WELCOME

Holger Maass

National Ground Segment

German Remote Sensing Data Center

German Aerospace Center

DLR at a glance

- Research Institutes
- Space Administration
- Project Management Agency

Aeronautics

Space Research and Technology

Transport

Energy

Digitization

Security

Locations and employees

More than 11000 employees work in 54 institutes and facilities at 30 sites across Germany.
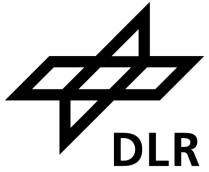
International offices in Brussels, Paris, Tokyo and Washington D.C.

DLR Neustrelitz

Employees: Appr. 120

- German Remote Sensing Data Center
    - Department National Ground Segment (40)
- Institute for Communication and Navigation
    - Department Nautical Systems (25)
- DLR_School_Lab
- Facility Management

- Institute for Solar-Terrestrial Physics (50)
    - Founded 2019

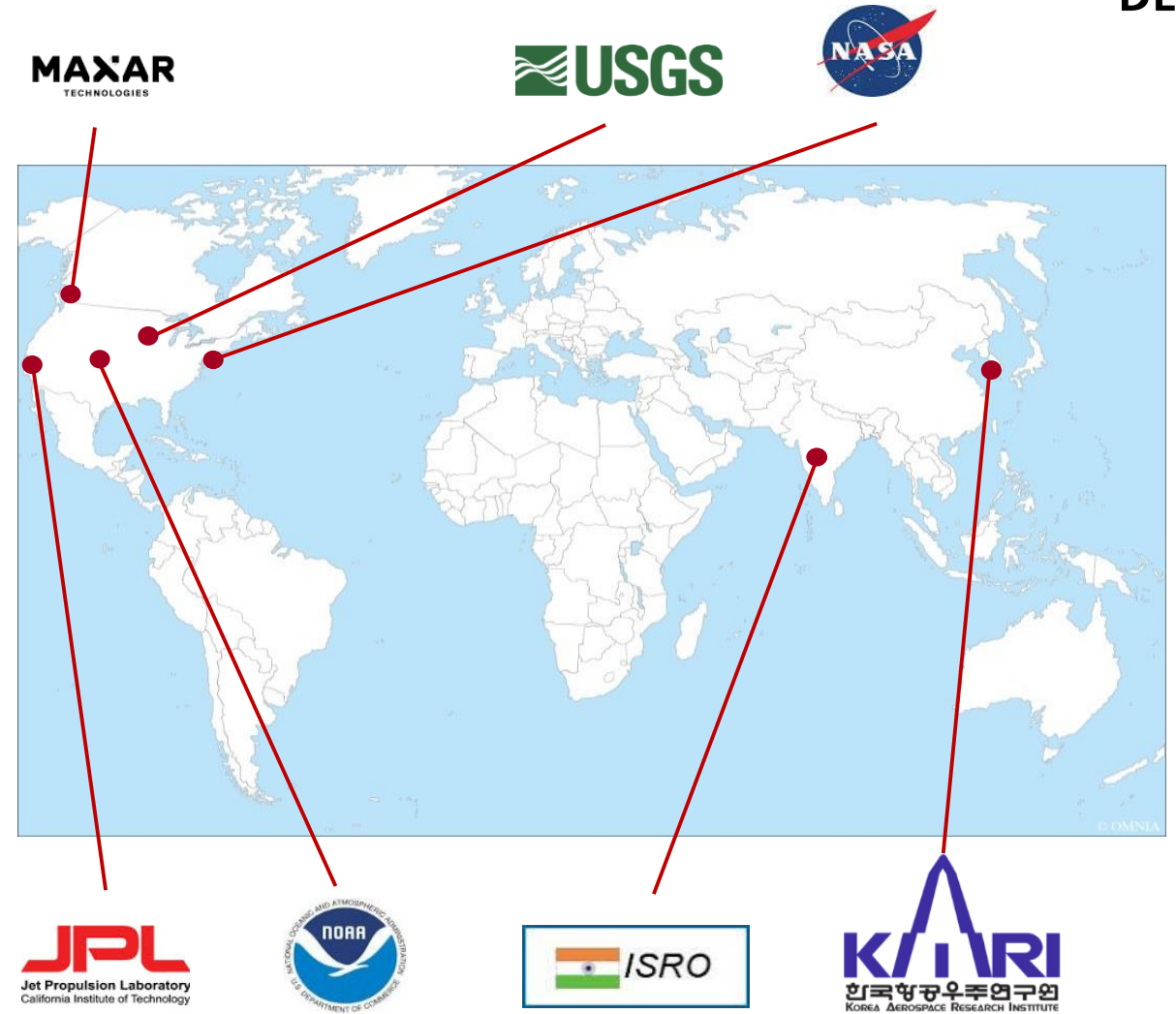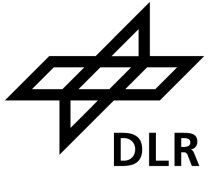# German Remote Sensing Data Center
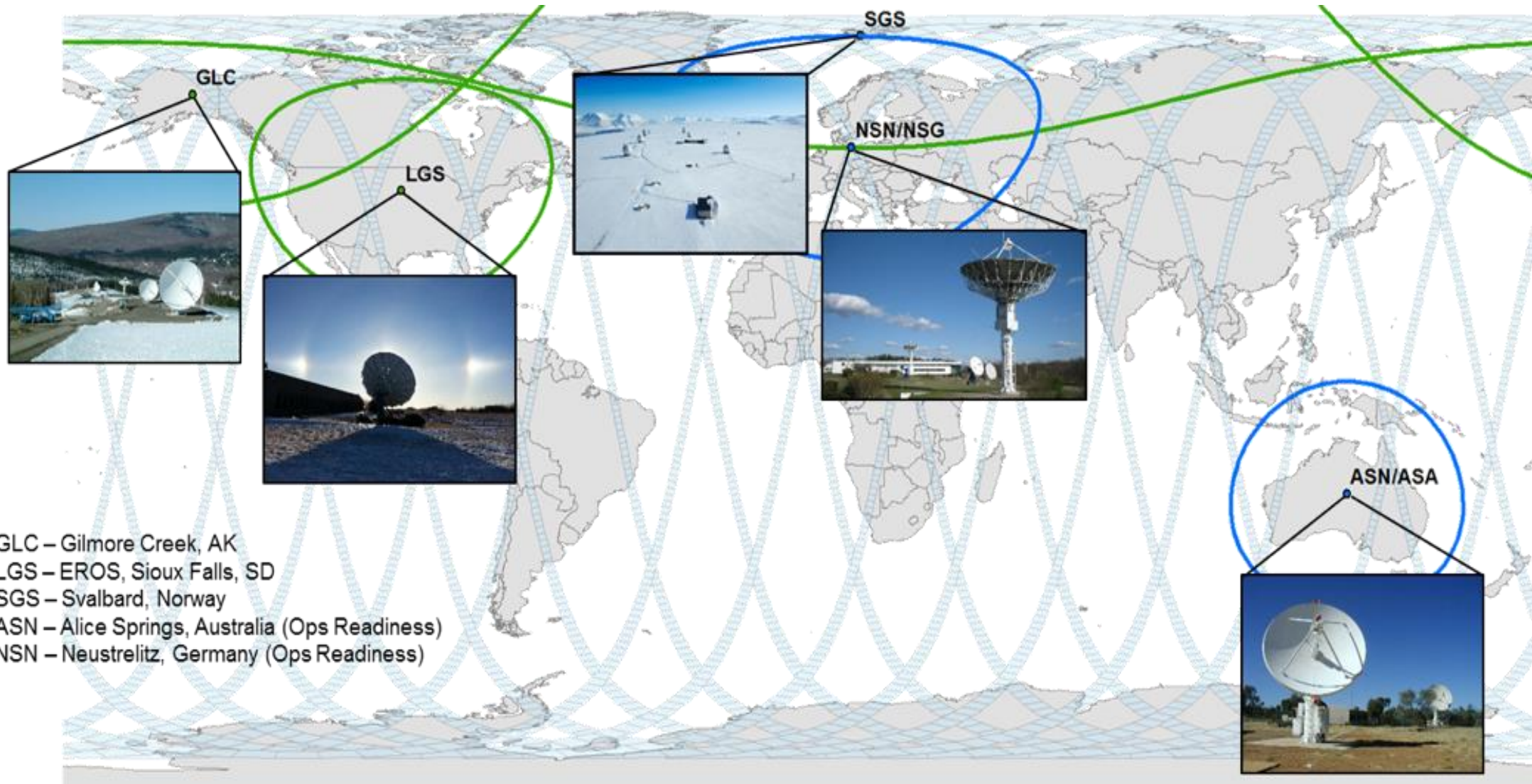**Department National Ground Segment**
Team Structure

- **System Development Ground Stations**
- **Software Development**
- **Data Science and Services**
- **System Operation Realtime Services**
- **Maritime Security Lab**
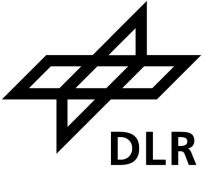
International Co-operation

Holger Maass, Ulrichshusen, HSM & Cluster FS Conference, 15-June 2023

DLR Neustrelitz Landsat Global Network
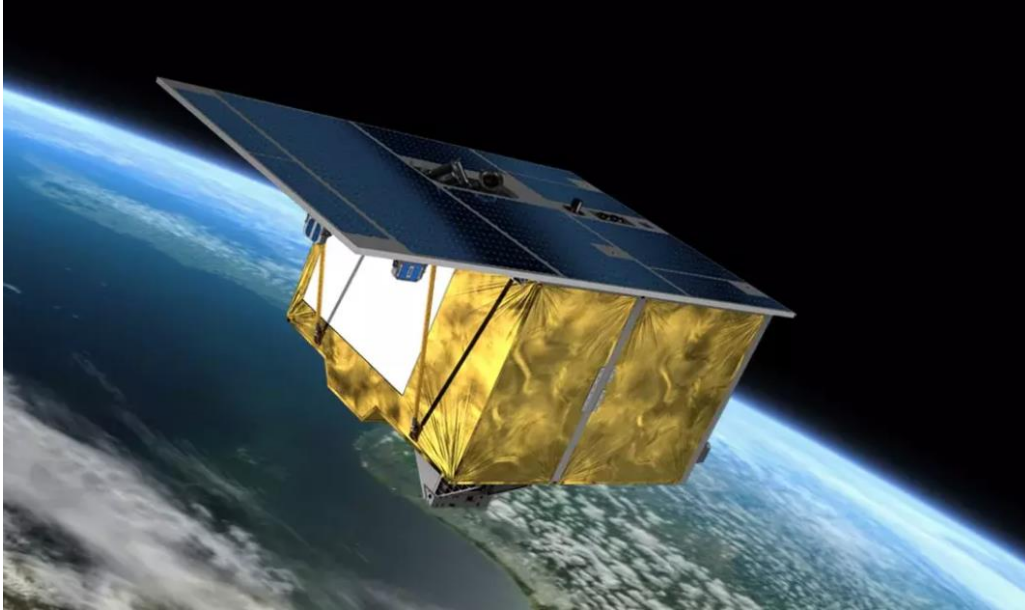

GLC – Gilmore Creek, AK
LGS – EROS, Sioux Falls, SD
SGS – Svalbard, Norway
ASN – Alice Springs, Australia (Ops Readiness)
NSN – Neustrelitz, Germany (Ops Readiness)

EnMAP Launch 1st of April 2022 18:24 MEST

- X-Band data acquisition
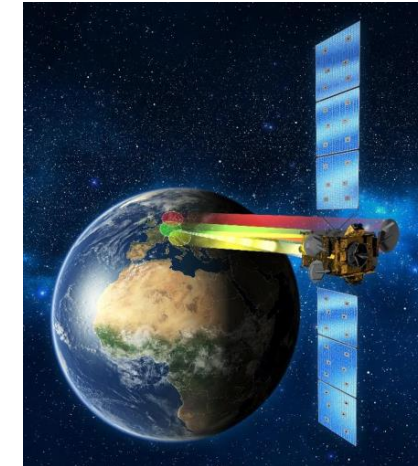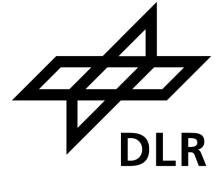- Start product generation in Neustrelitz

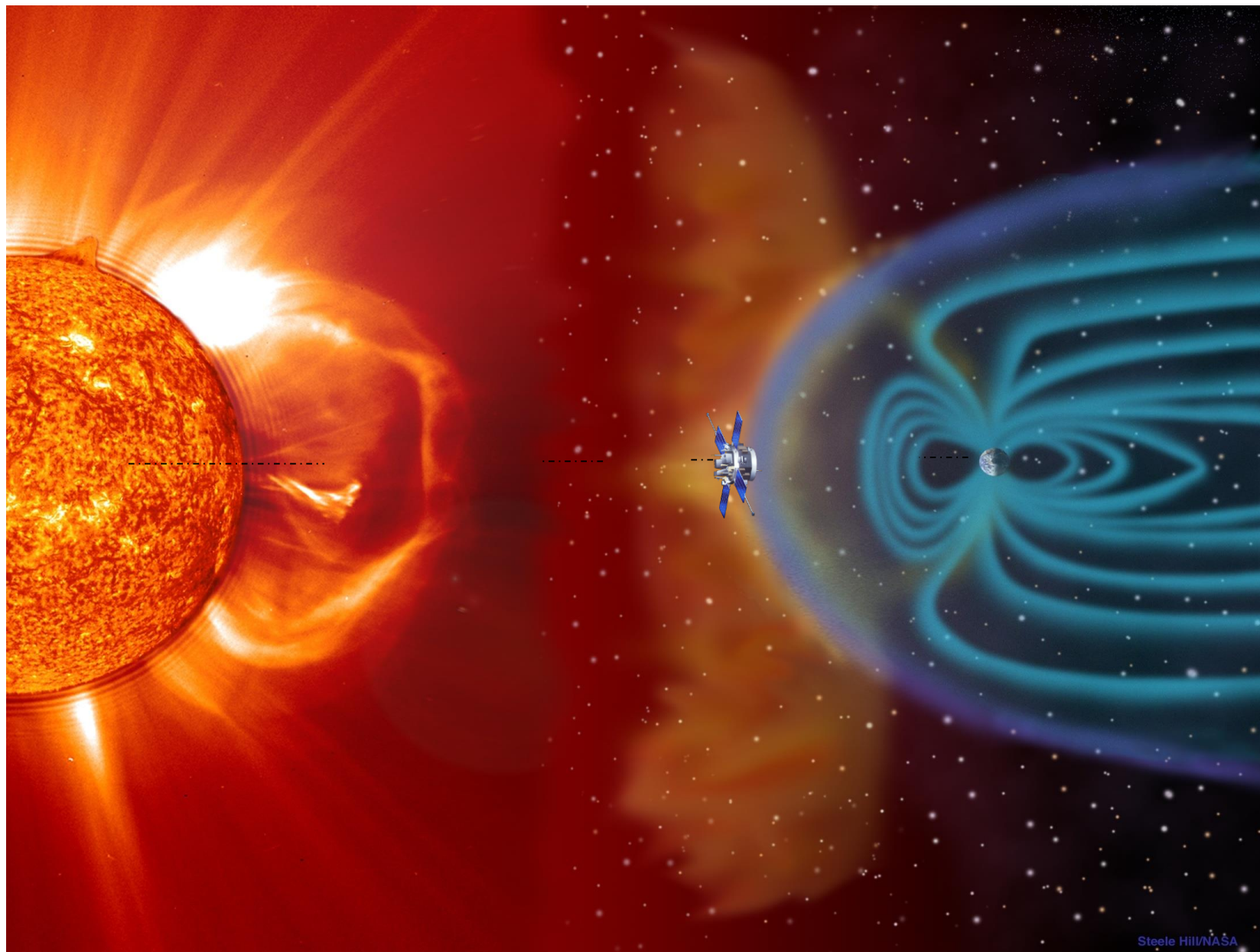Inauguration TriBand-II Antenna
1st of July 2022

Teleport for German Heinrich Hertz Mission (GEO)

- Setup of 2 Ku-Band antennas

- Launch: 16th of June 2023

- 15 years operational phase planned
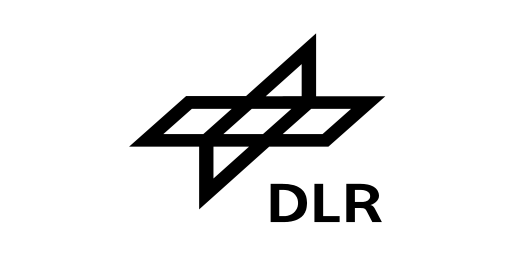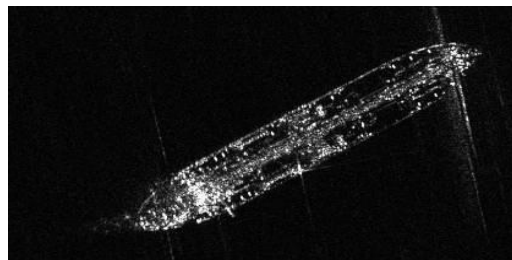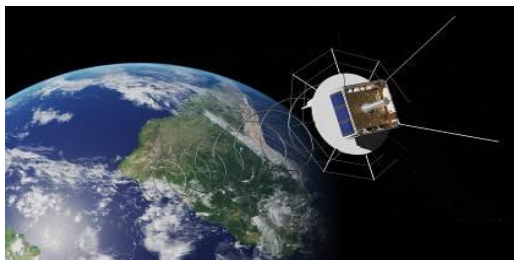
- Support of scientific campaigns

Steele Hill/NASA

MARITIME NEAR REAL TIME EARTH OBSERVATION APPLICATIONS

DLR

German National Program: Maritime Security

Holger Maass, Ulrichshusen, HSM & Cluster FS Conference, 15-June 2023

Multi- Sensor Approach

Optical (multi- and hyperspectral)

- Worldview-1-3
- GeoEye-1
- Deimos-2
- Plèiades
- Spot
- Landsat, Sentinel-2
- DESIS, EnMAP

Synthetic Aperture Radar (SAR)

- Sentinel-1A, B
- ICEYE
- TerraSAR-X
- TanDEM-X
- Radarsat-2

Automatic Identification System

- Terrestrial AIS
- Satellite AIS

Egbert Schwarz, Maritime Security Lab Neustrelitz

Research and Application Development
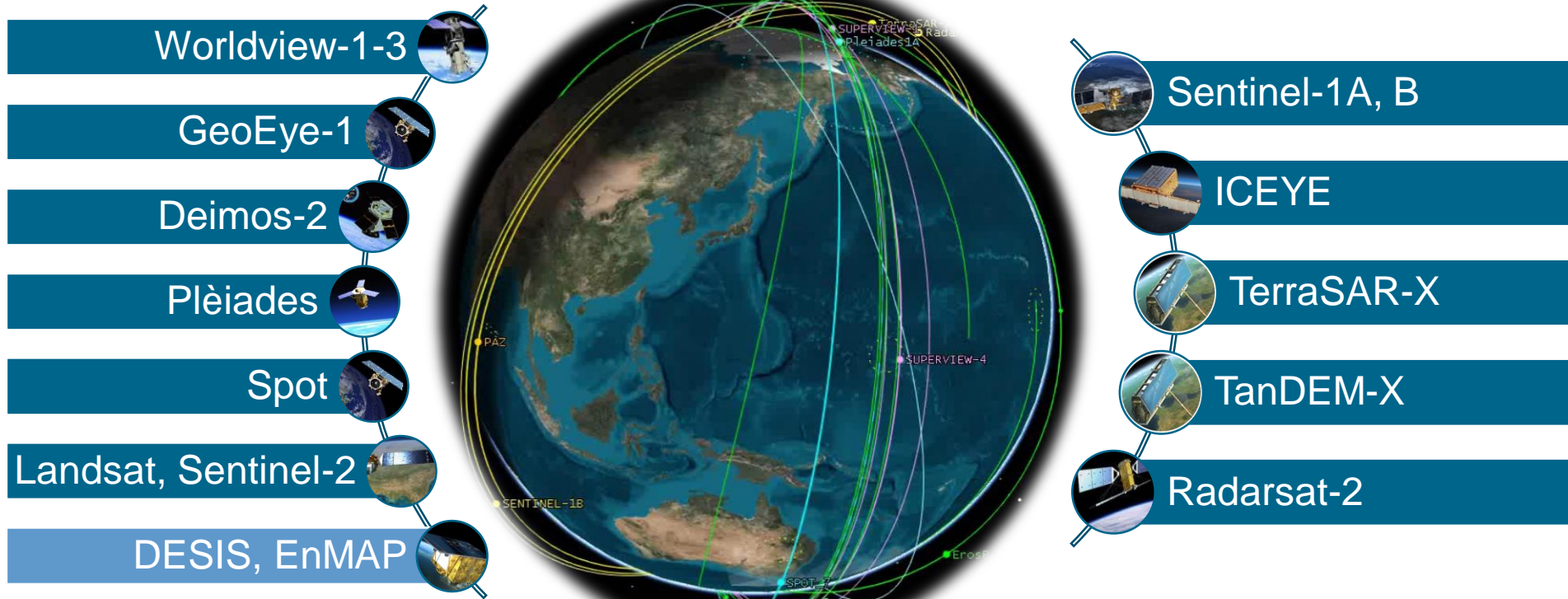
Software Systems
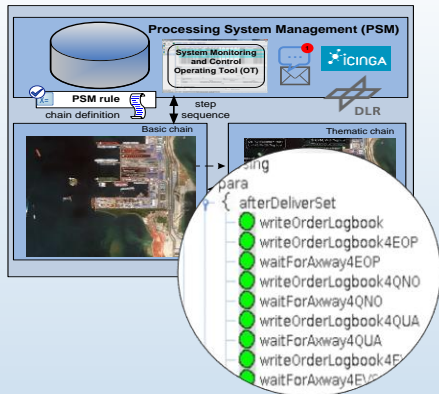
- Near Real Time NRT Framework solutions
- Replacement of PSM by WMP
- Cloud solution
- Frontend (VisualAnalyst)
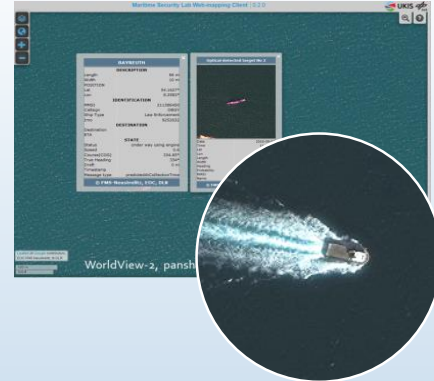- Order handling and product dissemination (MARISS-EO)
- AIS-DB

Object detection
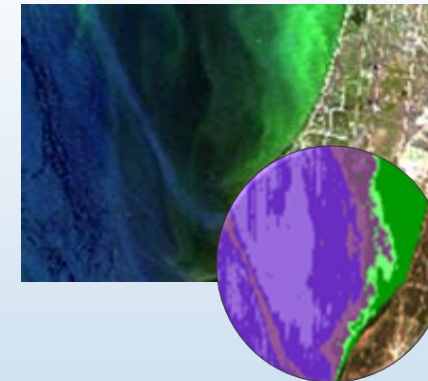

- Object Detection based on Artificial Intelligence (AI) based on high and very high resolution optical satellite imagery (Plèiades, Wordview1-3, GeoEYE, Landsat, Sentinel-2)
- Data fusion, e.g. Automatic Identification System AIS data

Oil spill detection

- Oil Spill Detection based on Threshold and Artificial Intelligence (AI) Method
- currently being developed for Landsat-8,9 → Sentinel-2

Hazardous Substance Classification

- Classification of Hazardous Substances based on hyperspectral data
- currently being developed for DESIS and EnMAP

Ice classification
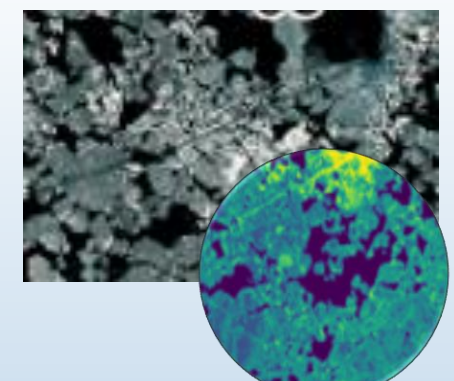
- Sea Ice Classification based on Artificial Intelligence (AI)
- currently being developed for Landsat-8,9 → Sentinel-2

"Satellite images and value added products for Maritime Surveillance based on Optical sensors"

- Delivery of information for the maritime situation picture

- High time requirements up to **30 minutes** after acquisition

- Very high spatial resolution of up to **30 centimeters**

- EUSI and AIRBUS are responsible for planning and acquiring the satellite data.

- DLR is responsible for the image processing of the data from AIRBUS and EUSI.

- DLR is responsible for the production of the information products for all data supplied by the consortium.

© AIRBUS DS Consortium Lead
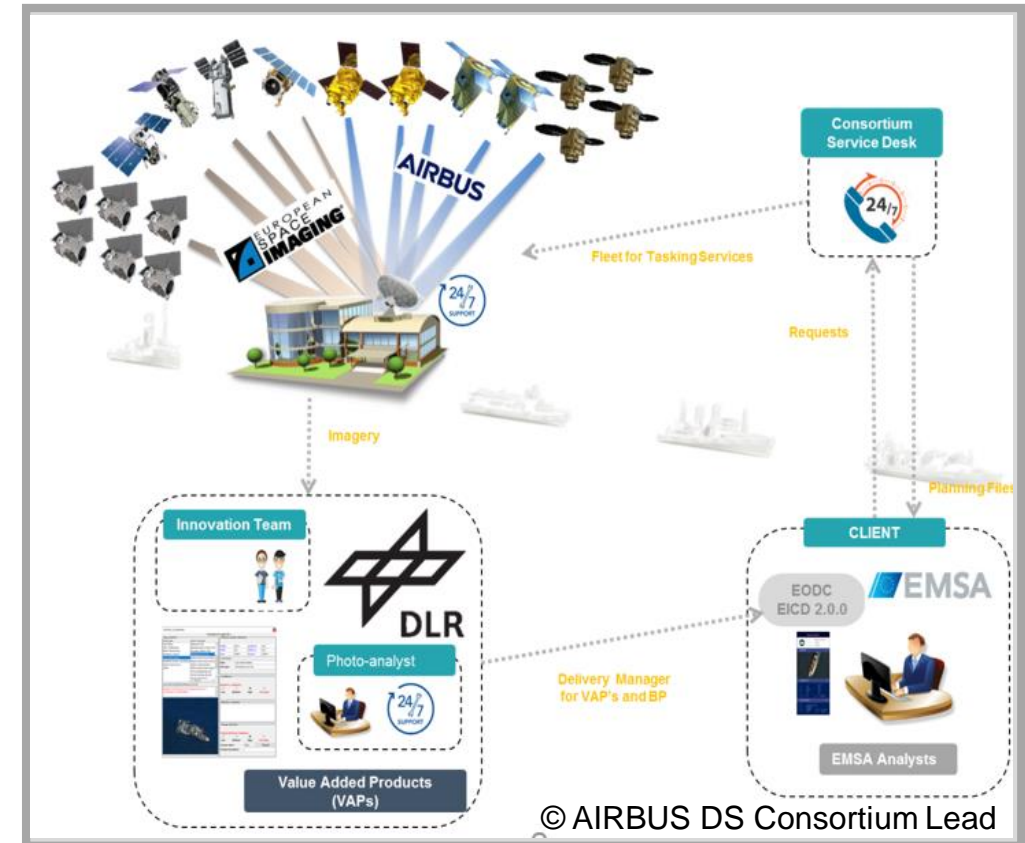
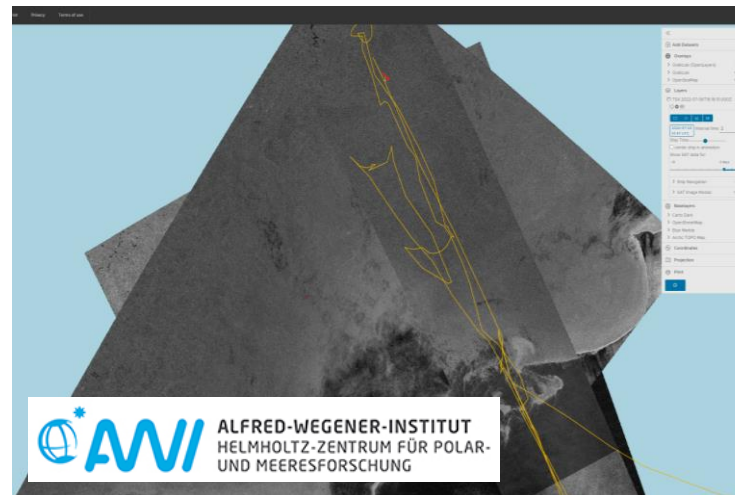# Maritime Surveillance Applications (NRT)

Marinekommando Rostock MGeo
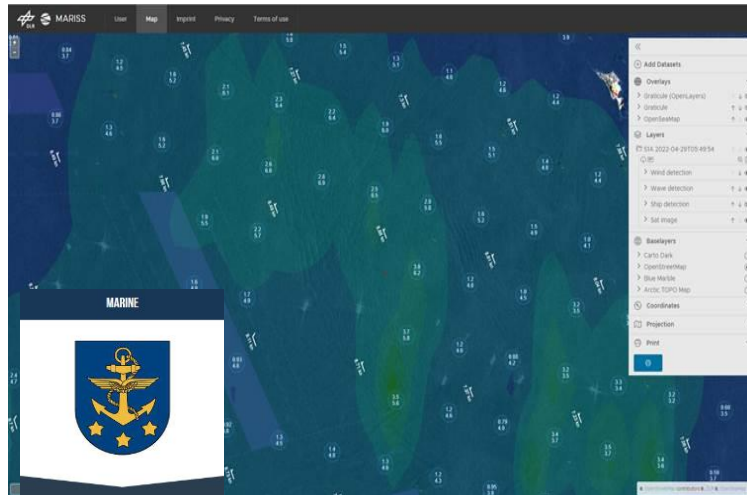
- Provision of wind and sea state products* derived from Sentinel-1 data for the North Sea and Baltic Sea.
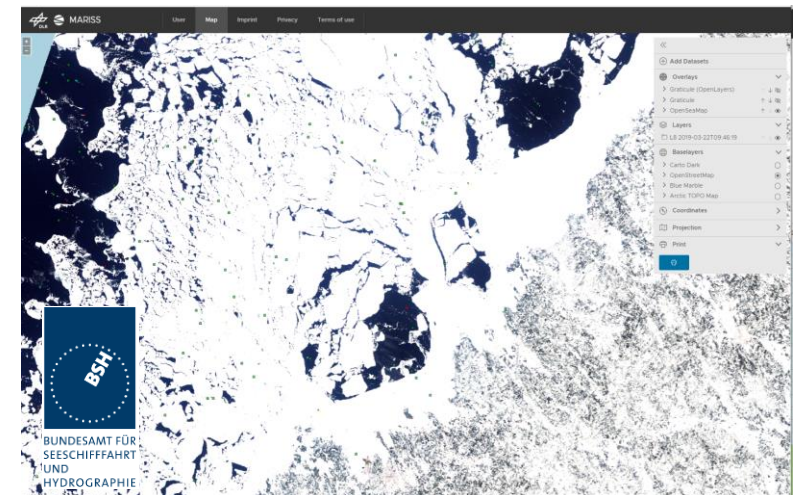
  *Processors provided by FMS Bremen

Support Navigation in Ice Covered Areas (AWI)

- NRT support of research vessel POLARSTERN during the campaign in the Arctic and Antarctic based on TerraSAR-X/TanDEM-X

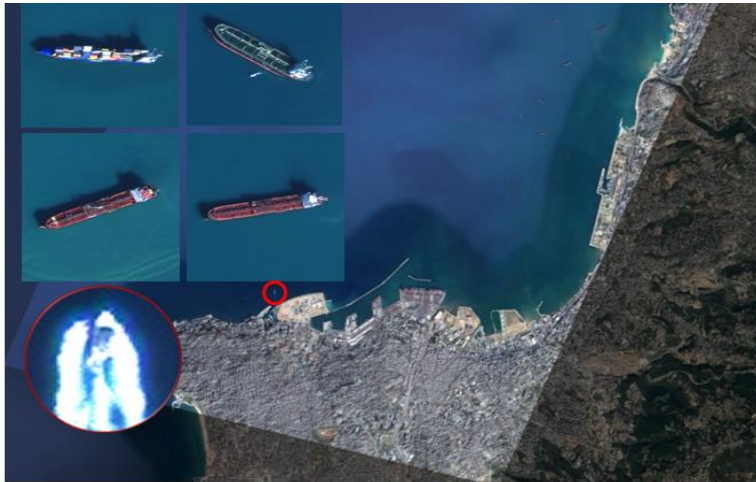## Bundesamt für Seeschifffahrt und Hydrographie BSH

- Provision of L1b products (Baltic Sea) from the Sentinel-1, Landsat-8/9, Aqua and Terra missions in NRT for the ice service.

Maritime Surveillance Service Application

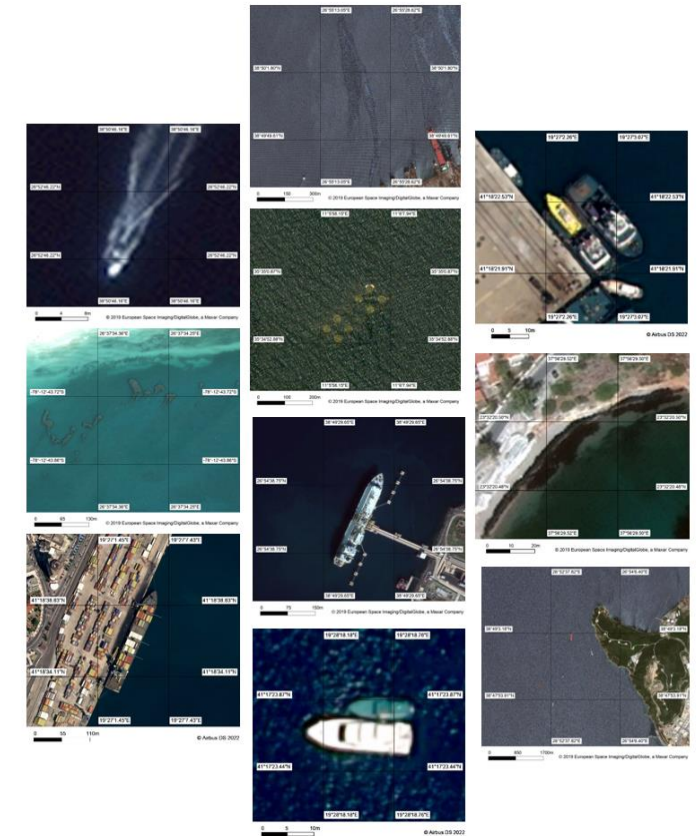## European Maritime Safety Agency EMSA

- NRT application for the provision of very high-resolution optical satellite images, as well as value added products for maritime situational awareness.

Maritime Surveillance Service ARBUS DS UK Ltd.

- NRT application for the provision of Sentinel-1 images on demand

Summary

- Multi-mission concept (~20 satellites)

- 24/7 operations (~40-50 passes/day, ~16000 passes/year)

- High availability and reliability

- Support for LEO- , GEO- and L1-satellites

- Extension with new capabilities and technologies (Ka-Band, optical)

- Station control software for service of processes and configuration of devices

- **Near Real-Time data processing**

- Data processing, data archiving, data distribution (e.g. streaming)

- Support cloud based services

- Analysis metadata of station components for higher reliability

- High automation

Holger Maass, Ulrichshusen, HSM & Cluster FS Conference, 15-June 2023

Thank you for your attention !

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