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TAKING THE PULSE OF OUR PLANET FROM SPACE

EUMETSAT ECMWF EUSPA

Earth Observation Data Information Service – EO DIS

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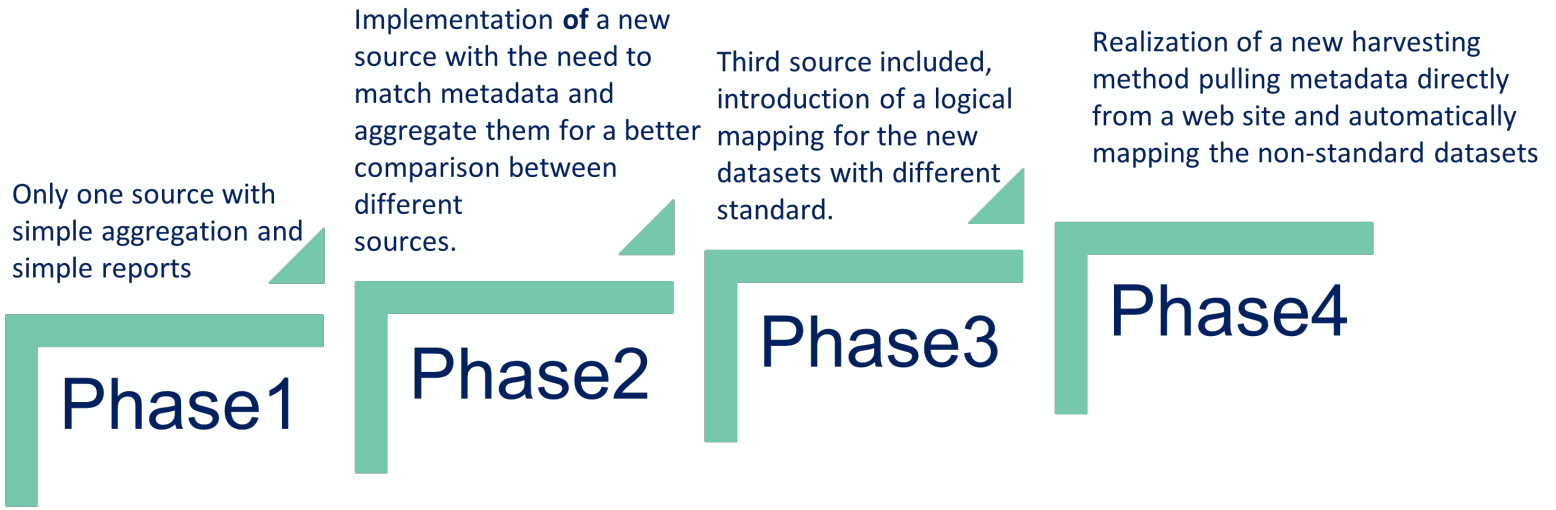
Context of EO DIS

- ESRIN, the European Space Agency's for Earth Observation has commissioned a centralized service to collect and store metadata relevant to Earth Observation data as generated in several systems and services running in the ESA Ground Segment.
- The service was designed, developed and operated inside the DSI (Data Service Initiative) contract led by Serco.
- The Data information Service (DIS) purpose is :
  - ✓ Centralise the information on the data produced by the various ESA services standardizing the handling of metadata
  - ✓ Provide a centralised end-to-end information on the data life-cycle managed by ESA Earth Observation
  - ✓ Monitor the data information across different ESA teams.
  - ✓ Give visibility of the Operations and Processes performed on the data
  - ✓ Provide Business Intelligence capabilities for data governance and data administration

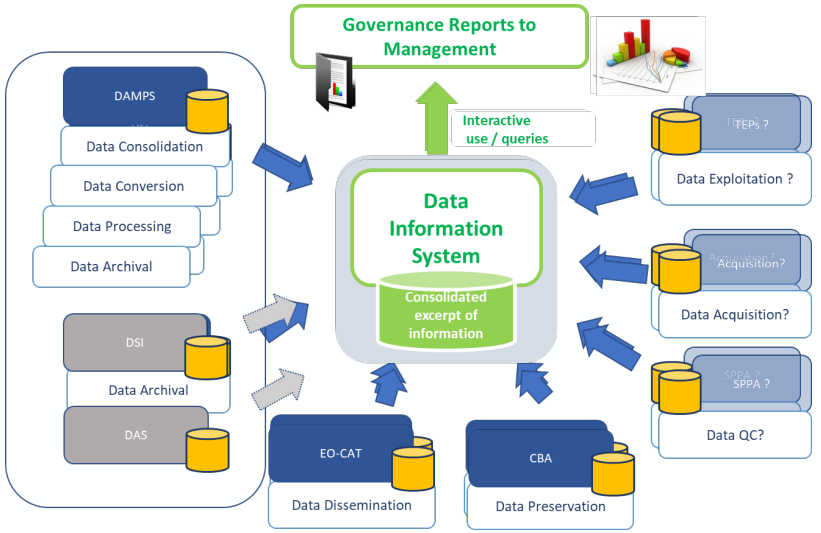
EO DIS Evolution

- How the service has evolved through its various phases
  - The need of DSI Data management (Pilot)
  - Service approach requirements with only 1 source of metadata (Phase 1)
  - Additional source + matching metadata requirements (Phase 2)
  - Additional source + requirements for datasets with different standard (Phase 3)
  - Additional source + harvesting and automatization of mapping not standard datasets



Standard interfaces – Various sources

- Service provides standard interfaces to allow data to be collected from additional external sources.
- Metadata extraction from several source systems and services and collection for every dataset and data product into a centralized system.
- All changes to the data to be managed and traceable, similar to any other items under standard configuration control.



Generic ICD

- ✓Which data shall be provided by sources and how are packaged
- ✓XSD schema definition for the xml files
- ✓Error handling
- ✓Communication rules

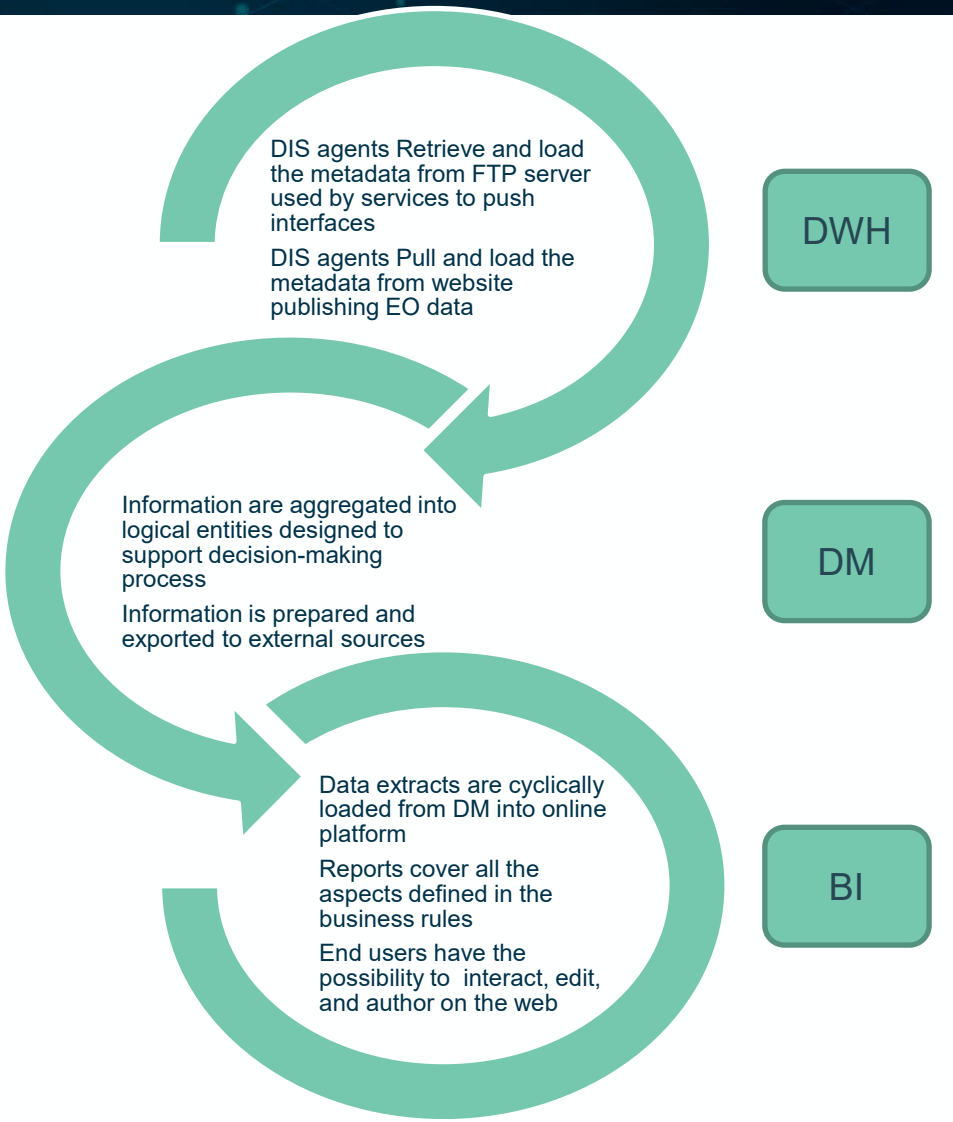
Custom ICD

- ✓Additional product information provided by source not included in the generic ICD
- ✓Customization of EO-DIS procedures (schedule, naming requirements etc.)
- ✓Specific communication rules
- ✓Any other variation related to the external system characteristics

- The service ensures that data assets can be traced in any system that is federated to EO DIS – therefore providing a unified view of multiple archives and copies of the asset

How EO DIS works

- Data warehouse (DWH) – a staging area used to store information from different sources identifying data unequivocally across missions & services
- Data mart (DM) - containing the aggregated information modelled to be ready for the presentation layer
- Business Intelligence platform (BI) – based on Tableau online cloud. It is possible to access data on the web using customized reports tailored to the end-user needs.



How EO DIS is used

- DIS platform is designed to be used in various ways:

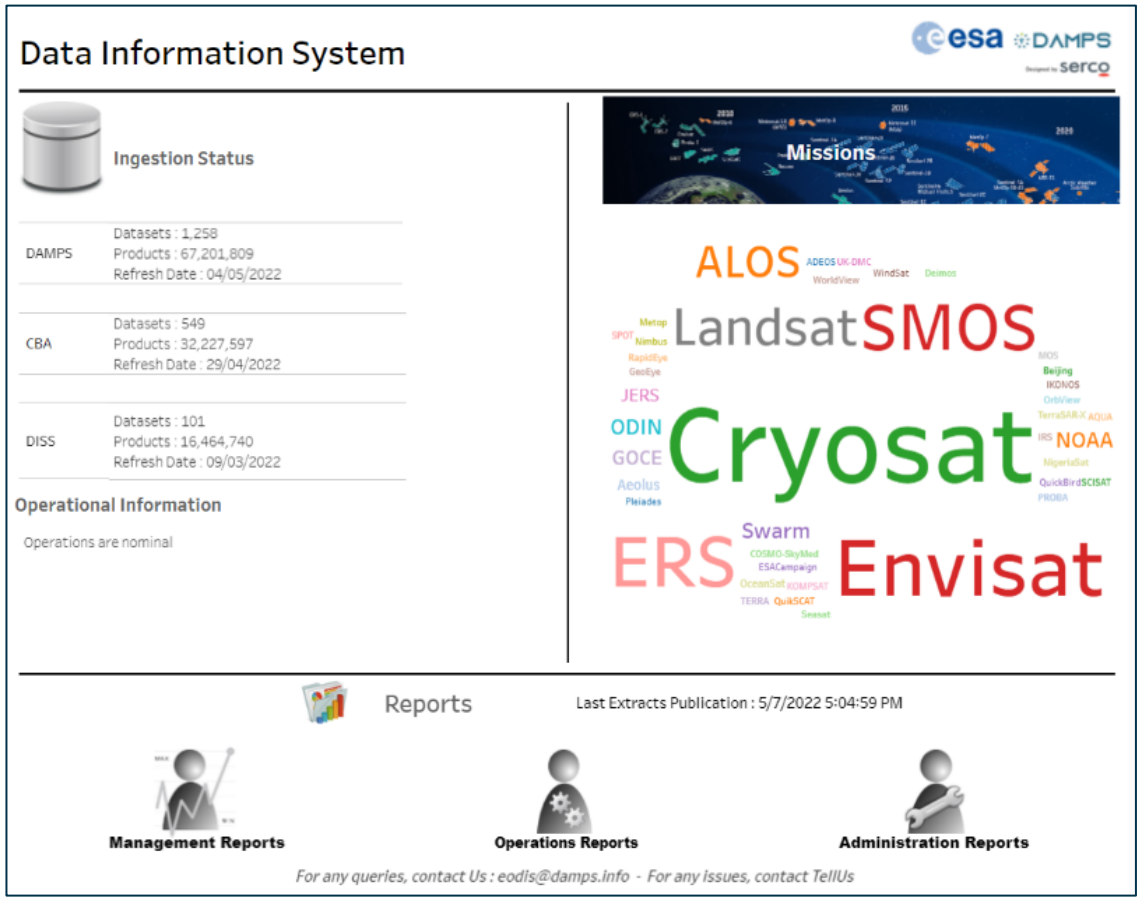
  - ✓ Reports : User driven reports are available in online platform allowing end-users to intuitively visualize, explore and discover aggregated data
  - ✓ Queries : Customized queries upon specific needs
  - ✓ Exports: Aggregated data can be exported for any further usage in several formats (CSV, XML, etc…).

EO DIS User Front-end

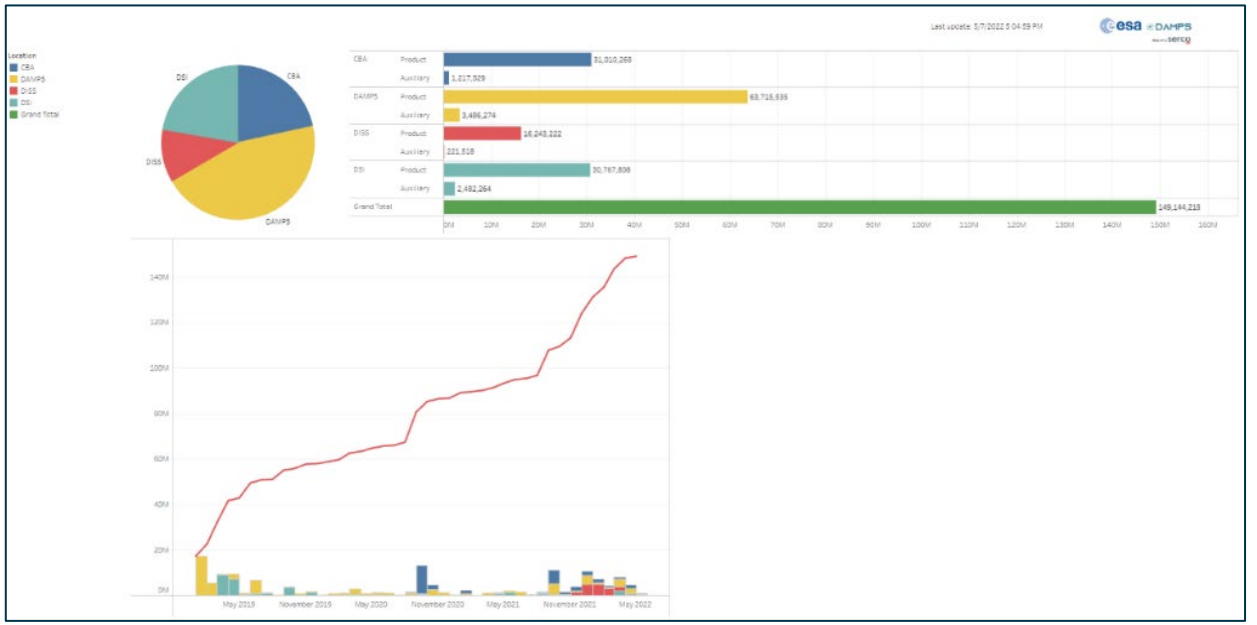
- The front-end relies on Tableau online platform which provides a Software-as-a-Service model improving productivity in terms of efficiency, scalability and accessibility. The platform offers an intuitive user interface and a self-service approach.

- The main features of EO DIS BI solution are:
  - **Decision Making** - customized reports allow end-users to go deeply through satellite metadata and make data-driven decisions.
  - **Data Tracking**: it is possible with some reports to keep track of the information among all the external sources describing relationships between groups of data and across different environments.
  - **Data Mining**: ad-hoc report can be used to uncover trends and to classify data through categories

EO DIS User Front-end – General dashboards examples



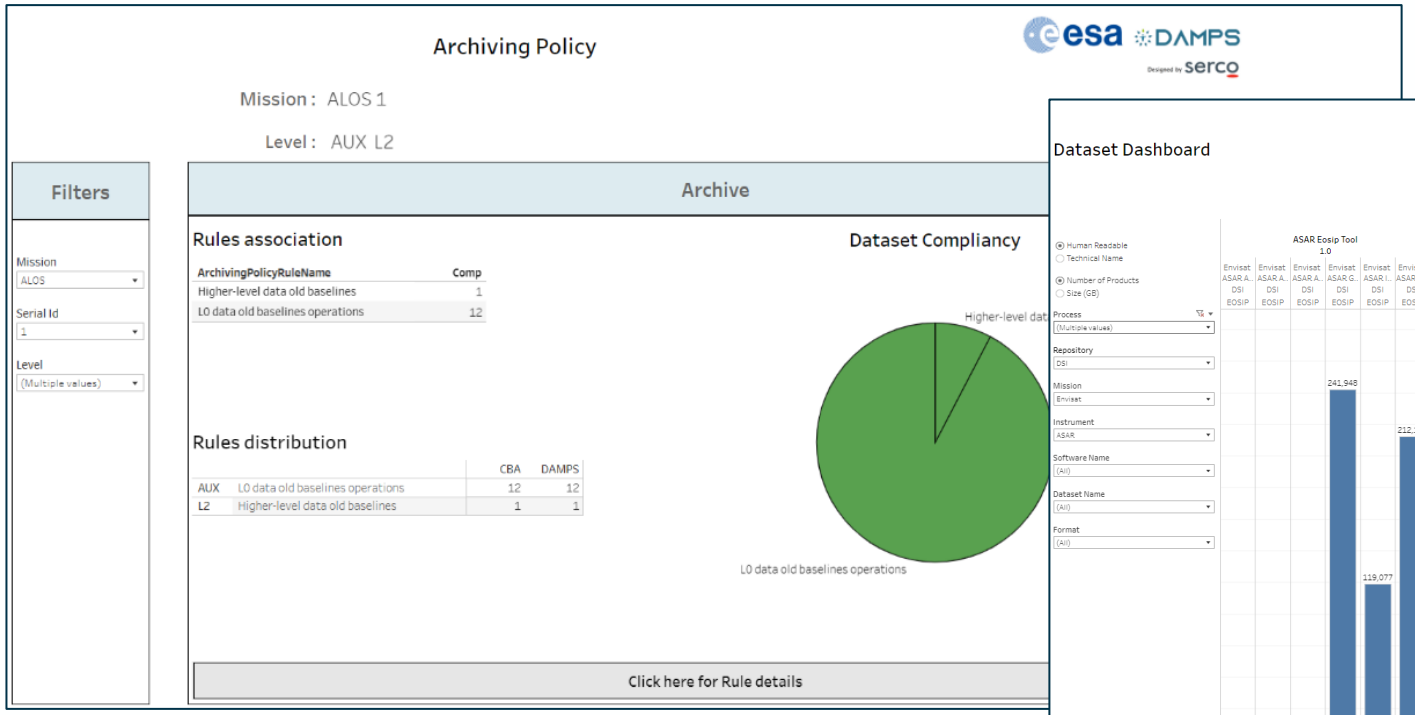
EO DIS Welcome page



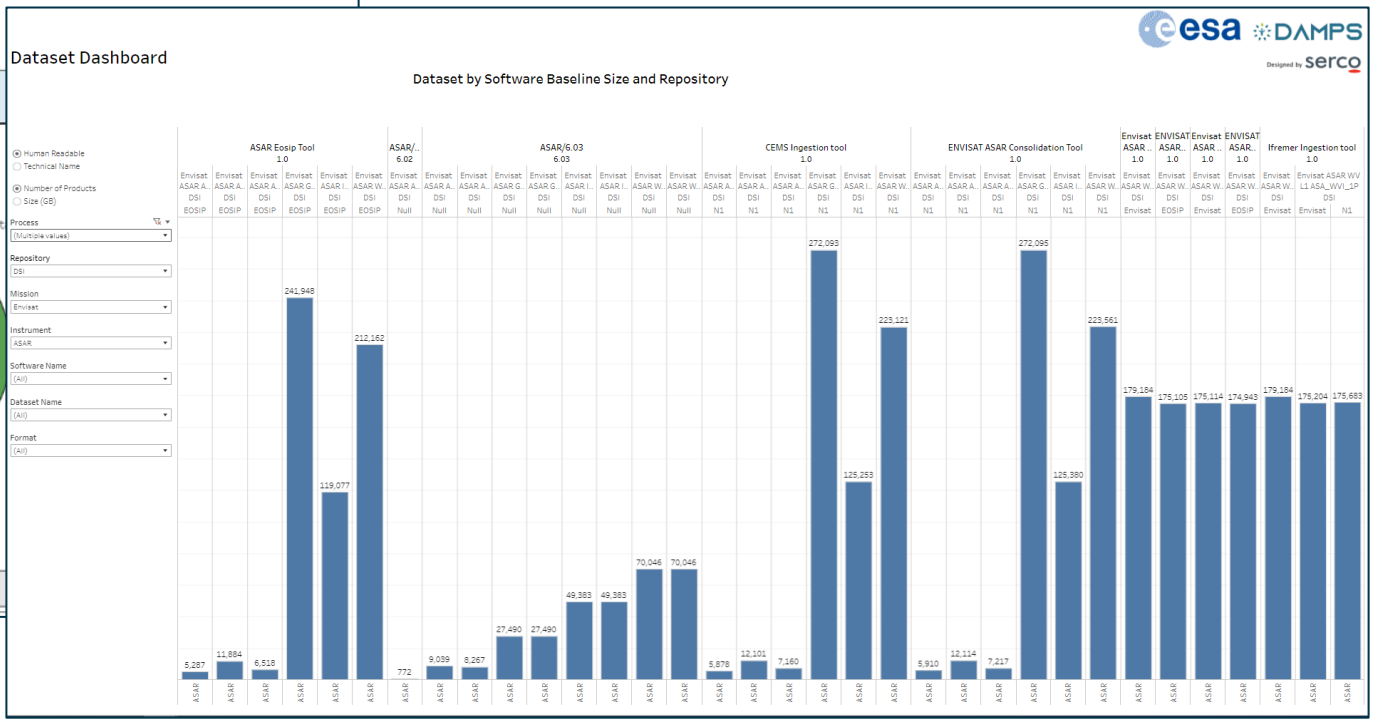
EO DIS Administration report example

EO DIS User Front-end – Decision Making examples

- The stakeholders include mostly Management, which DIS assists with decision-making, and Operations, which are supported by a detailed and accurate account of the location, status and cross-relationship of the data.

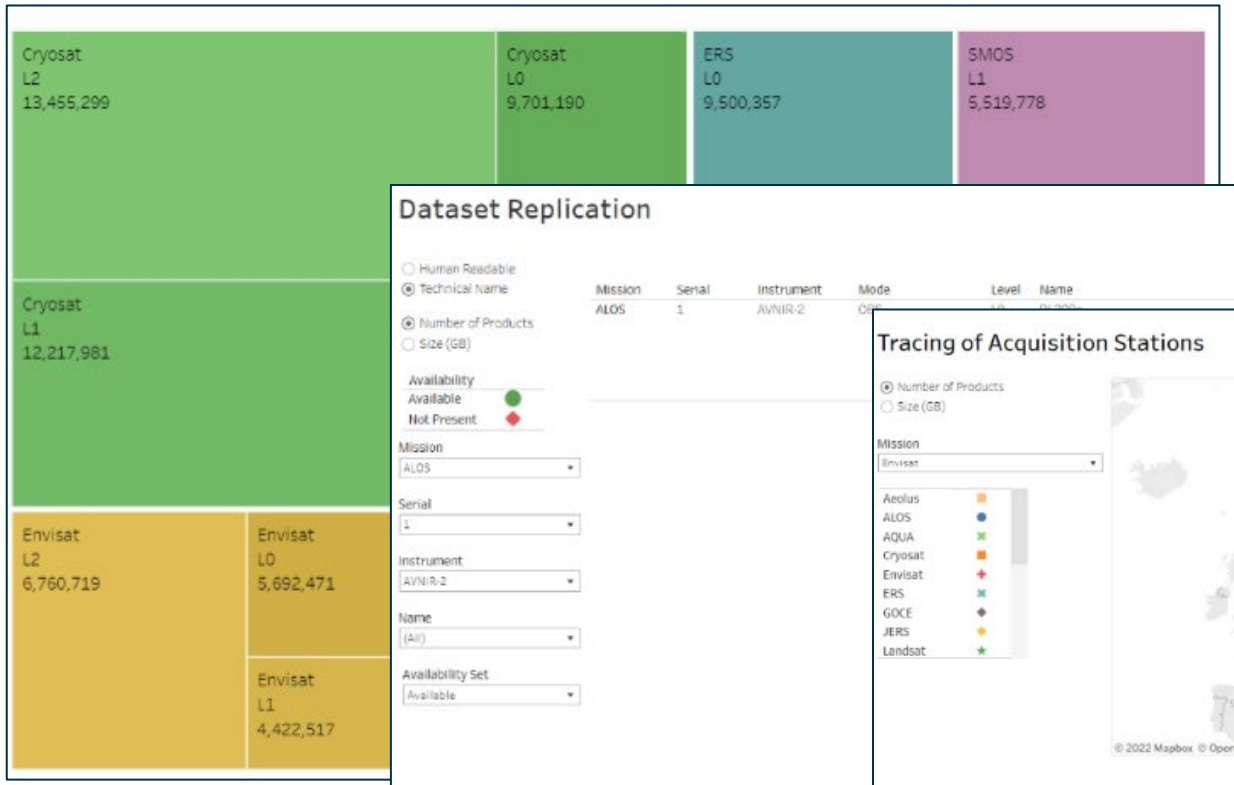


EO DIS Archiving policy

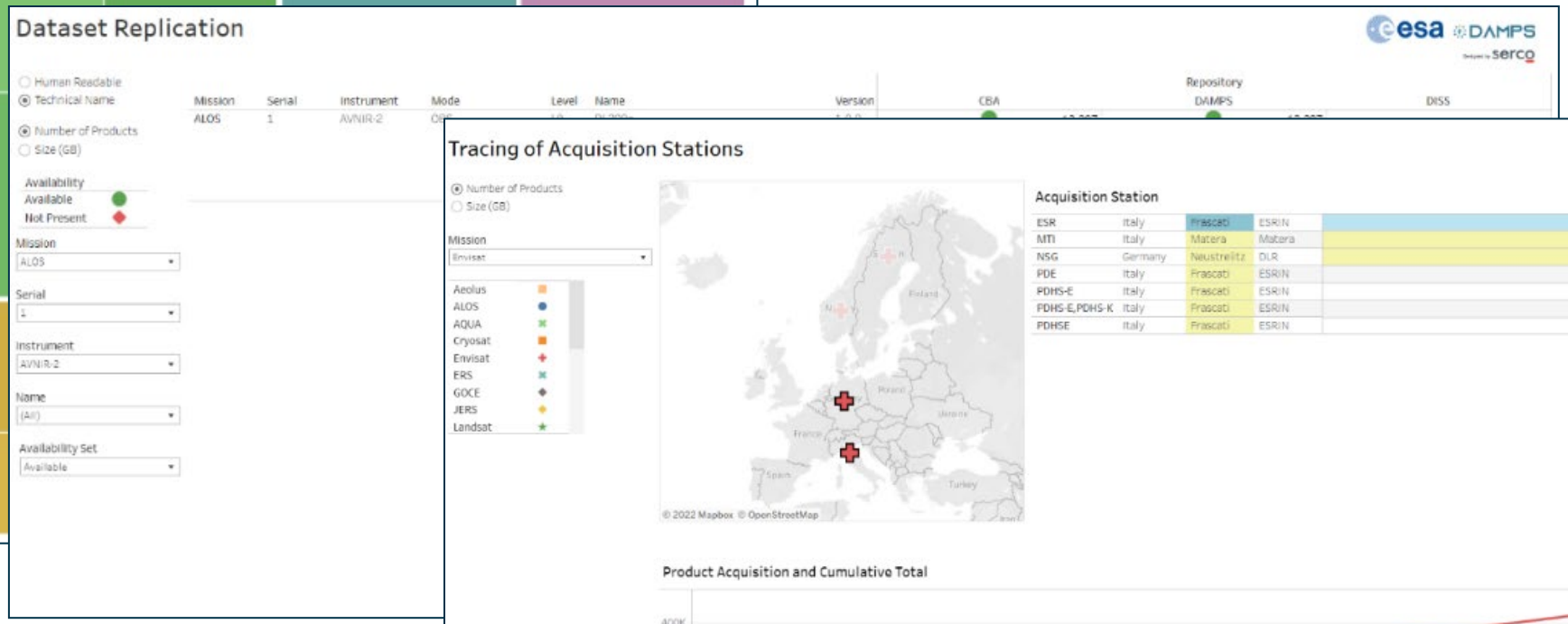


EO DIS Dataset Overview

EO DIS User Front-end – Data Tracking examples



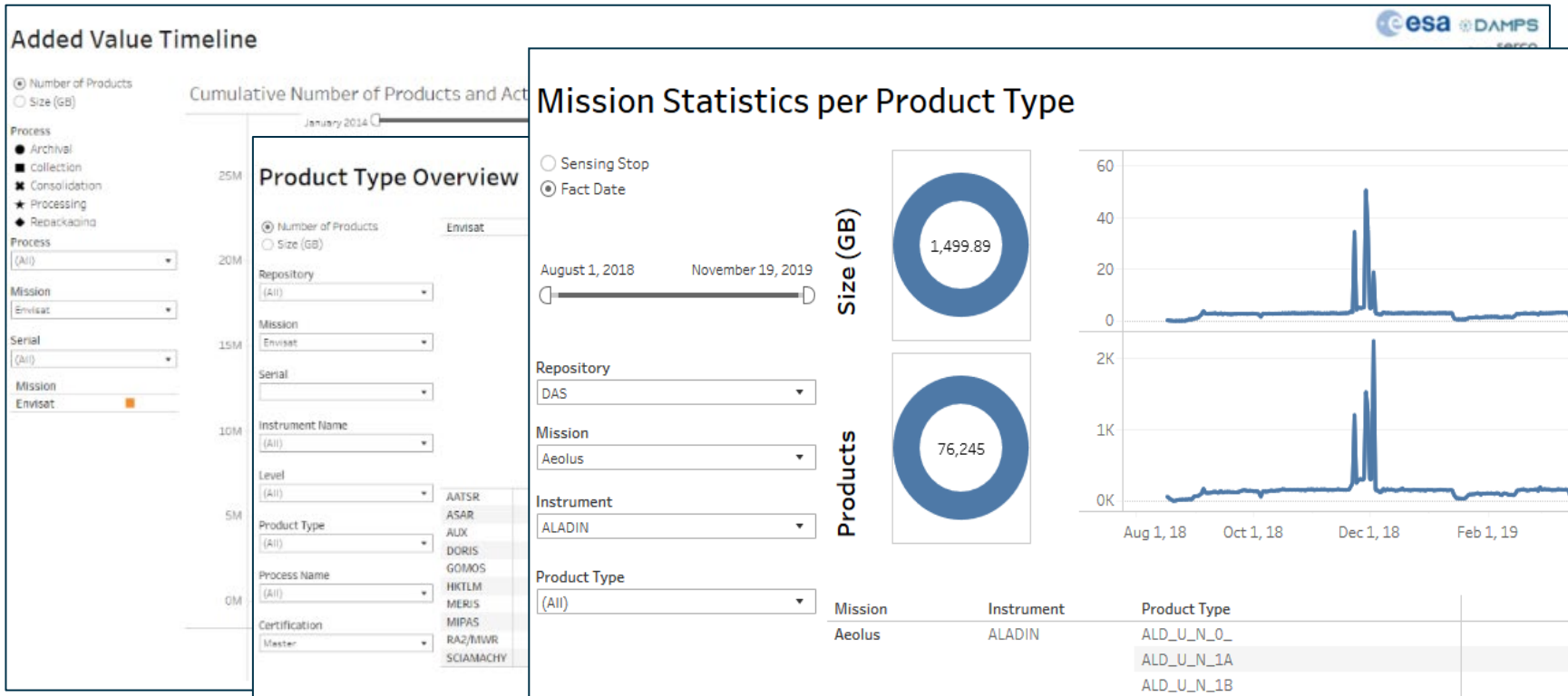
EO DIS Data Holding



EO DIS Dataset Replication

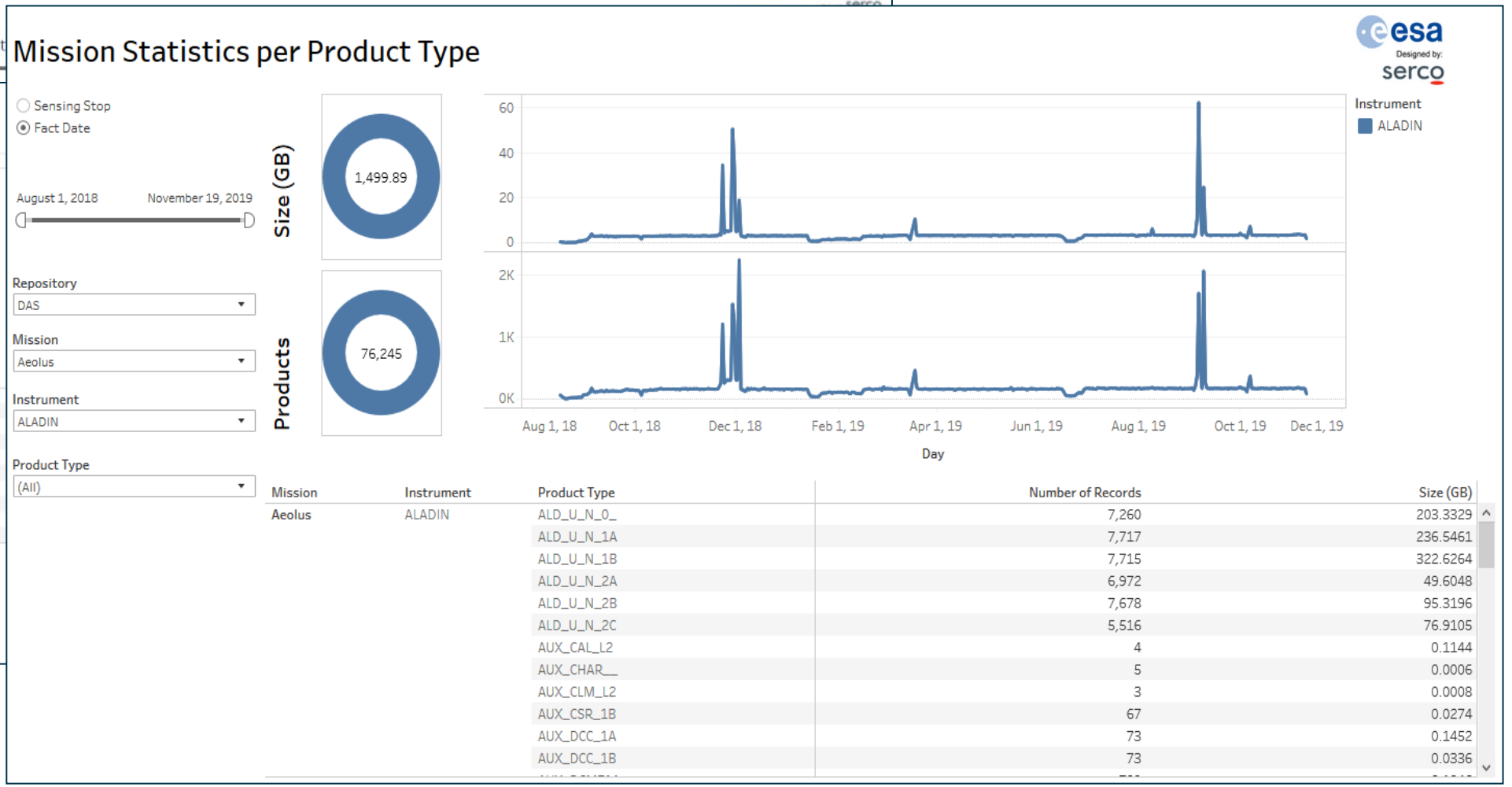
EO DIS Tracking of Acquisition Station

EO DIS User Front-end – Data Mining examples



EO DIS Added Value Timeline

EO DIS Product Type Overview

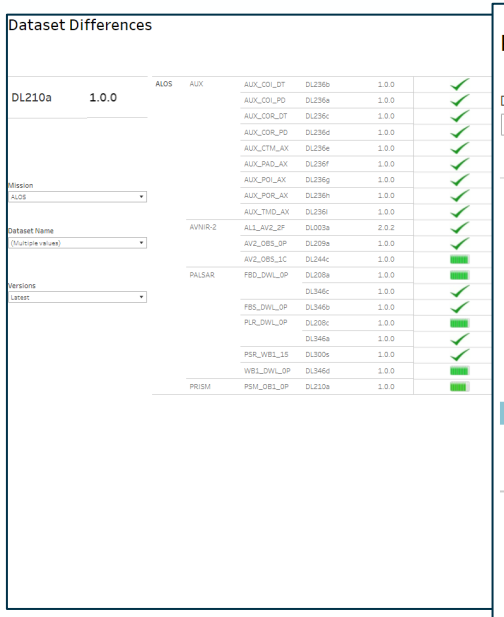


Mission	Instrument	Product Type	Number of Records	Size (GB)
Aeolus	ALADIN	ALD_U_N_0_	7,260	203.3329
		ALD_U_N_1A	7,717	236.5461
		ALD_U_N_1B	7,715	322.6264
		ALD_U_N_2A	6,972	49.6048
		ALD_U_N_2B	7,678	95.3196
		ALD_U_N_2C	5,516	76.9105
		AUX_CAL_L2	4	0.1144
		AUX_CHAR__	5	0.0006
		AUX_CLM_L2	3	0.0008
		AUX_CSR_1B	67	0.0274
		AUX_DCC_1A	73	0.1452
		AUX_DCC_1B	73	0.0336

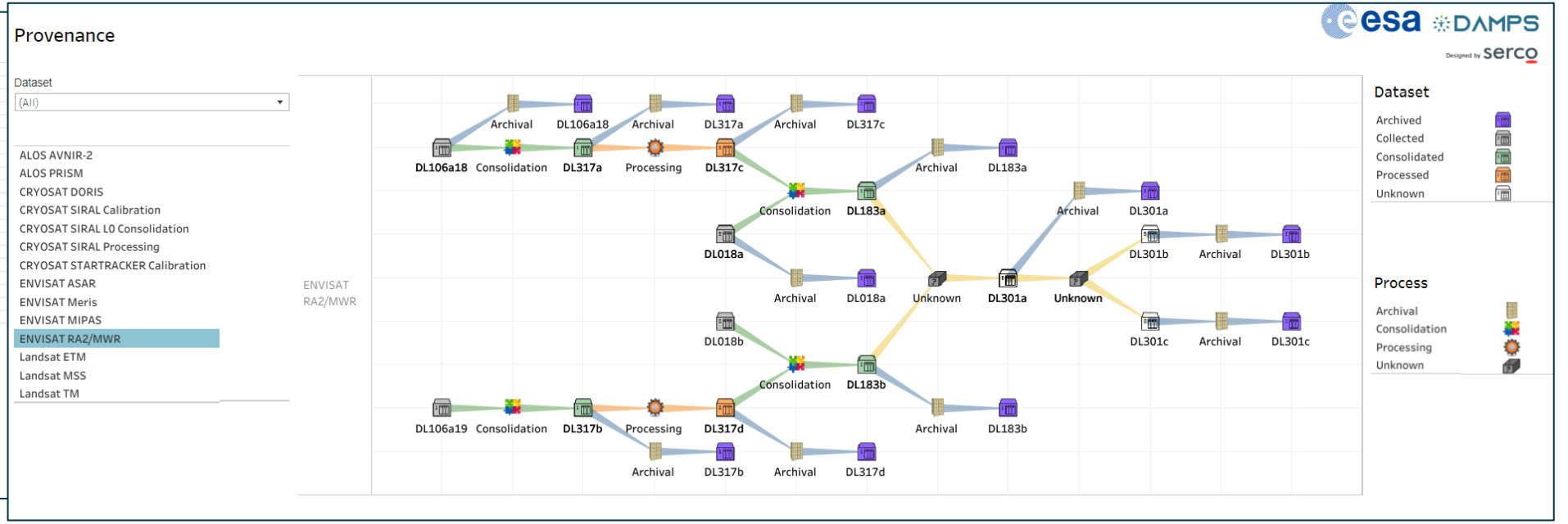
EO DIS Aeolus Mission Statistics per Product Type

EO DIS User Front-end – Preservation of information

- As the amount of data managed increases, the need to maintain knowledge of the data becomes more challenging. DIS is a helpful tool for retaining visibility and understanding of these EO data assets, as well as for comparing the contents of different archives to always ensure that datasets are fully identified and aligned, Detection of misalignments in archives trigger immediate resolution of such issues.



EO DIS Dataset Differences



EO DIS Provenance

Benefits / Conclusions

- The service provides a consolidated view of all data holdings throughout all federated systems
- Lending itself to providing a unique operational and management asset monitoring and control
- As the age of data increases and new data is generated from multiple sources the task of maintaining control of the data assets becomes more challenging
- The service provides a means to preserve the complete information of the product along its lifetime including all the references to the various preservation elements
- The service is fully scalable and can also be used for management and operational support as well as a pure asset management tool

Thanks