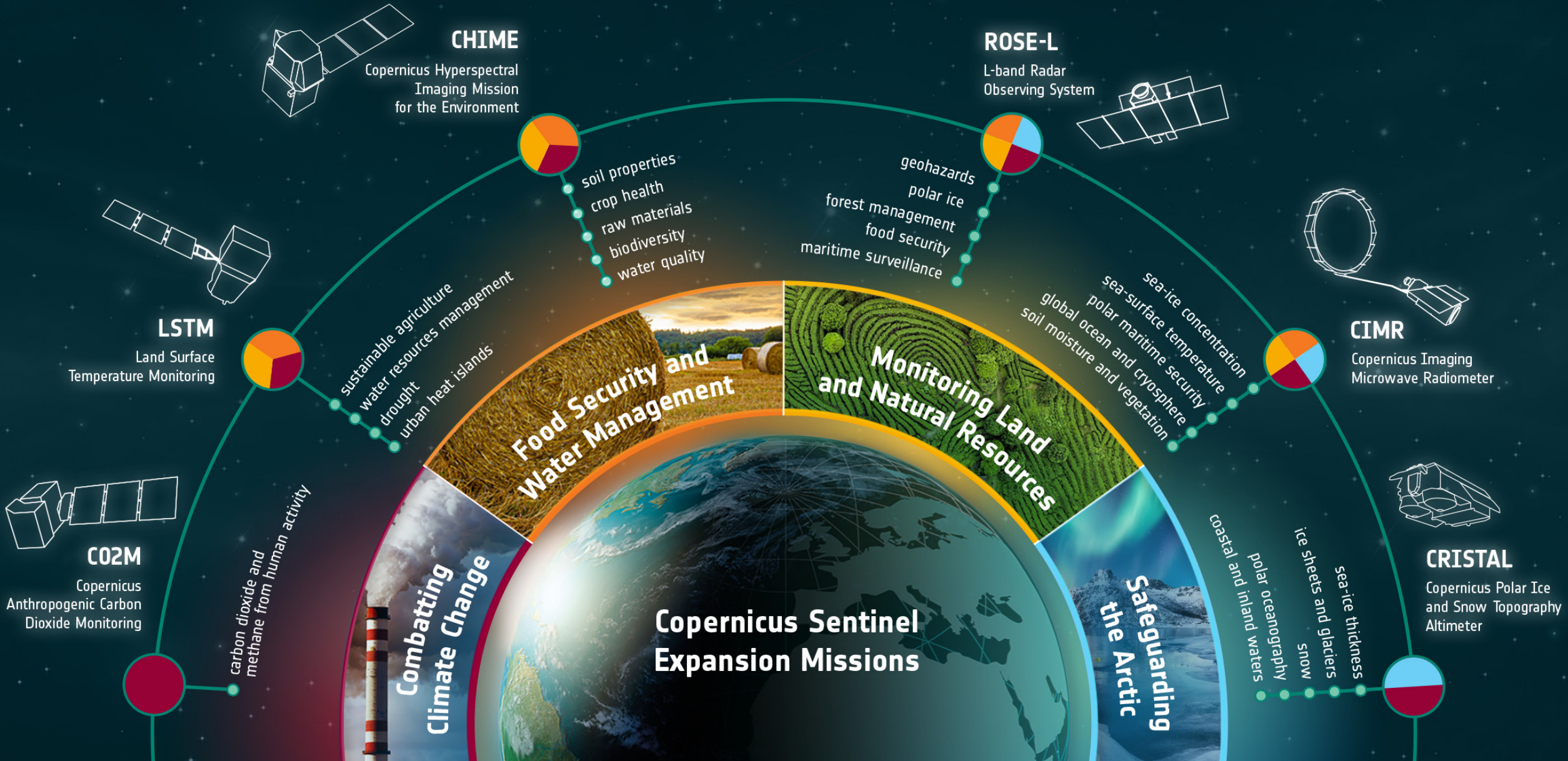
# Norwegian national roadmaps for all Sentinel expansion missions



PROGRAMME OF THE  
EUROPEAN UNION



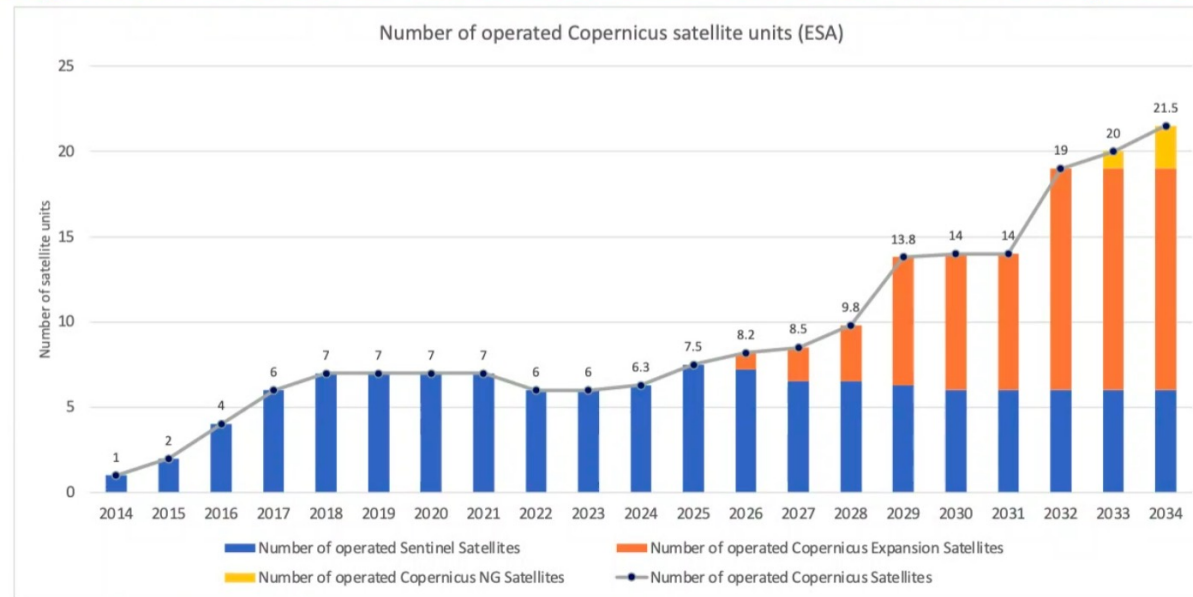
co-funded with



# Preparation for a new age with more Copernicus data

## Context – Operated Satellites

### Integration of 8 novel missions and 11 satellite units in 7 years



# Some preliminary thoughts about the new age of big Copernicus data

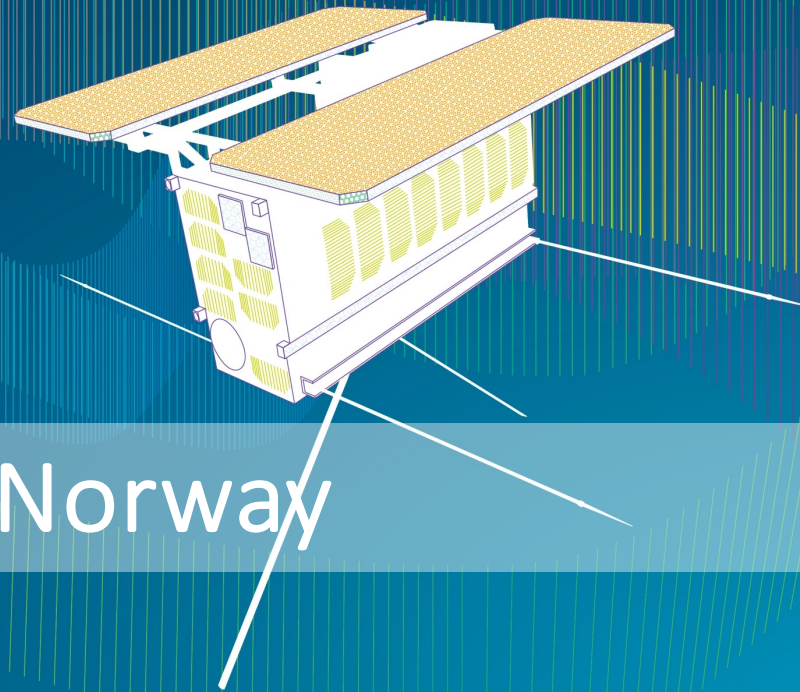


- Sentinel based data, products or services are important to have close to the user ´s own big data processing chains for many hard core operational organizations and services, especially for users of QRT services
- Sentinel and Copernicus data are most of the time part of the puzzle rather than the only puzzle piece for an operational service in an operational organization
- Need to have a future long term Copernicus federated data management architecture that understands and supports this, creates trust among the users, and develops more use.
- Centralized, non-redundant, one stop shop, one point of failure data architecture with unclear future cost and temporal sustainability creates less trust and less use, should be avoided
- Need to stimulate a future redundant, federated data management architecture that can handle diversified use.

# Some preliminary thoughts about the new age of big Copernicus data



- Need to support the further development and path towards more efficient use of the rich Copernicus data holdings, future large volumes of data, and innovative data organization and access interfaces.
- Need to support a future ecosystem and European dataspace with an interoperable set of decentralized and collaborative services maintaining their own identity and control that stimulates larger scalability.
- Sufficient quota and bandwidth to allow fast distribution of data to end users will still be important, and probably more important in the future for fast services also depending on other data sets than Copernicus.
- Member states advanced services and local infrastructure will require local copies of data due to support to national initiatives and technical performance
- CollGS is and will be very important
- Science collaborations with data centers for federated data access and processing is interesting.



# Making space valuable to Norway



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# Thank you!