The Copernicus Data and Exploitation Platform – Deutschland (CODE-DE)

Jörn Hoffmann
DLR Space Administration

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Helsinki, Finland
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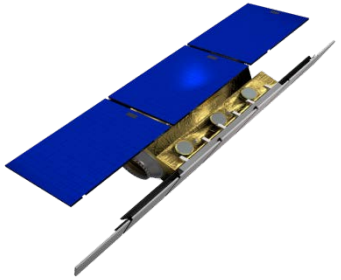
DLR – a dual capacity entity

Tasks of the DLR Space Administration



Defines and implements the national space programme, integrates national and European space activities:

- National Missions
- National User Support programmes (scientific use, methods, pilots, …)
- ESA Development and User programmes
- EU H2020 Space Activities

Monitors and influences the EU Copernicus Programm

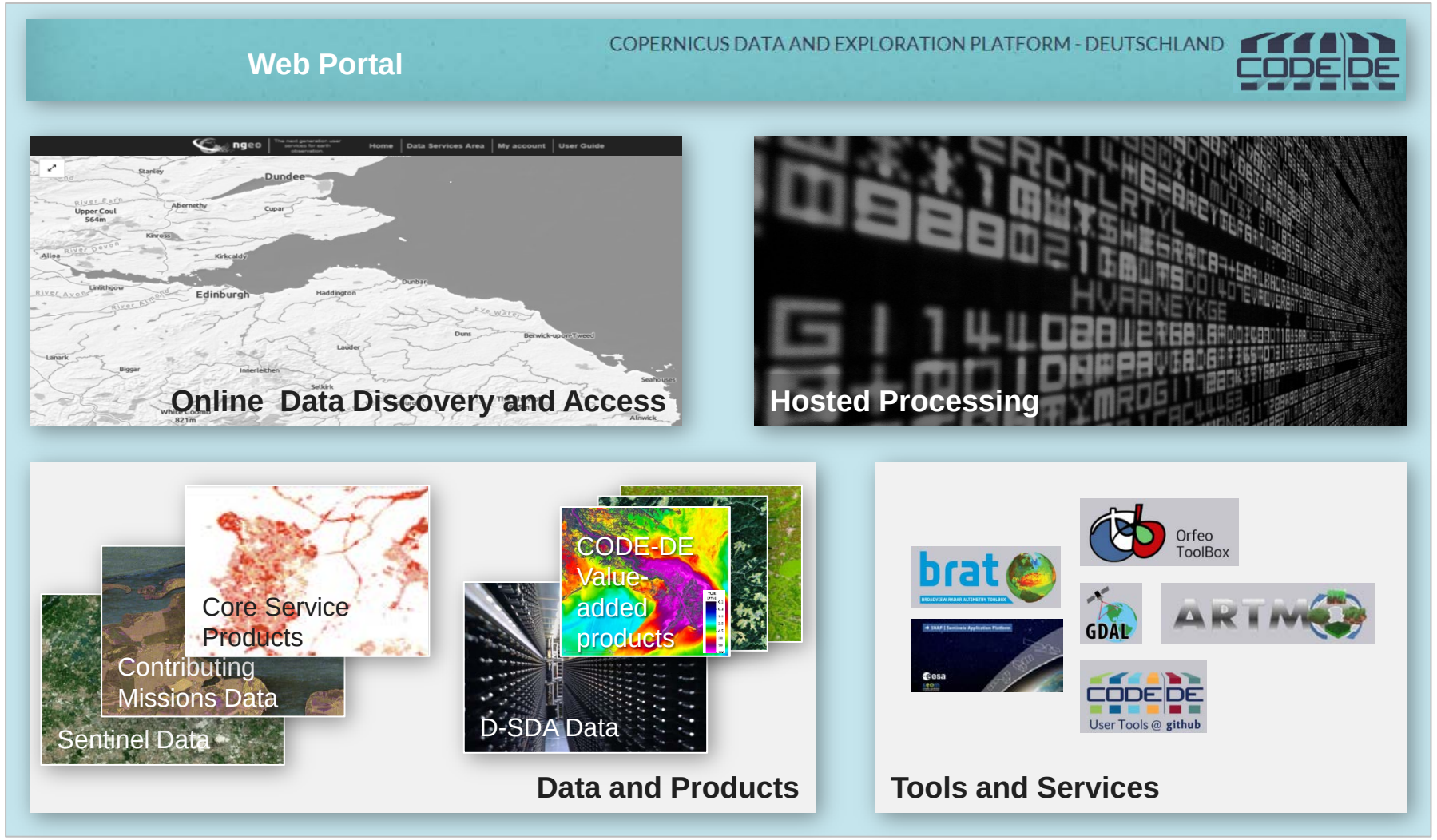
- Copernicus Committee and User Forum
- Advisory function for Federal Ministries

Implements national Copernicus actions

- Support to national user coordination
- Technical projects for implementation and validation
- CODE-DE

CODE-DE Objectives and Functionalities

- Efficient access to Copernicus Data and Services for users in Germany
- Provide value-added products for national use
- Enable development of downstream services



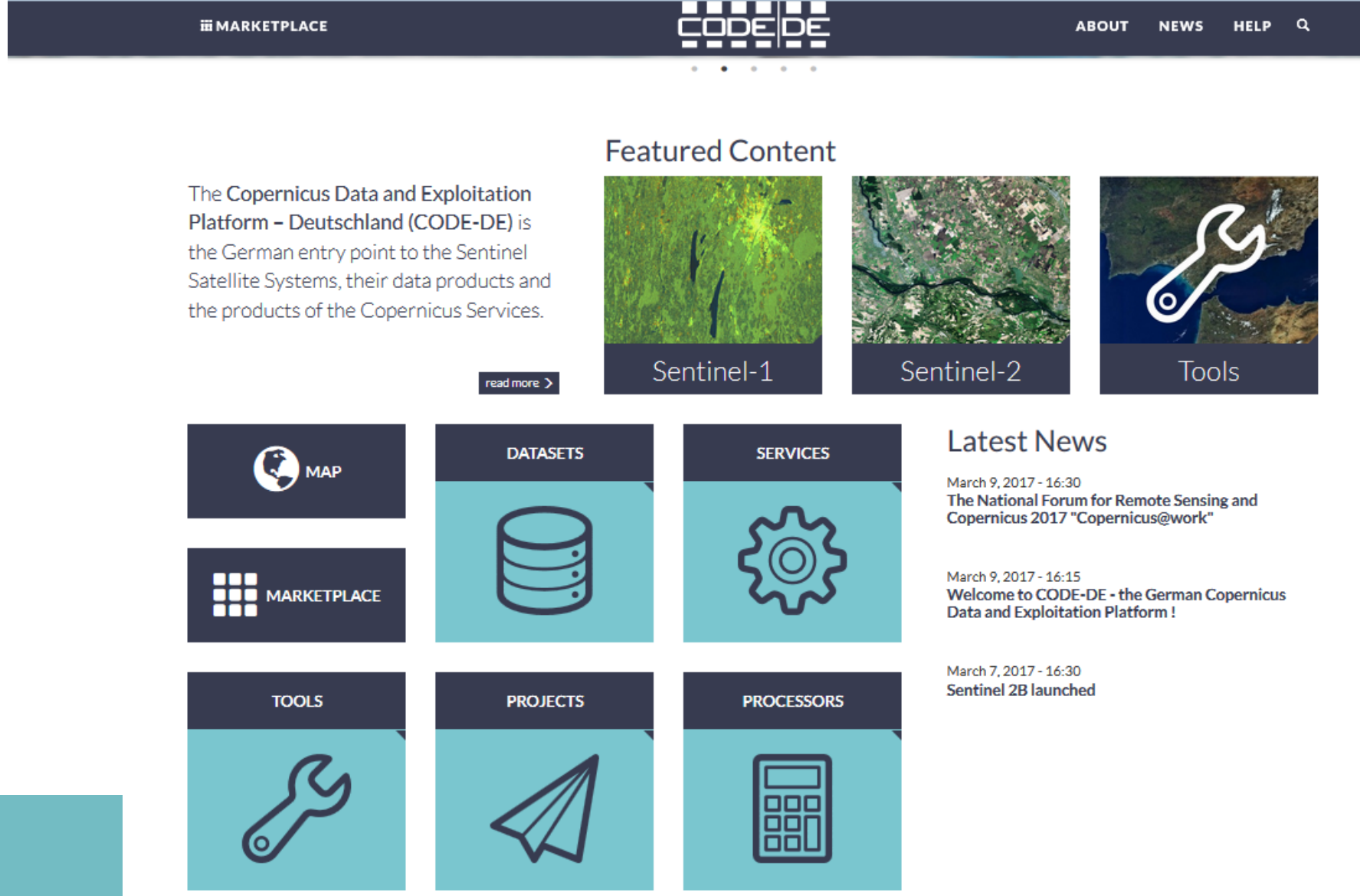
Facts

Bundesministerium für Verkehr und digitale Infrastruktur

- Financing: Federal Ministry of Transport and Digital Infrastructure
- Management: DLR Space Administration
- Project duration: 07/2016 – 03/2019
- Three phases
  - Data access: **Since 03/2017**
  - Hosted processing: Q2/2017
  - Operations: Q3/2017
- Access to CODE-DE
  - Open Search and Visualization service
  - Self-registration for „Data Access“ and „Download“
  - Limited number of „Power Users“ receive free access to processing environment
  - Scalable access to additional processing (for charge)

Content

- Sentinel-Data
- Service Data
- Value-added products
- Tools and services
- Help Desk and Manual



CODE-DE rolling archive

Mission	Instrument	Level and Product	Retention Time [Months]		
			Central Europe	Europe	Global
Sentinel-1	SAR	L1 SLC	36	12	0
	SAR	L1 GRD	36	12	1
	SAR	L2 OCN	-	-	6
Sentinel-2	MSI	L1C	36	12	1
Sentinel-3	OLCI, SLSTR	L1	36	12	1
	OLCI, SLSTR	L2 Land, Ocean	36	12	1
	OLCI&SLSTR	L2 SYN, VGT-P, VGT-S	36	12	1
	SRAL	L2 Land, Ocean	36	12	1
Sentinel-5p	TROPOMI	L1	-	-	1
	TRPOPMI	L2	-	-	1

CODE-DE “Sentinel-Rolling Archive”

Central Europe

- Archiving strategy will be adapted to actual use

CODE-DE: satellite data sets

- **Copernicus Services**
- **SRTM**
- **ASTER DEM**
- **Link to GDI-DE**

D-SDA - EOC Geoservice (collection discovery, viewing, download via D-SDA OGC-compliant spatial data services)

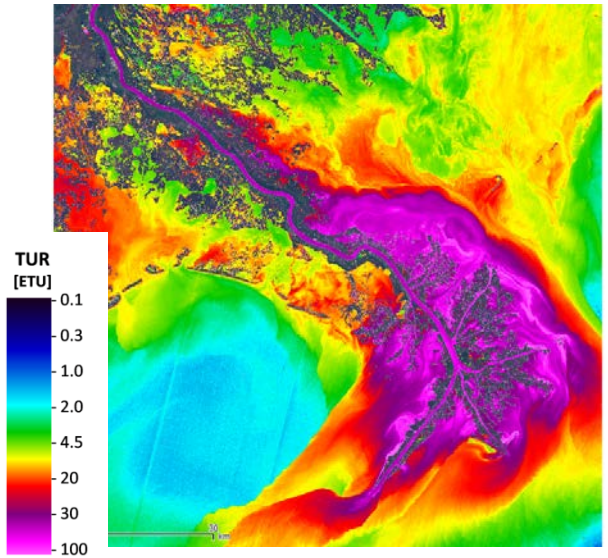
Product Category	Collections	Number of Collections	Regional Coverage	Temporal Coverage	Conditions of Use	Total volume [TByte]	Estimated volume accessed per year [TByte]
SRTM X-SAR DEM Mosaics	Hillshade Mosaic Elevation Mosaic Color-Coded Elevation Mosaic Elevation Mosaic Error	4	Global	2000	No restrictions	3	1
METOP GOME-2 Atmospheric Products	Nitrogen Dioxide (NO2) Sulfur Dioxide (SO2) Ozone (O3) Cloud Top Pressure (CTP) Cloud Fraction (CF) Cloud Optical Thickness (COT) …	30	Global	2006ff	No restrictions	1	1
MODIS Image	Image Mosaic Germany	1	Germany	2011	No restrictions	1	1

D-SDA - Archive Reload (collection/product discovery, viewing, download via CODE-DE services)

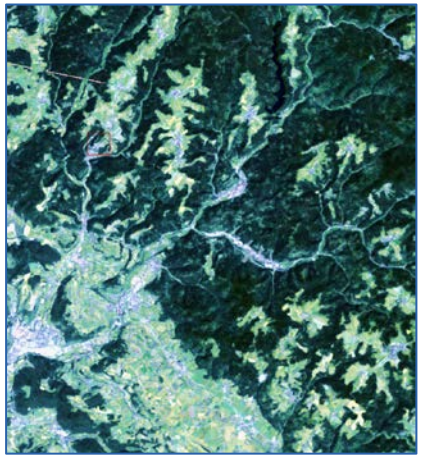
	Product Category	Collections	Number of Collections	Regional Coverage	Temporal Coverage	Conditions of Use	Volume increase [Tbyte/year]	Estimated volume reloaded per year [Tbyte]
tbd*	**Sentinel-1**	Single-look complex data (SLC) Ground range detected images (GRD)	2	Global	2015ff	No use restrictions; ESA to approve PAC archive reload	1,836	25
	Sentinel-2	Level-1c images	1	Global	2016ff	No restrictions	1,392	100
tbd*	**Sentinel-3**	OLCI Level-1 OLCI Land Level-2 OLCI Water Level-2	3	Global	2016ff	No use restrictions; ESA to approve PAC archive reload	1,755	25

Data products

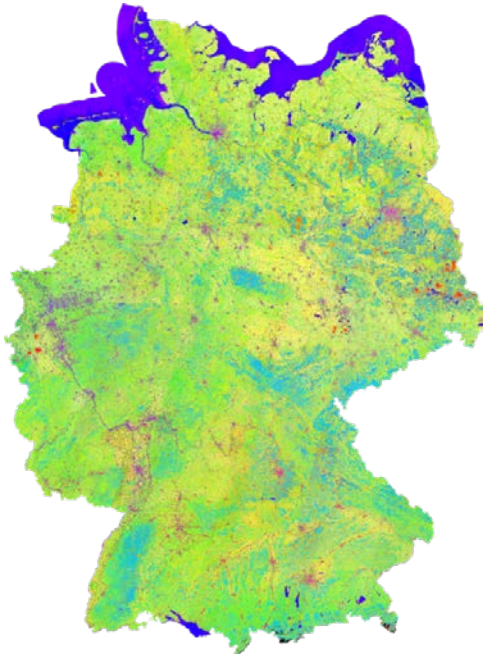
- Cloud-free Sentinel-2 mosaic (Germany, updated every 14 days)
- Flexible tiling
- Multi-temporal features (Sentinel-1 + Sentinel-2)
- Water quality processor



Suspended matter concentration and turbidity



RGB NDVI max-mean-min 2014-2015



RGB NDBI-max, NDVI-max and NDWI-mean 2014-2015

Components of the processing environment

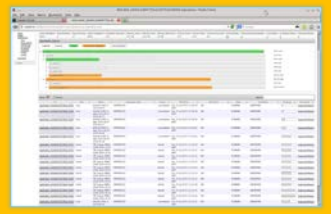
Web GUI

Production service

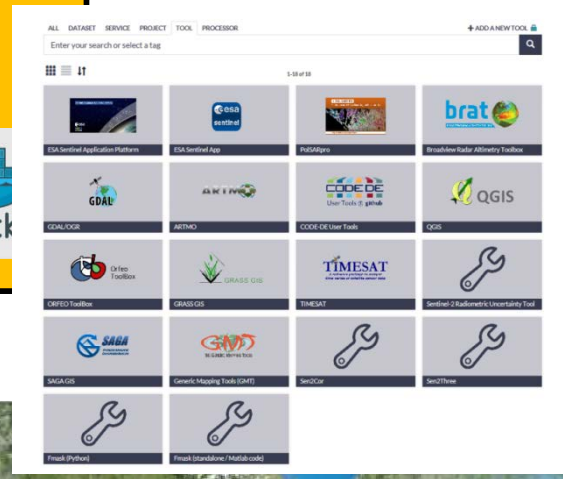
Project VMs

Calvalus software and structures

Hadoop Cluster



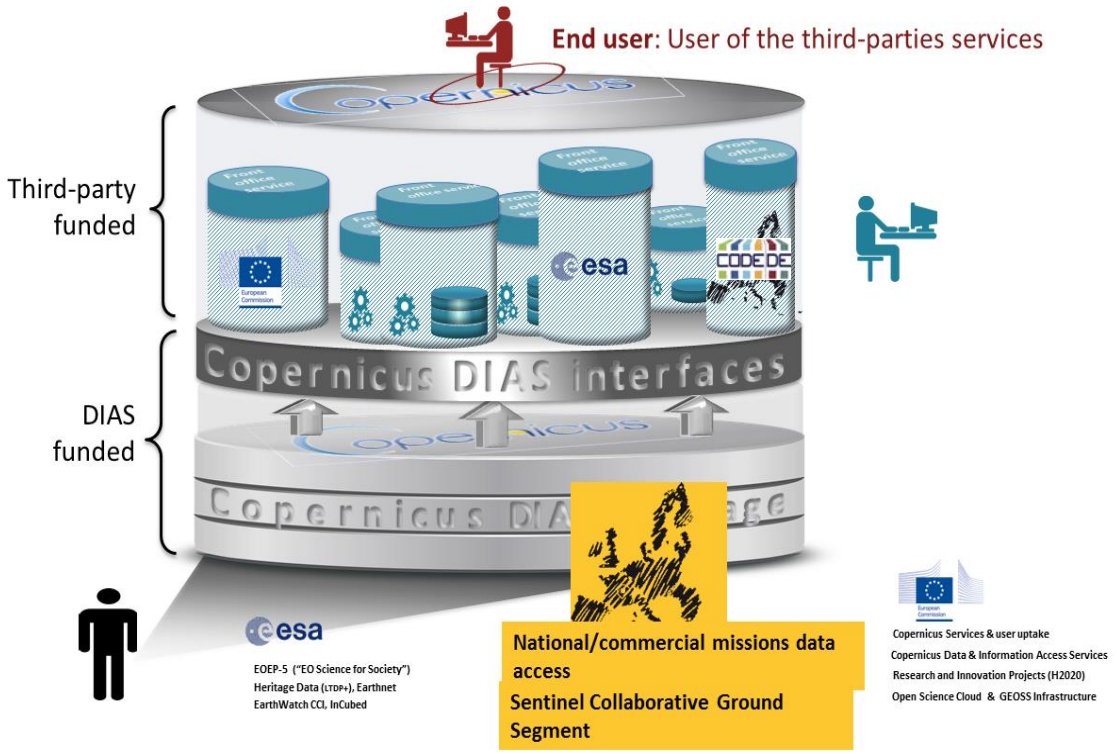
Tools and processors



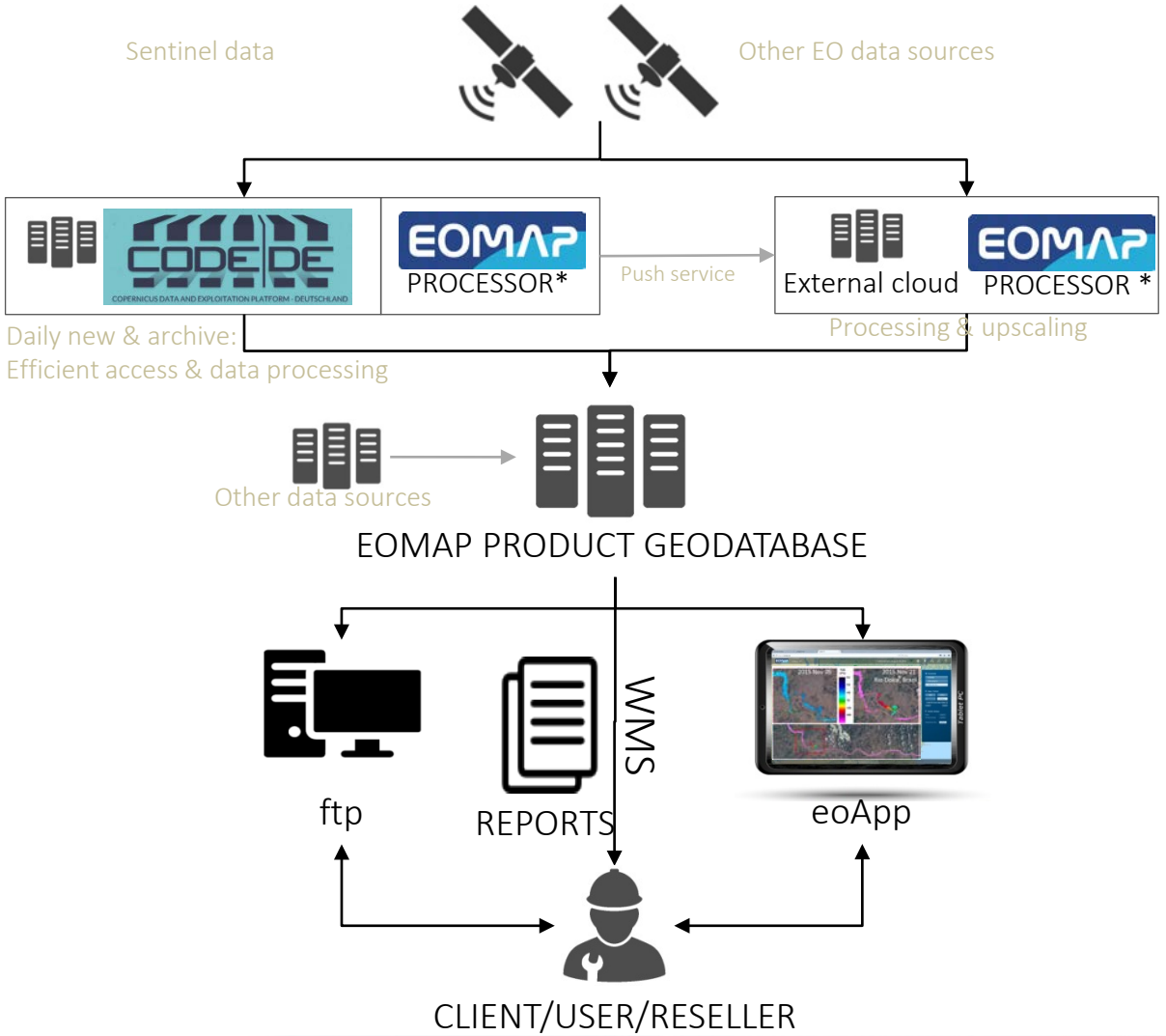
CODE-DE: Future plans

- **Transition to DIAS starting 2018**
- **Open to sharing/networking with other CollGS**

- **Currently being analyzed:**
  - Continued specific national need
  - Development of commercial offers
  - Availability of EU-level resources
  - Integration of national missions



Showcase: CODE-DE in EOMAP‘s production

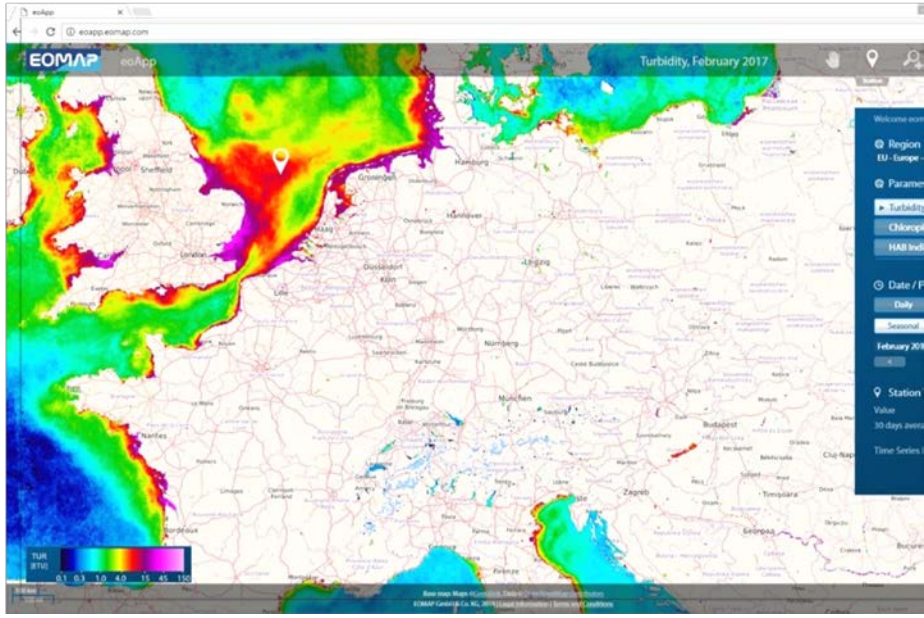


*EOMAP Docker processors in CODE-DE:
Operational VA chains for various thematic products

Showcase: CODE-DE in EOMAP‘s production

- **VA processor implementation tests within CODE-DE infrastructure**
  - Setup of thematic EOMAP Docker processors
  - VA production for Sentinel-1/2/3
  - Tests on Import / subscription / performance / export, …

- **Embedded activities**
  - Demonstration for national projects: MARSAT, AGRO-DE
  - Pilot-production for commercial market development activities

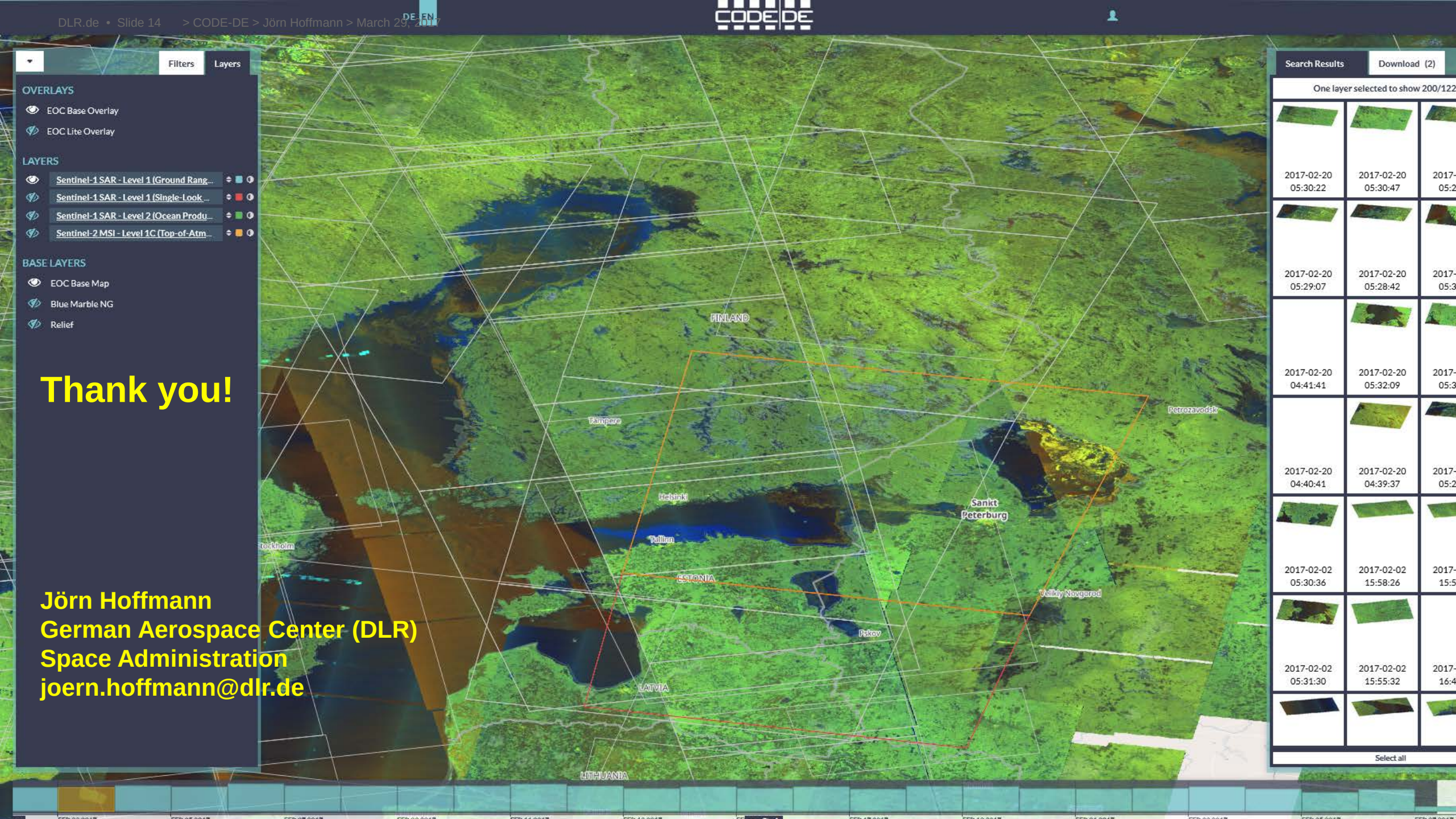


Example:
Actual turbidity product over Europe, generated within the DLR ground segment, distributed and aggregated through the operational EOMAP GEO-infrastructures, visualized at the eoApp web application.

MarSat

AGRO-DE

DLR



Thank you!

Jörn Hoffmann
German Aerospace Center (DLR)
Space Administration
joern.hoffmann@dlr.de