EO data hosting and processing – core capabilities and emerging solutions

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An introduction to Airbus Defence and Space

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A closer look at the Geo-Intelligence business

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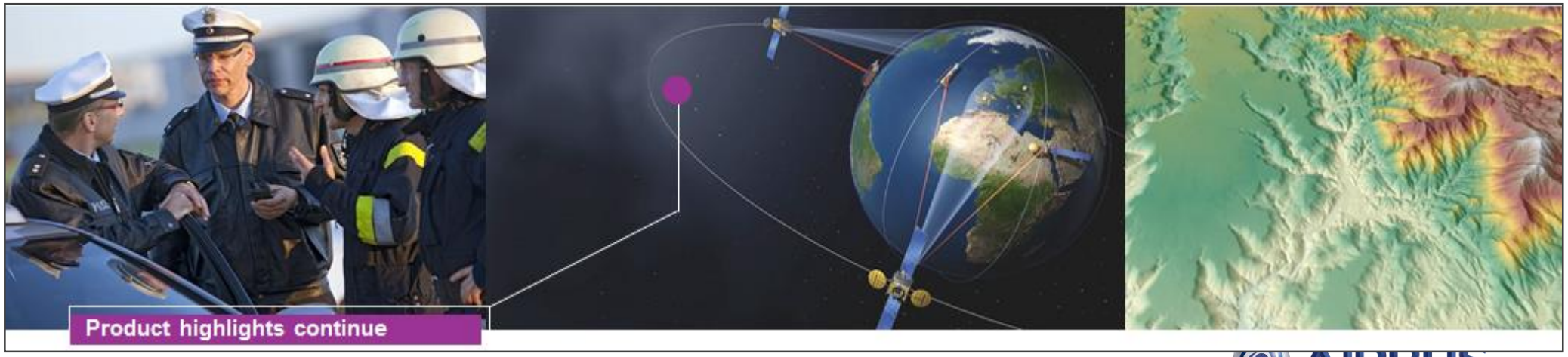
The UK part of Geo-Intelligence

- Core competences include:
  - Data management and data hosting
  - Geospatial solutions
  - EO-based services and value adding activities
- UK Geo-Intelligence has been involved in Copernicus since its inception
- Primarily through activities in the land, security and emergency response domains



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Elements of the C3S ‘vision’

- Key extracts from the C3S introduction presentation:
  - To be an authoritative source of climate information for Europe
  - To build upon national investments and complement national climate service providers
  - To support the market for climate services in Europe
- The implications of these key elements of the C3S ‘vision’ for the CDS:
  - Robust, secure, scalable with sound ongoing operations and maintenance
  - Cost-efficient, taking advantage of investments already made and lessons already learned
  - Accessible, promoting easy access and information exchange

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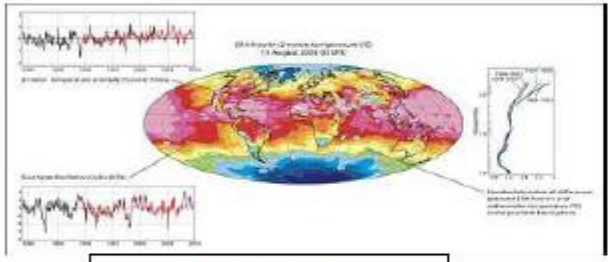
Elements of the C3S 'vision'

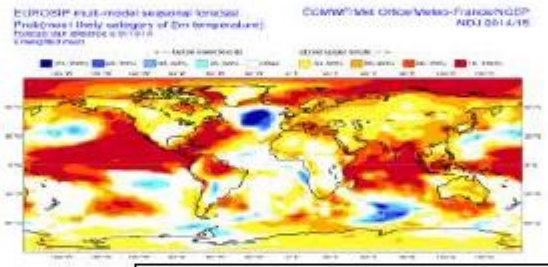
C3S Service elements: Climate Data Store

Series of ECV datasets and climate indicators

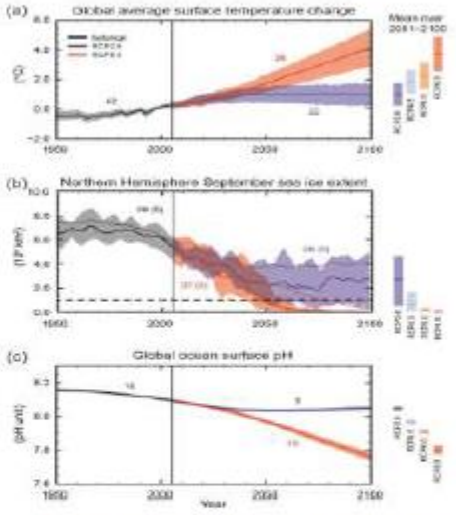
- Observed, reanalysed and simulated
- Relevant to support adaptation/mitigation policies at European level and wider

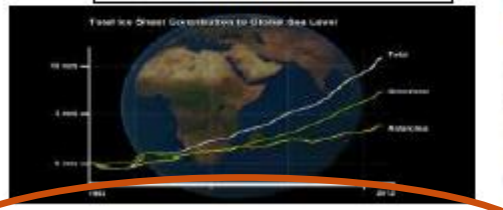


Reanalyses

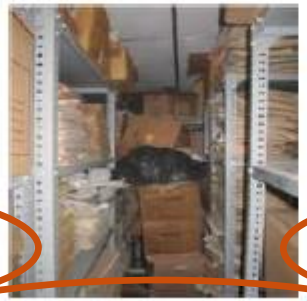


Multi model seasonal forecast products

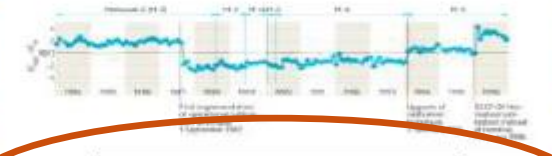




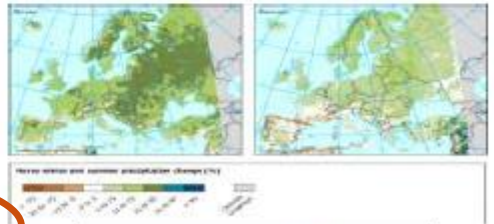
Other ECV datasets



Data collection and data rescue



Data reprocessing



Climate projections

opernicus

ECMWF

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Processing and archiving – Sentinel-1 and Sentinel-2 PACs

- Geo-Intelligence UK have been operating PAC facilities as part of the ESA ground segment network for over 25 years
  - UK PAF for ERS-1 and ERS-2
  - UK PAC for Envisat
  - ESA PAC for the SWARM mission

  } Processing, archiving and dissemination services continue under the current ESA Farnborough Operations Centre

- In 2012, Geo-Intelligence UK was awarded contracts for setting up, operating and maintaining PAC facilities for both the Sentinel-1A and Sentinel-2A satellites. For S1A, the Farnborough PAC was selected as the Commissioning PAC
- Recently both contracts have been extended to include the B units for both S1 and S2
- As a result, Geo-Intelligence UK operates on behalf of ESA/EC the largest archiving facility for Sentinel data in the world
- Installation, integration, operations and maintenance of large EO data storage facilities is thus a core capability for Airbus Defence and Space, Geo-Intelligence UK

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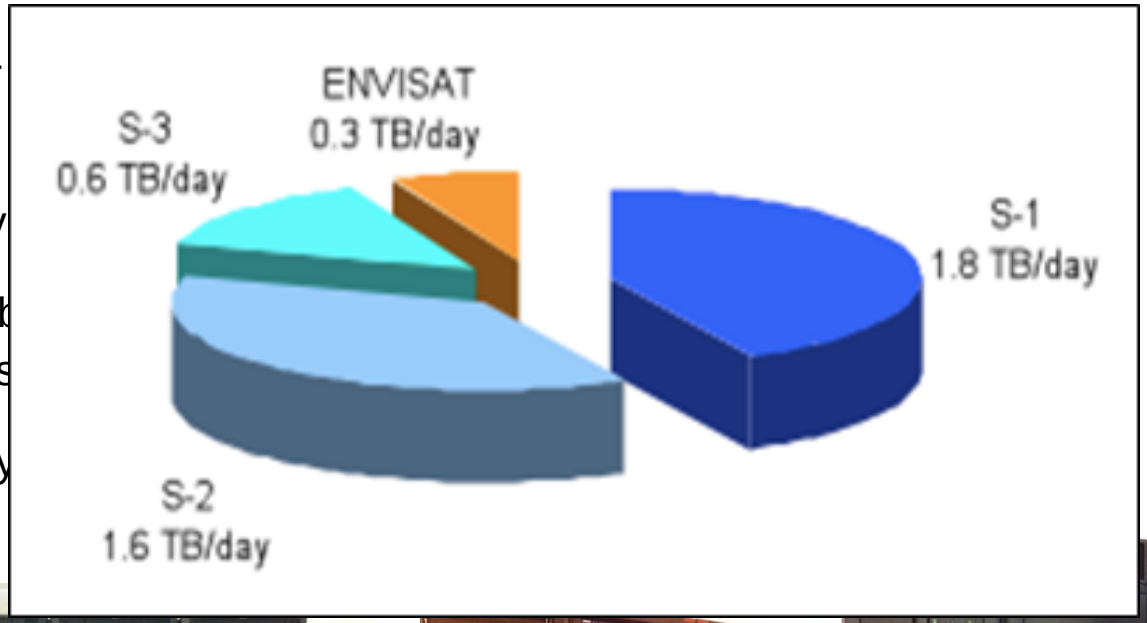
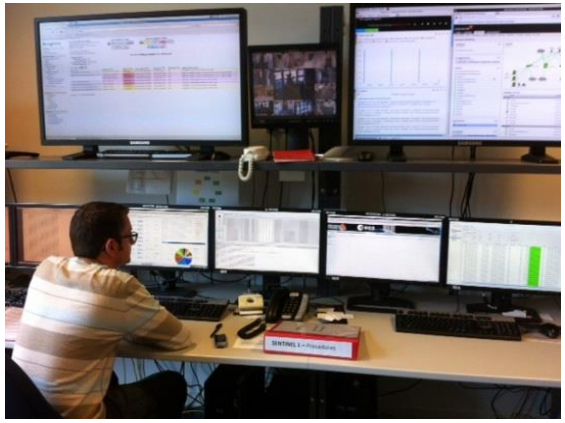
Processing and archiving – Sentinel-1 and Sentinel-2 PACs

- With both the Sentinel-1 and Sentinel-2 PACs located in Airbus DS's Farnborough facility, the site is a critical component of the overall PDGS, disseminating data directly to the Copernicus Services
- Sentinel-1A launched in April 2014
  - Routine Operations Phase
    - Approximately 300TB of data hav
    - Approximately 1.8TB of data will b
      users per day, when S1A reaches
    - The operations team are currently
      reprocessing activities





Connecting the CDS to the user community - GeoStore

- Airbus DS operates the largest commercial geospatial hosting facility in Europe – GeoStore
- Key characteristics include:
  - 24/7 access to catalogue
  - Tasking and archive ordering with direct delivery
  - Automated alert system to keep customers informed
- These concepts would translate directly to effective dissemination of ECV datasets, reprocessed datasets, seasonal forecast products etc

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Bulk processing and hosted processing

- The AIRBUS **Processing Cloud** provides a Sentinel Exploitation Platform for 'Big Data' processing and hosted processing
- Examples of successful processing and reprocessing campaigns already completed include:
- MERIS processing:
  - 1 day to implement IPF and test
  - 3.5 days to process 2 years of MER_RR
- AATSR, ATSR-2, ATSR-1 reprocessing:
  - L2P/L3U processing for entire missions
  - Estimated processing time for AATSR mission using ESA provided infrastructure >700d
  - Processing times using the AIRBUS **Processing Cloud**:
    - AATSR: 2 weeks
    - ATSR-1: 5 days
    - ATSR-2: 10 days

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Bulk processing and hosted processing

- The AIRBUS **Processing Cloud** also enables the development of new products and services in a partnership approach
- The APC is also intended to support SMEs, research organisations, universities etc to operationalise their algorithm capabilities:
  - Supports the commercialisation of EO products and services by reducing the requirement for upfront infrastructure investments
  - Provides a ready-made route to market to support business case development
- Examples include real-world examples, potential Copernicus Service examples and could be extended to include C3S examples:
  - Sentinel-1 REDD+ service with the University of Edinburgh
  - Sentinel-2 data to support the Copernicus Land Services
  - Sentinel-1/Sentinel-2 data to support ECV preparation

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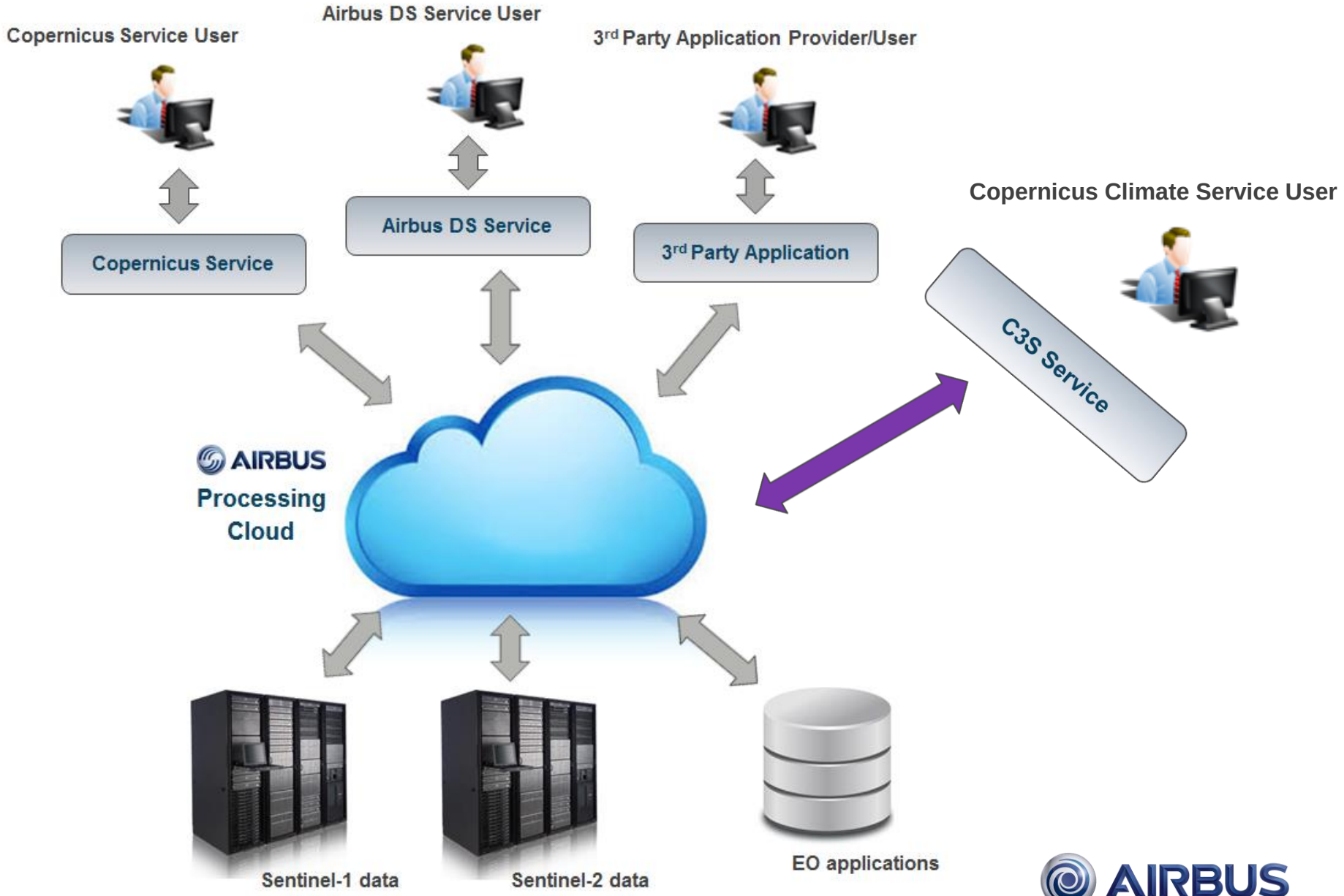
Bulk processing and hosted processing



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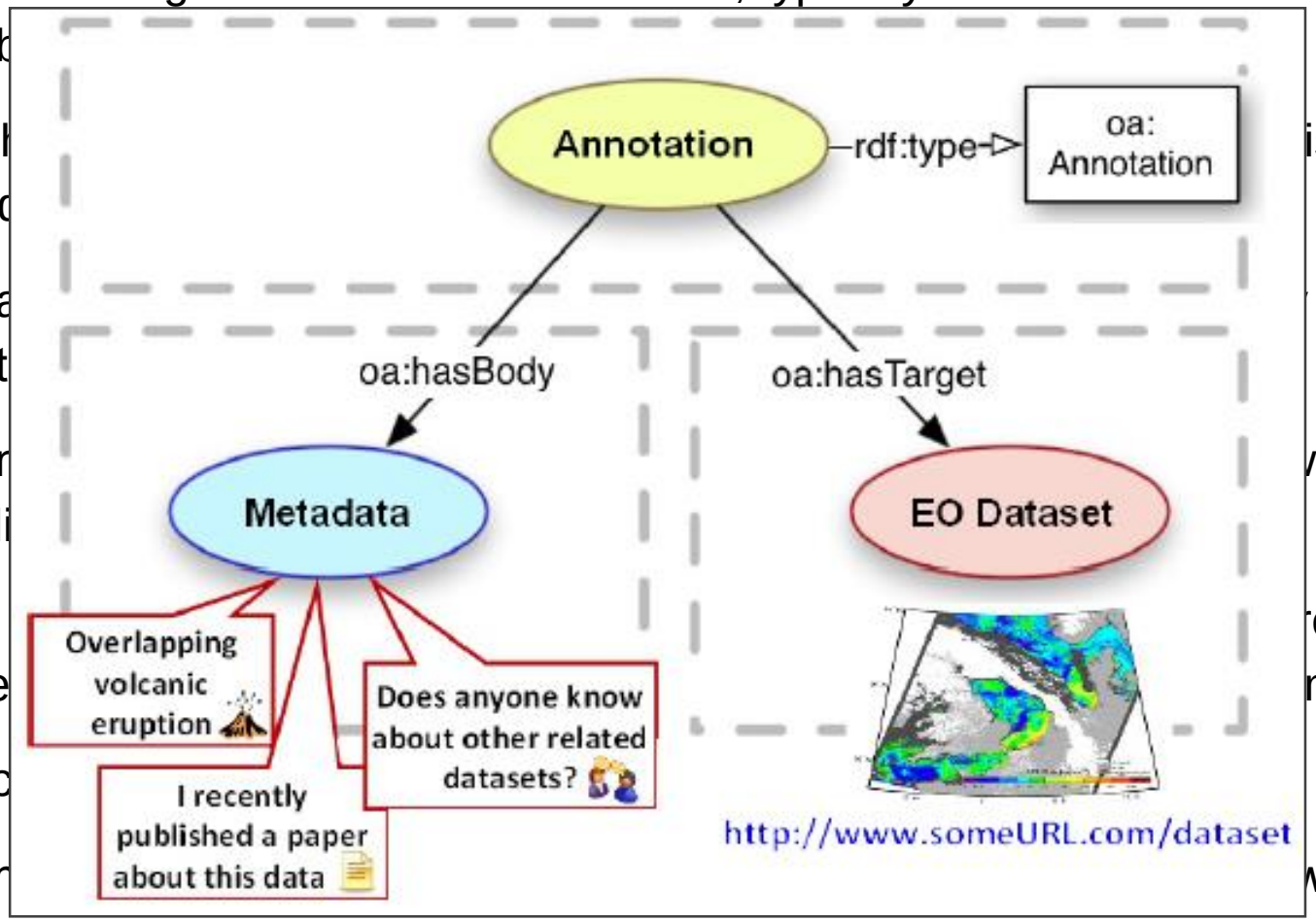
More efficient use of data through Linked Data models

- When data first emerges from a new EO mission, typically there is an intense period of analysis, calib
- This activity th is supplemented
- Much of this a with the outputs const
- This 'commer vide variety of locations, li
- This reduces rent users to properly asse ments
- A similar proc
- Linked Data r with 'generic 'targets'



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Linked Data models

- Linked Data models may be used to connect users, and prospective users, of data to knowledge and expertise that would otherwise be difficult to extract from the user community
- Further, Linked Data models enable these users, or prospective users, to also contribute commentaries of their own
- Linked Data is therefore about using the Web to connect data/products that weren't previously linked
- Airbus DS are using their experience of Linked Data models to implement a solution supporting Coordinated Quality Control in the context of the ESA Copernicus Space Component e.g. synthesis reports are linked to datasets and to data providers
- This enhanced exploitation of both mission and dataset perspectives supports improved identification of patterns in quality issues and harmonisation across missions
- A similar concept is considered relevant within the context of the CDS considering ECVs, reanalyses, forecasts, modelling capabilities, climate projections etc

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Thanks very much.

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