TERENO International Conference 2014

Data Management and Long Term Archiving of Remote Sensing and In-situ Data at DFD - Status and Trends

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Knowledge for Tomorrow

DLR

Content

- More data $\rightarrow$ Much more data

    - Project of the past - MIR/ PRIRODA

    - Project of today - TERENO

- Problem solved– next Problem

    - Data Management and Long-Term Archiving

- Outlook

More data - Much more data

Project of the past – MIR/PRIRODA

- German- Russian project MOMS-2P (Modular Optoelectronic Multispectral Stereo-Scanner) on board of the orbital space station MIR (PRIRODA module)
    - 18 m resolution: 4 Multispectral channels, 2 Stereo PAN
    - 6 m resolution: 1 Pan nadir
- MOMS-2P images up to a latitude of 51°(e.g. Europe)
- operation of the camera **1996 to1999**
- 152 data takes, processing up to L1B, **1 TB of mission data**

- Duration from ordering till acquisition and delivery: **sometimes ½ year**
- Use requires **specialized knowledge** (formats, preprocessing steps…)
- Data access today - **challenging**
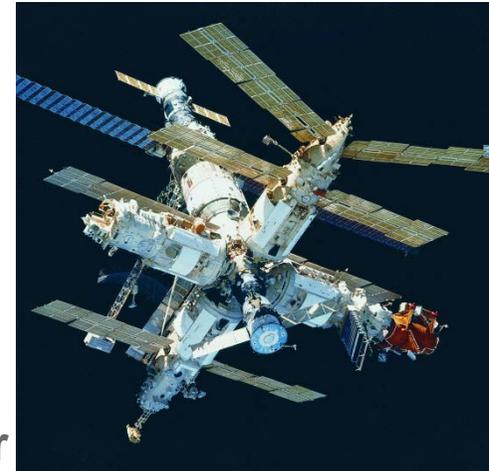
More data - Much more data

Project of today - TERrestrial ENvironmental Observatories (TERENO)

Initiative of the Helmholtz community,

Objective:

Analysis of long-term regional landuse changes and their socio-economic effects as a result of the global climate changes

Realization of a **long-term monitoring** for extraction of environmental data at different scale levels to support environmental modeling

Basis:

Development of an **observation platform** consisting different terrestrial observatories of different regions with the focus to remote sensing and in-situ measurements

ZACHARIAS, S. et al. (2011): A Network of Terrestrial Environmental Observatories in Germany.- In: Vadose Zone Journal (Soil Science Society of America).- Vol. 10, S. 955–973.
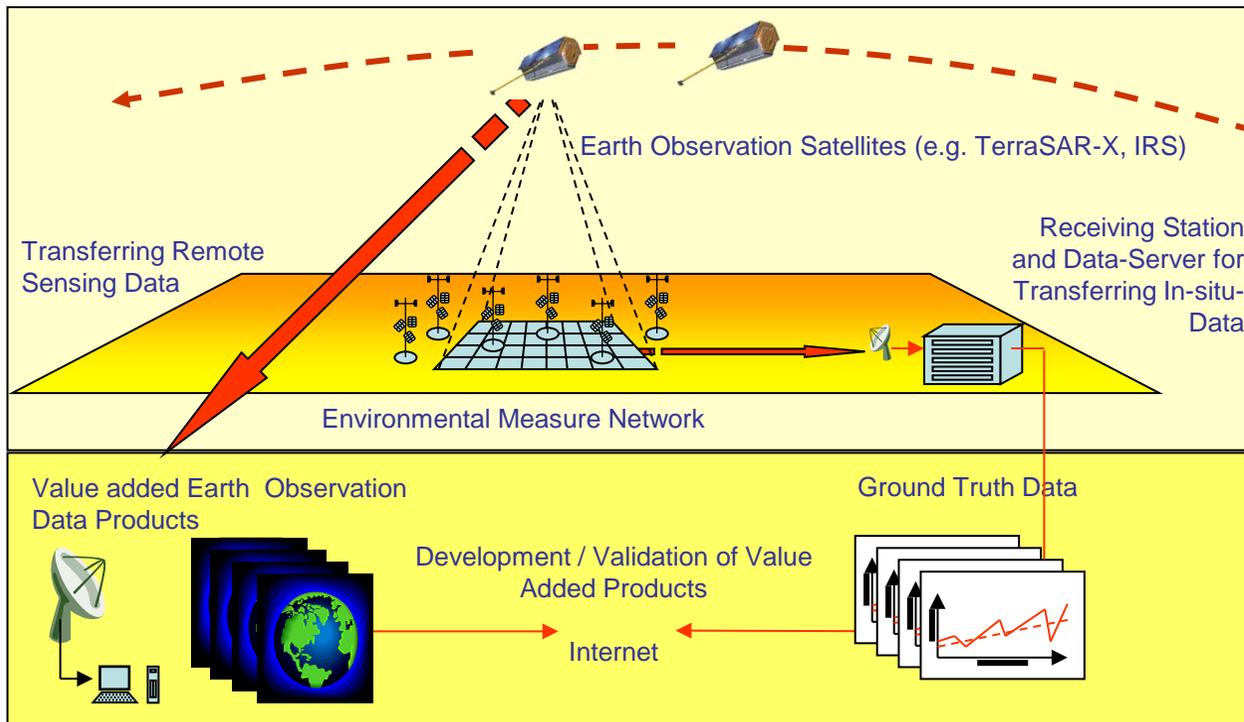
TERENO
TERRESTRIAL ENVIRONMENTAL OBSERVATORIA

DLR

More data - Much more data

Measurement Strategy for Remote Sensing

Earth Observation Satellites (e.g. TerraSAR-X, IRS)

Transferring Remote Sensing Data

Receiving Station and Data-Server for Transferring In-situ-Data

Environmental Measure Network

Value added Earth Observation Data Products

Ground Truth Data

Development / Validation of Value Added Products

Internet

Remote Sensing includes various platforms, sensors, methods for interpretation

Urgent requirement for in-situ-data for validation

Cal-val of remote sensing requires numerous environmental parameters

Requirement:
Operationally measured cost- and labour-effective in-situ-data

Borg, E. (2010): CAL/VAL Site DEMMIN for Remote Sensing.- In NEREUS – network of European regions using space technology.- Ed.: NEREUS Earth Observation / GMES Working Group.- p. 13-14.

More data - Much more data

Durable Environmental Multidisciplinary Monitoring Information Network (DEMMIN)
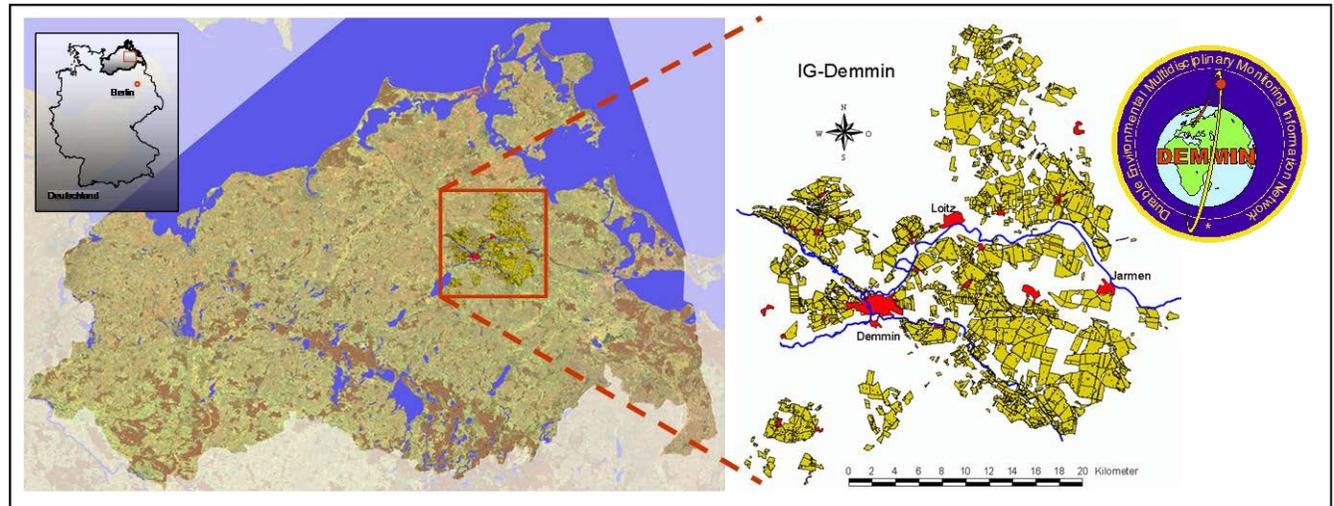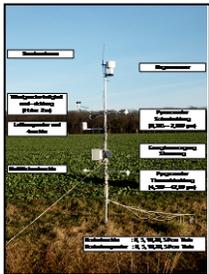
Mean Size of fields is 80 ha and in maximum 300 ha.

-40 environmental stations (DLR and GFZ),

-Measurement interval 15 minutes- slot = 900 sec, 15 samples,

-Data transfer via telemetry transfer,

-Web-data access on data server

-plus 65 soil moisture probes (GFZ)
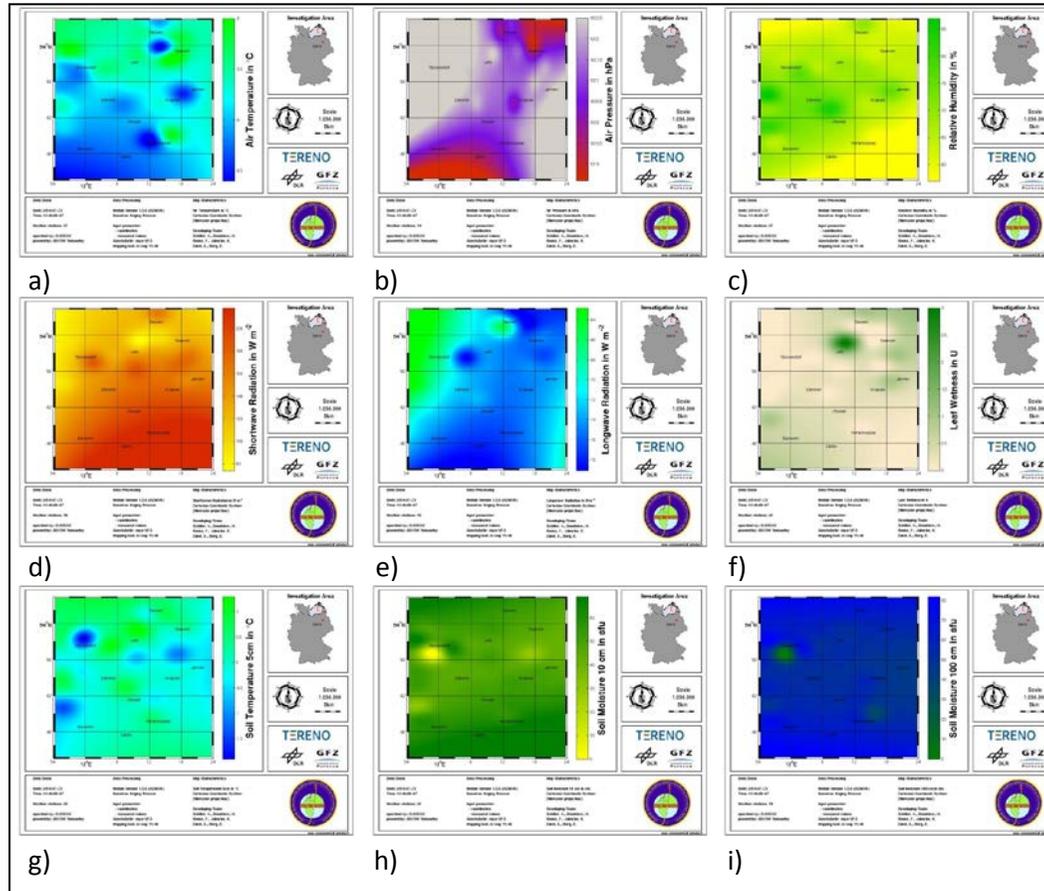
Yield mapping/ Soil investigations/ N-Sensor / Biomass

Borg, E. et al. (2009): DEMMIN – Teststandort zur Kalibrierung und Validierung von Fernerkundungsmissionen. In: 15 Jahre Studiengang Vermessungswesen – Geodätisches Fachforum und Festakt, Neubrandenburg, Eigenverlag (Hrsg.: Rebenstorf, R.W.).- 16.-17.01.2009.- S. 401-419.

More data - Much more data

In-situ-data Browse Products

Sample products showing parameter distribution of:

a)   air temperature,
b)   air pressure,
c)   relative humidity,
d)   shortwave,
e)   longwave radiation,
f)   leave wetness,
g)   soil temperature – 5 cm,
h)   soil moisture – 10 cm,
i)   soil moisture – 100 cm

(http://demminweb.dlr.de)
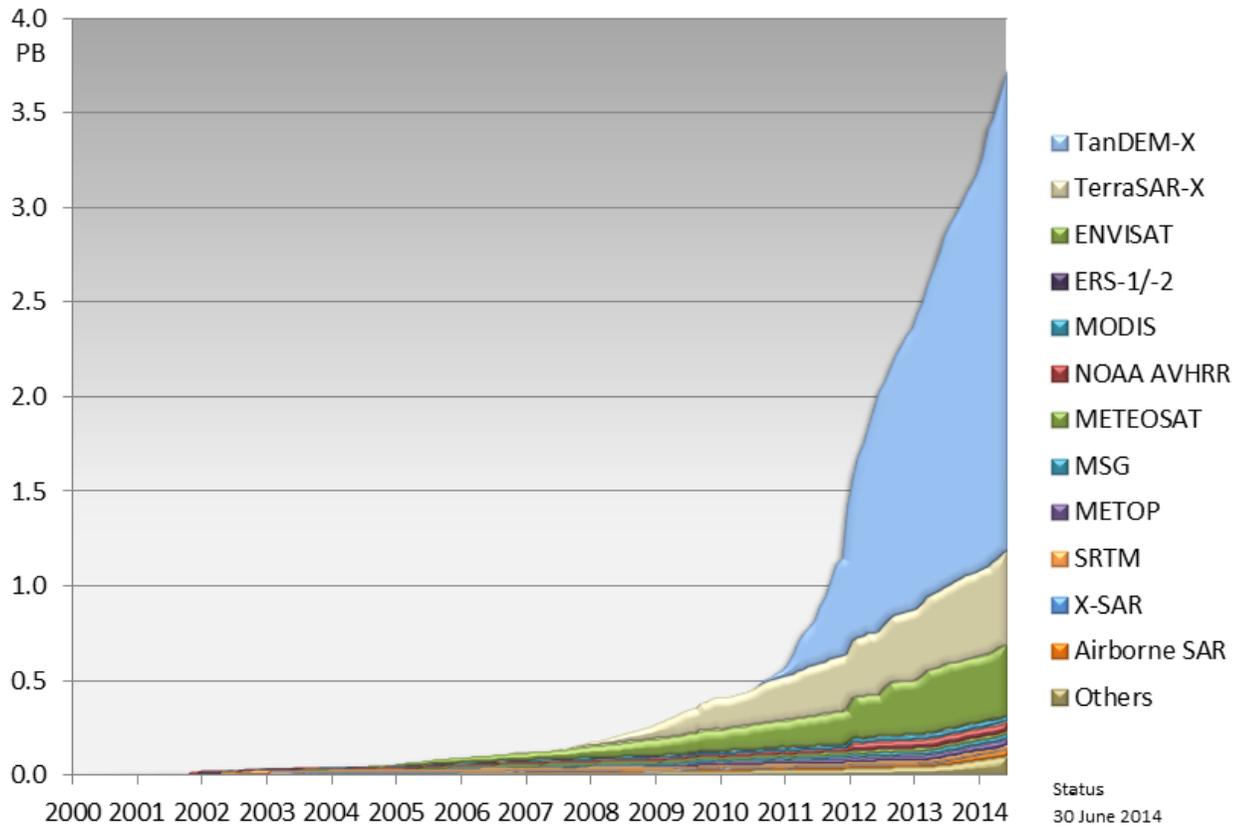
More data - Much more data

General trends

Rising

- Amount of EO space data

- Diversity of EO space data

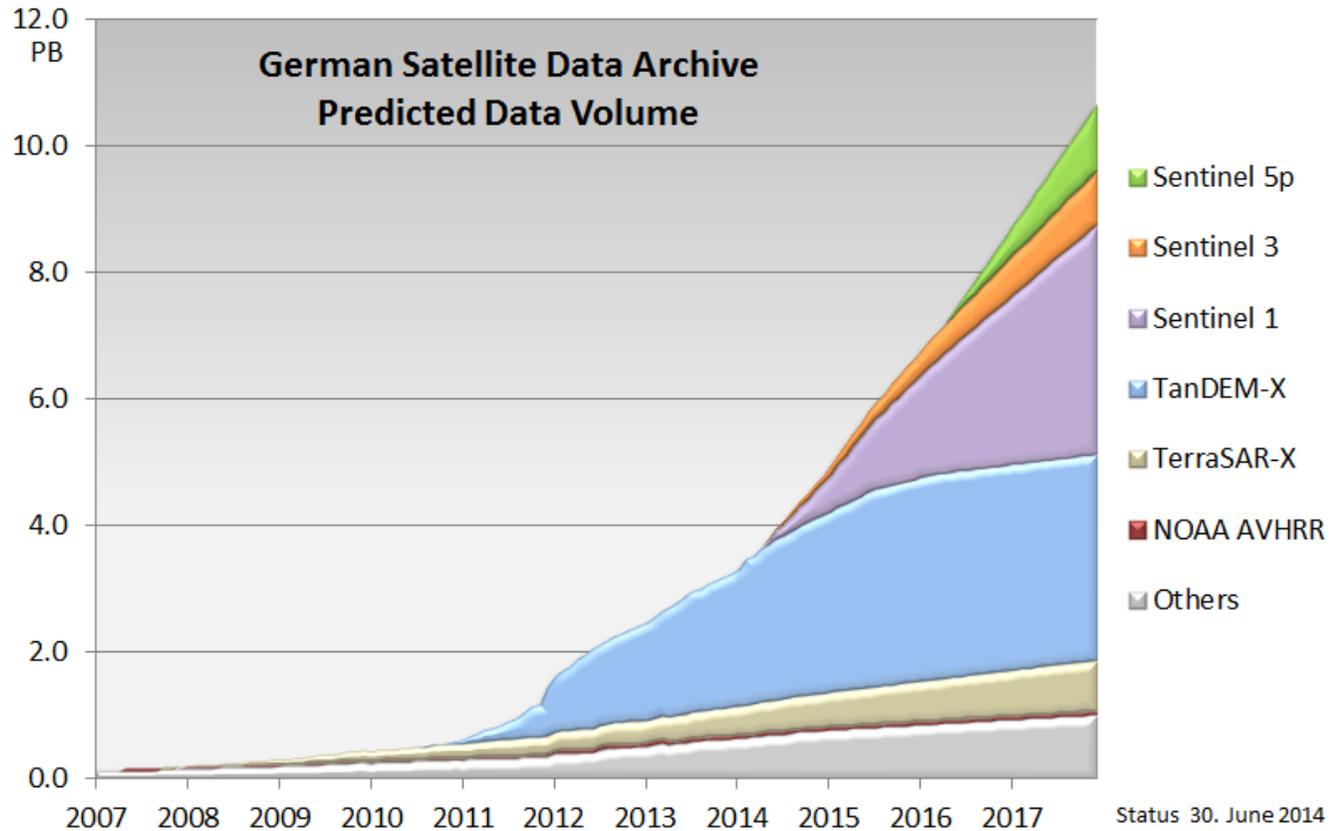- Amount and diversity of In-situ and other complementary data

More data - Much more data

D-SDA Archive Volume

Status
30 June 2014

More data - Much more data

D-SDA Future

German Satellite Data Archive
Predicted Data Volume

Status 30. June 2014

More data - Much more data

General trends

Rising

- Amount of EO space data

- Diversity of EO space data

- Amount and diversity of In-situ and other complementary data

Additional

- Use of unstructured data

- Investment (data management, transfer…) despite falling Cost per GB

- Transfer overhead

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Problem solved – Next Problem

Long-Term Archiving

Data Management

– Automatic Tape Libraries (robot systems)

– HSM (Hierarchical Storage Management)

Reliable Long-Term Archiving

- Quality Monitoring

- Parallel use of different (tape) technologies

- Active preserving (refreshing, replication, migration, emulation)

- Generation of redundancy information

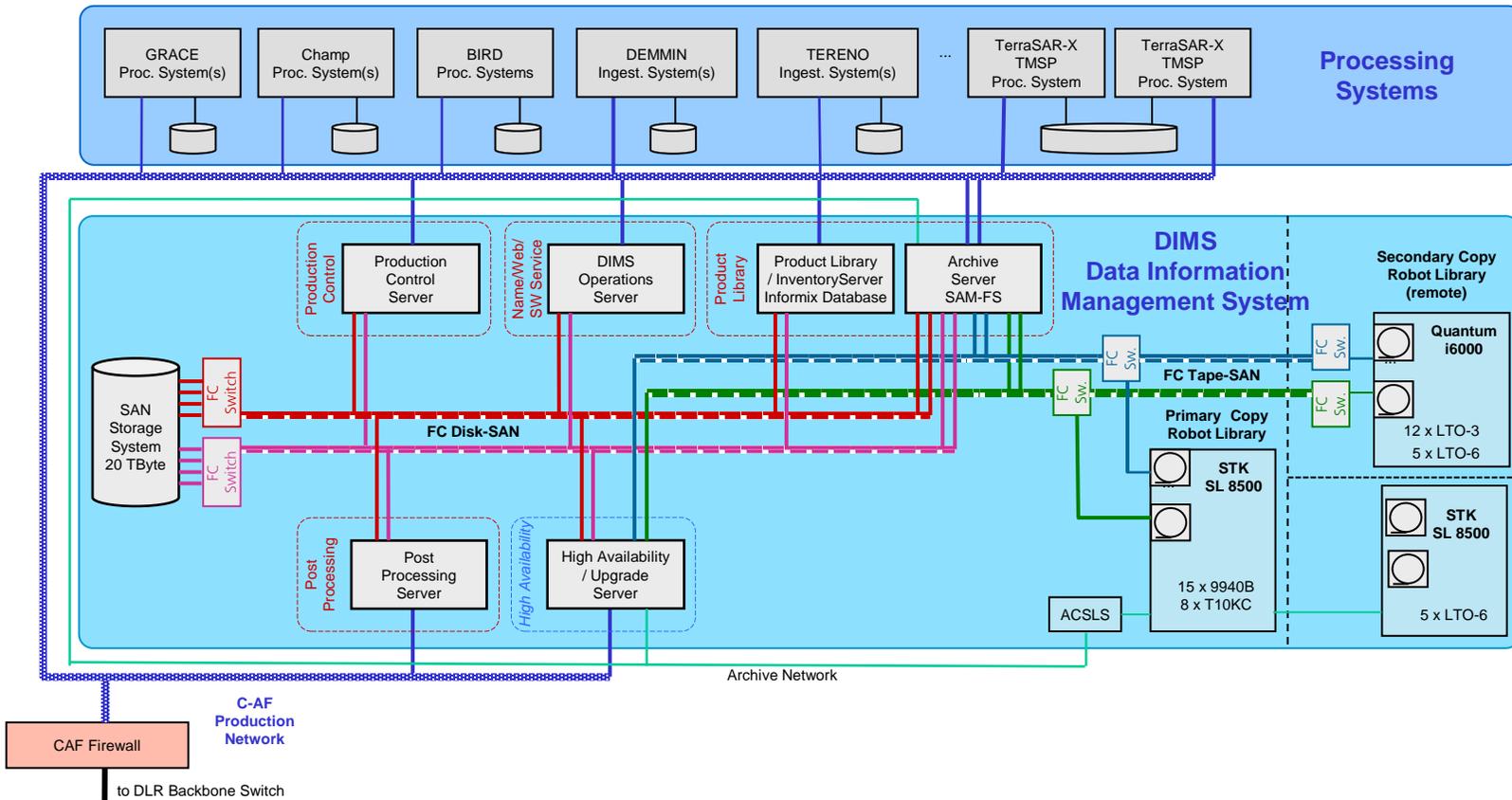- Conversion of data formats

- Storage of Processing chains

Problem solved – Next Problem

Data Information and Management System
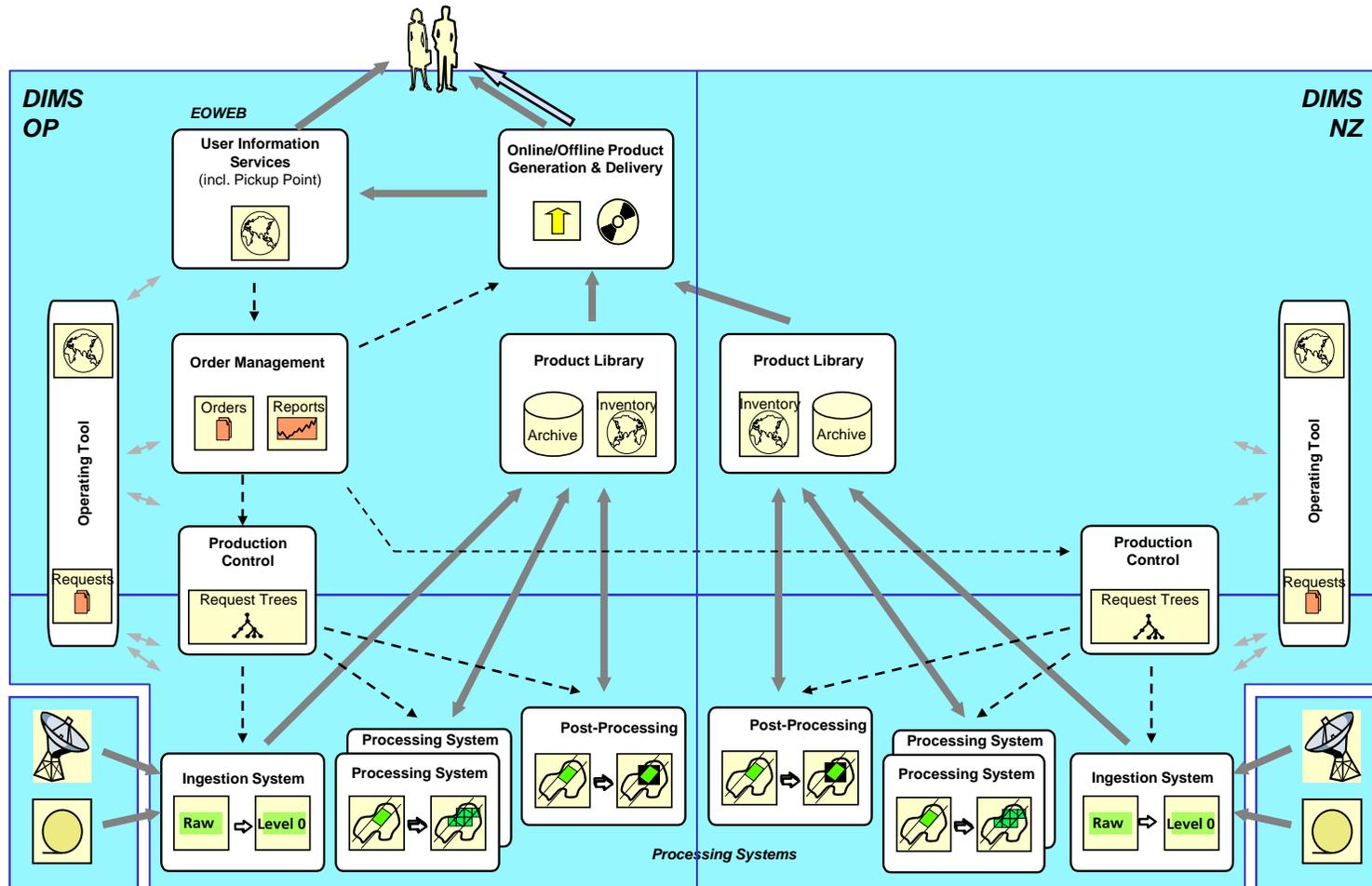
Problem solved – Next Problem

D-SDA Hardware Overview Neustrelitz

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Outlook

Data Curation –how ensure interpretability

- more complex view of data as pure readability

- also security, trustability, provenance, timeliness, quality of Data and Meta data

Interoperability

- Access to digital information from different sources (research, private companies, public offices, etc.)

- For different users (offices, administrations, citizens, etc.)

- For a variety of use cases (research, government, etc.)

- Extension data access: from file-based to service-oriented
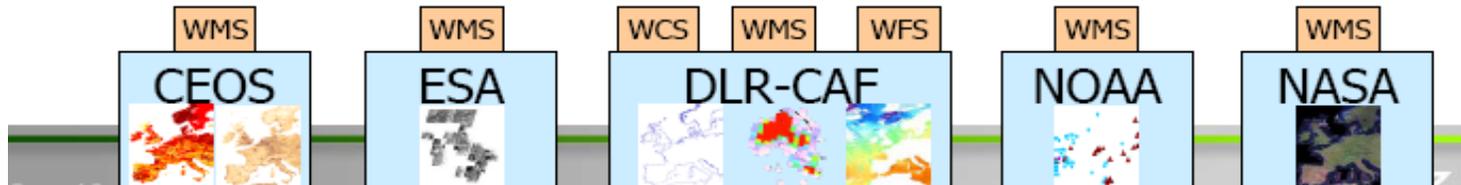
- Use of Standards (as much as possible)

DLR

Outlook
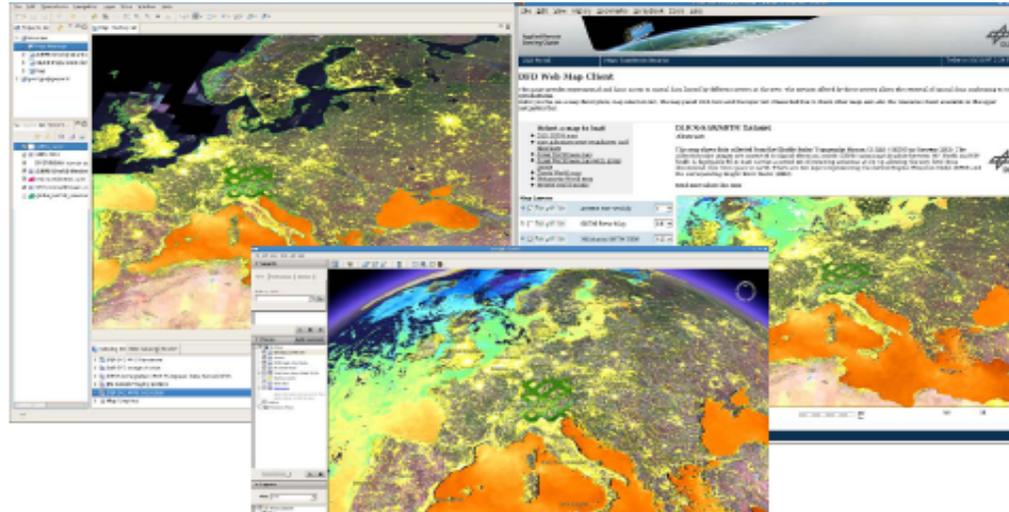
Use of Standards (as much as possible)

Outlook

Overcome Risks

- Digital technology advances, hardware and software may become outmoded
- Information may become inaccessible
- Users unable to understand or use data
- Access and use restrictions may make it difficult for others to re-use data
- Ability to identify the location of data may be lost
- Current custodian of the data may cease to exist
- Ones we trust to look after the digital holdings may let us down

Digital Long-Term Archiving in single Organizations$\rightarrow$

Robust Data-and Information-Infrastructure of an International Research Community

http://www.alliancepermanentaccess.org

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