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Meeting ESA-FFG-Austrian Actors
ESRIN, 24th May 2016

ESA EO GS Operations Concept Evolution: Objectives

- Mission improvement
  - Improve the availability and facilitate the exploitation of data
  - Better serve a broader user community
  - Improve the overall missions operability, reliability and availability
- Reduce Costs
  - Sustainably reduce operating cost to meet budget constraints
  - Leverage technological evolution and continuous decrease of HW costs
- Increase efficiency
  - Standardise, streamline and simplify interfaces to support modular concepts
  - Develop advanced tools supporting functions/processes whenever necessary.
  - Use commercially available (European) products whenever possible
- Perpetuate and sustain
  - Ensure preservation and access of data and associated information in the long term

ESA EO GS Operations Concept Evolution: Core features of the target concept

- **One core EO GS Reference Operations Concept for all ESA and TPM missions**
- Modularity and flexibility: can be tailored as necessary to meet individual mission needs
- Compatible with historic (ERS/Envisat/TPMs), current (Sentinels, Earth Explorers, TPMs) and future EO missions
- Definition of the reference operations concept based on the following principles:
  - Limit HW procurement (e.g. rely on IAAS type services)
  - Streamline, simplify and standardize interfaces between functional blocks with a view of minimizing dependencies between those blocks and allow maximum flexibility for their implementation
  - Focus on long term data and associated information preservation, curation and access
- The CORE PDGS shall be one of the elements "fuelling" the future network of Earth Observation Community Platforms

Data Generation Element 1/2

Systematic Generation

Data Acquisition
(or procurement, and including mission planning)

Data processing
(including partial reprocessing)

Data Quality Control
(for data conformance)

Data Generation Element 2/2

Data Reprocessing

Data consolidation

Data Reprocessing

Data Quality Control
(for data conformance)

Systematic Generation

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Data Preservation Element

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Data Reprocessing
Data Quality Control
(for data conformance)

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Datasets Preservation

Data Master Archive
(all preserved datasets)

Cold back-up
(including partial reprocessing)

Master inventory
All Data Holdings

EO Dataset Management
All Data related information

Data Access Element

Data access

As-is dissemination
(all products processed systematically)

On-the-fly processing
(cache with all required input, e.g lvl0, aux…)

Virtual Research environment
(hosted processing)

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User Services Element

User services

User Management
(registration, authentication, authorization…)

Information services
(Guide & Directory, web pages…)

Data Discovery
(Catalogue of data products offering)

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Data improvement

CAL/VAL
(Calibration files, product validation)

Algorithm improvement
(new prototypes and IPF)

LTPA
(QC and trends analysis)

(all preserved datasets)

Cold back-up
(including partial reprocessing)

Master inventory
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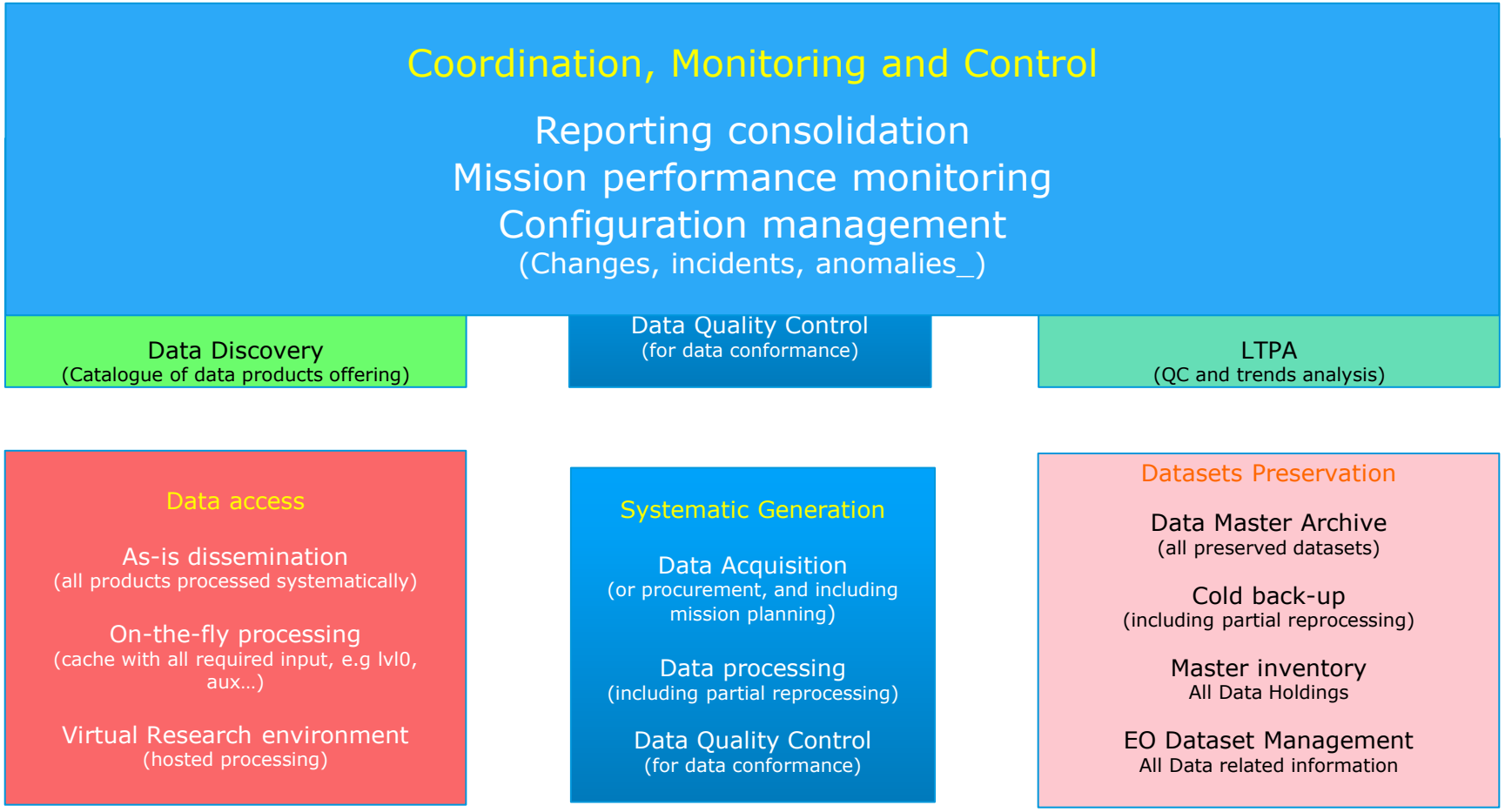
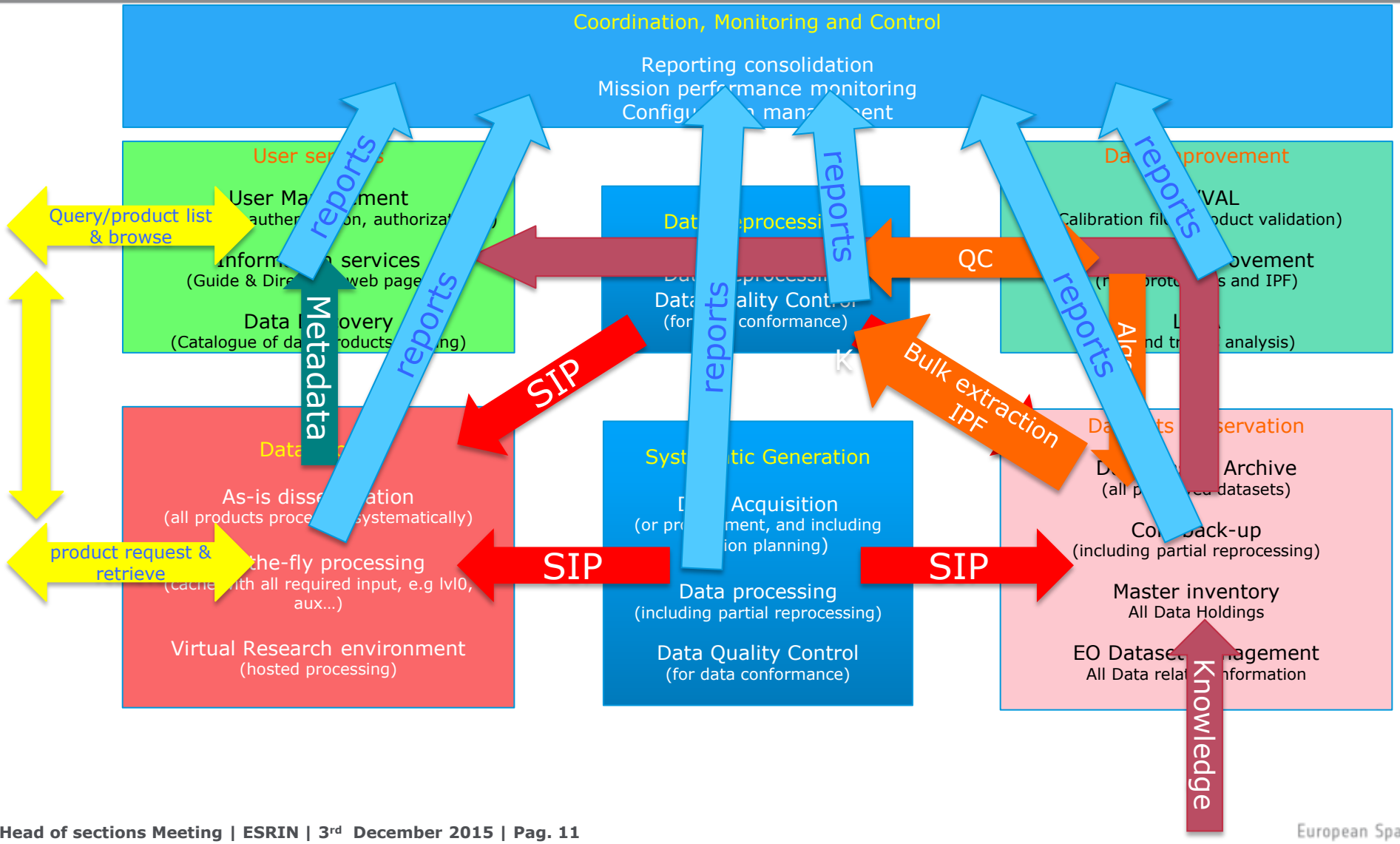
Coordination Element



Main interfaces



Operations model

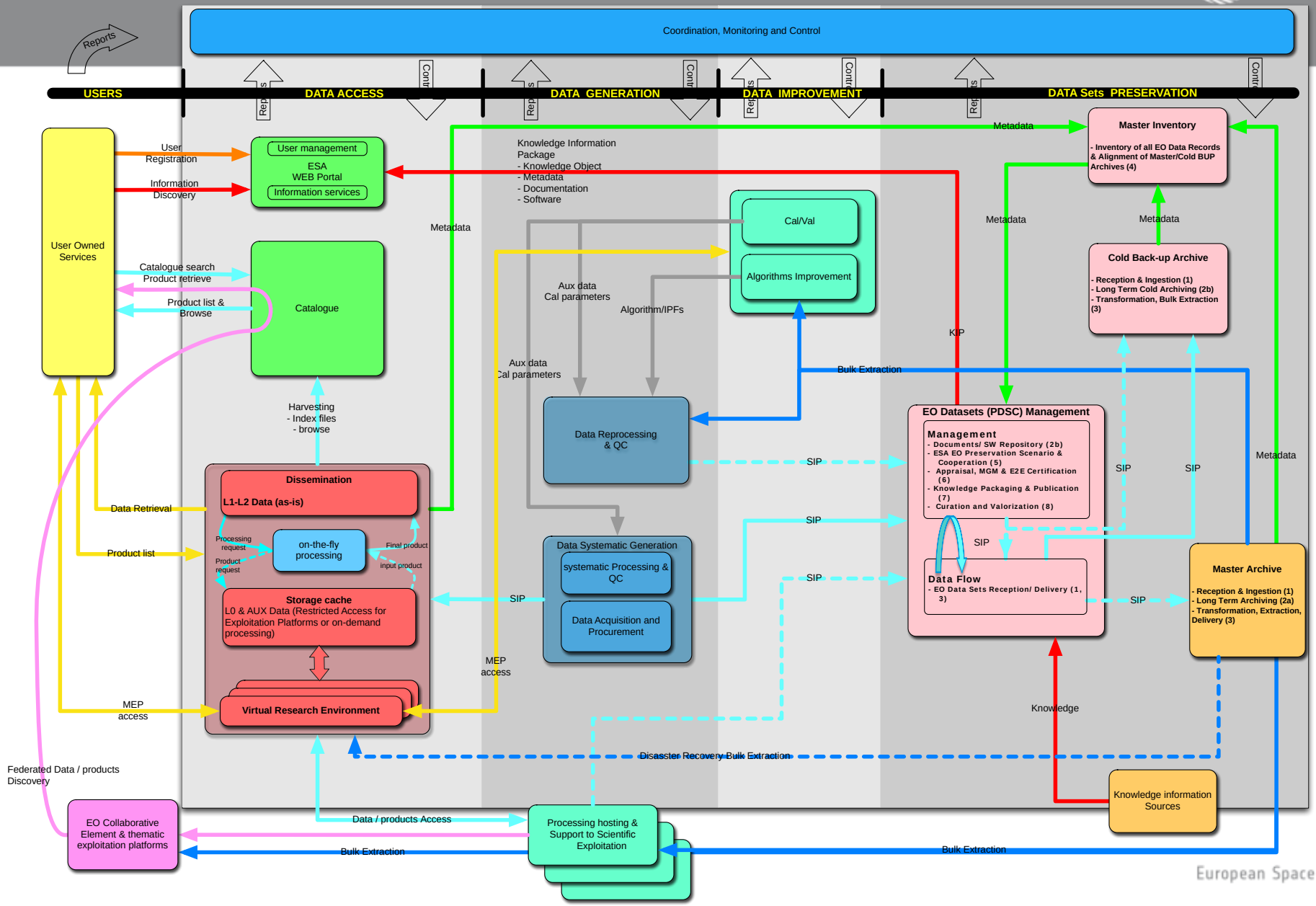
- ITIL theoretical model
- EOP Reference model (compatible with QMS)
- Mapping of each mission on the EOP Reference model
- Roadmap for
  - Convergence to the EOP Reference model (standard)
  - Homogeneity between missions (efficiency)
  - Quick wins and long term objectives

Procurement Terminology

- Operations contract: classical contract for an operational facility (e.g. PACs or Stations) where ESA is deploying own HW and SW in the facility and places a contract with the facility owner to operate these systems

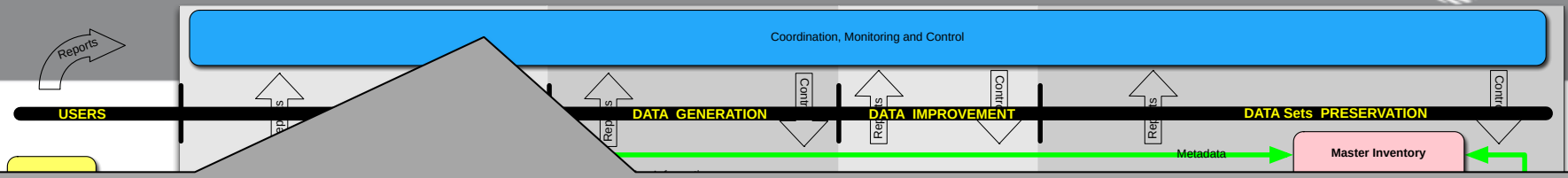
- Service Contracts: contract where the Contractor executes ESA-defined processes for the activities in scope under agreed levels of quality and performance (Service Level Agreement). While ESA is defining and enforcing the appropriate technical requirements, e.g., on equipment compatibility, interfaces, performance, security and reliability, it is the Prime Contractor's responsibility to propose and manage a Consortium and to deploy the necessary means, including adequate infrastructure and competences, to provide the abovementioned services (i.e. ESA will refrain to impose or provide any technological platform or CFIs).

PDGS Operations concept Functional Elements



Spare slides

PDGS Operations concept Functional Elements



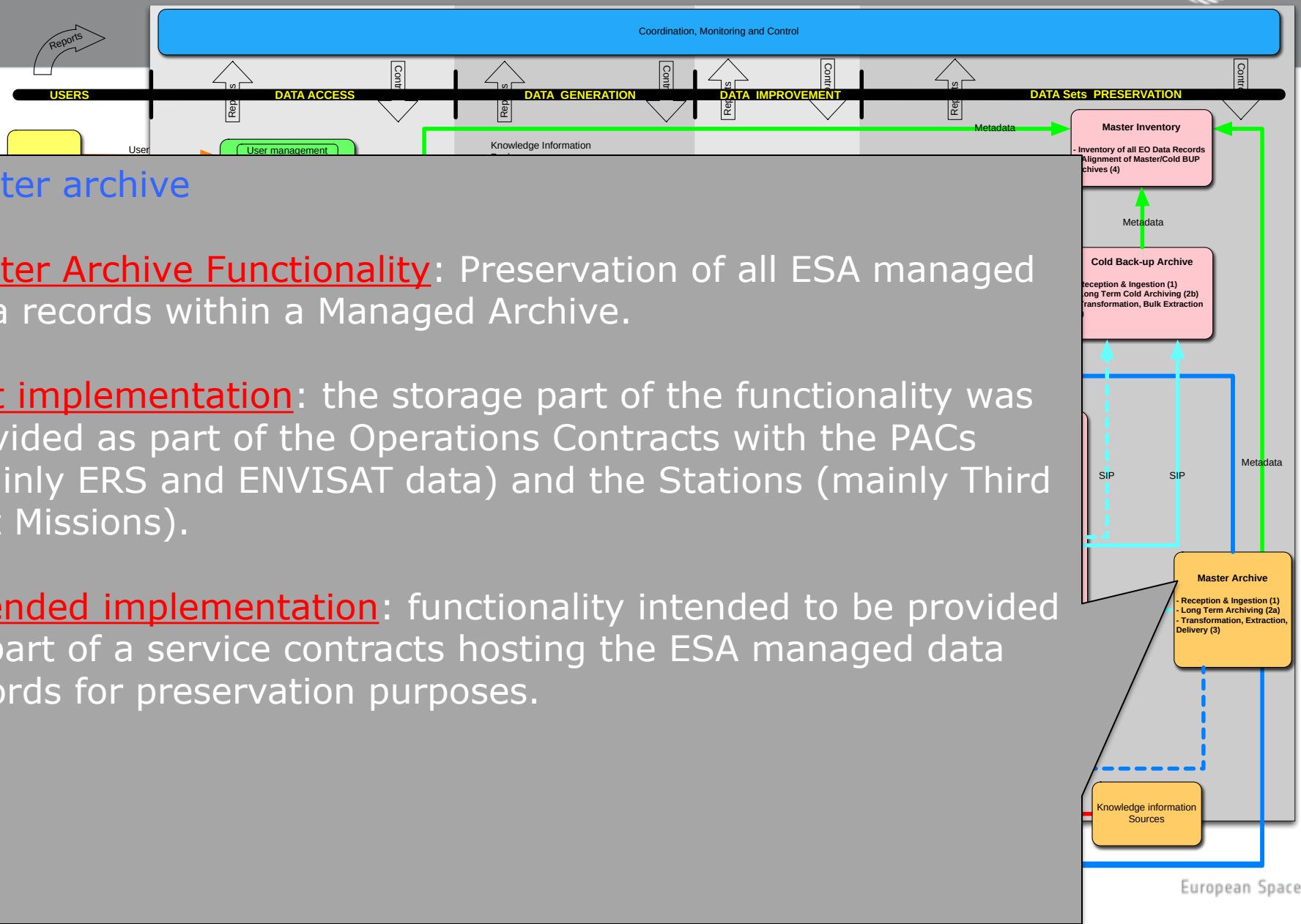
Coordination, Monitoring and Control

Functionality: Configuration Control, Change Management, Problem and Non-conformance Management, Actions Management.

Past implementation: most of the functionality of the Configuration Control Database was delegated to each separate operations contract. Effective end-to-end configuration control was difficult.

Intended implementation: Implementation of an end-to-end Configuration Control Service procured from Industry, and covering all core ground segment activities.

PDGS Operations concept Functional Elements



Master archive

Master Archive Functionality: Preservation of all ESA managed data records within a Managed Archive.

Past implementation: the storage part of the functionality was provided as part of the Operations Contracts with the PACs (mainly ERS and ENVISAT data) and the Stations (mainly Third Part Missions).

Intended implementation: functionality intended to be provided as part of a service contracts hosting the ESA managed data records for preservation purposes.

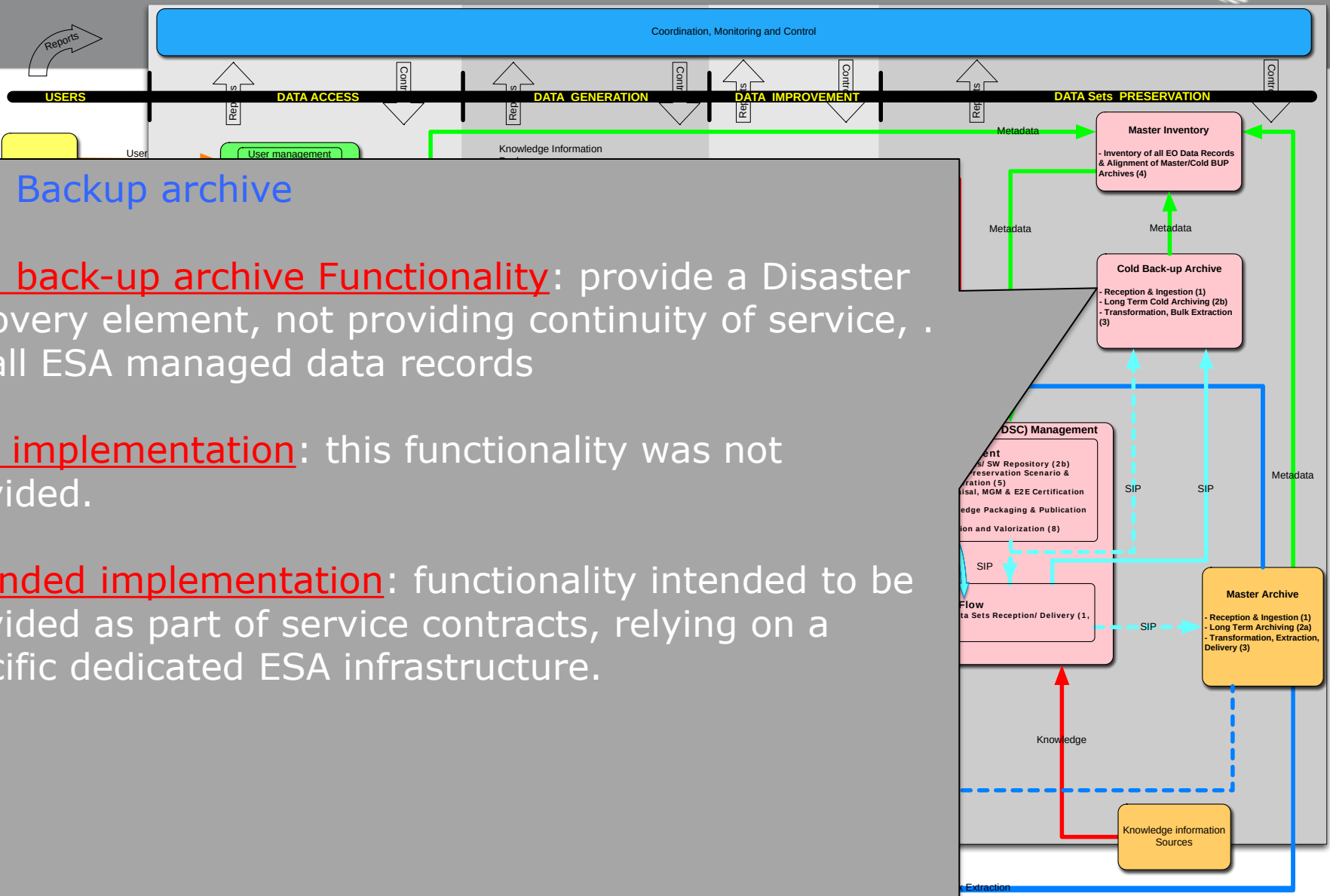
PDGS Operations concept Functional Elements

Cold Backup archive

Cold back-up archive Functionality: provide a Disaster Recovery element, not providing continuity of service, . for all ESA managed data records

Past implementation: this functionality was not provided.

Intended implementation: functionality intended to be provided as part of service contracts, relying on a specific dedicated ESA infrastructure.



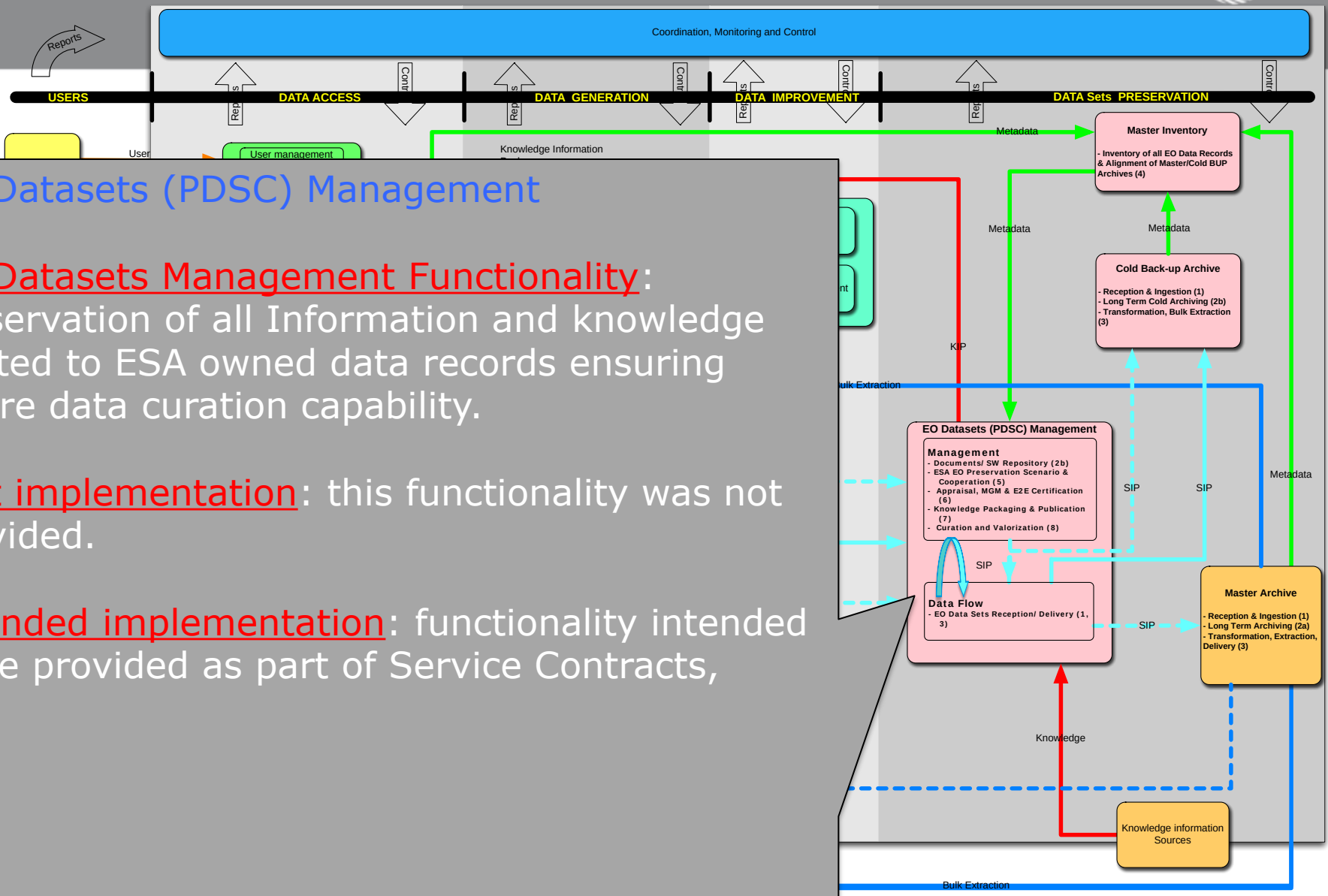
PDGS Operations concept Functional Elements

EO Datasets (PDSC) Management

EO Datasets Management Functionality: Preservation of all Information and knowledge related to ESA owned data records ensuring future data curation capability.

Past implementation: this functionality was not provided.

Intended implementation: functionality intended to be provided as part of Service Contracts,



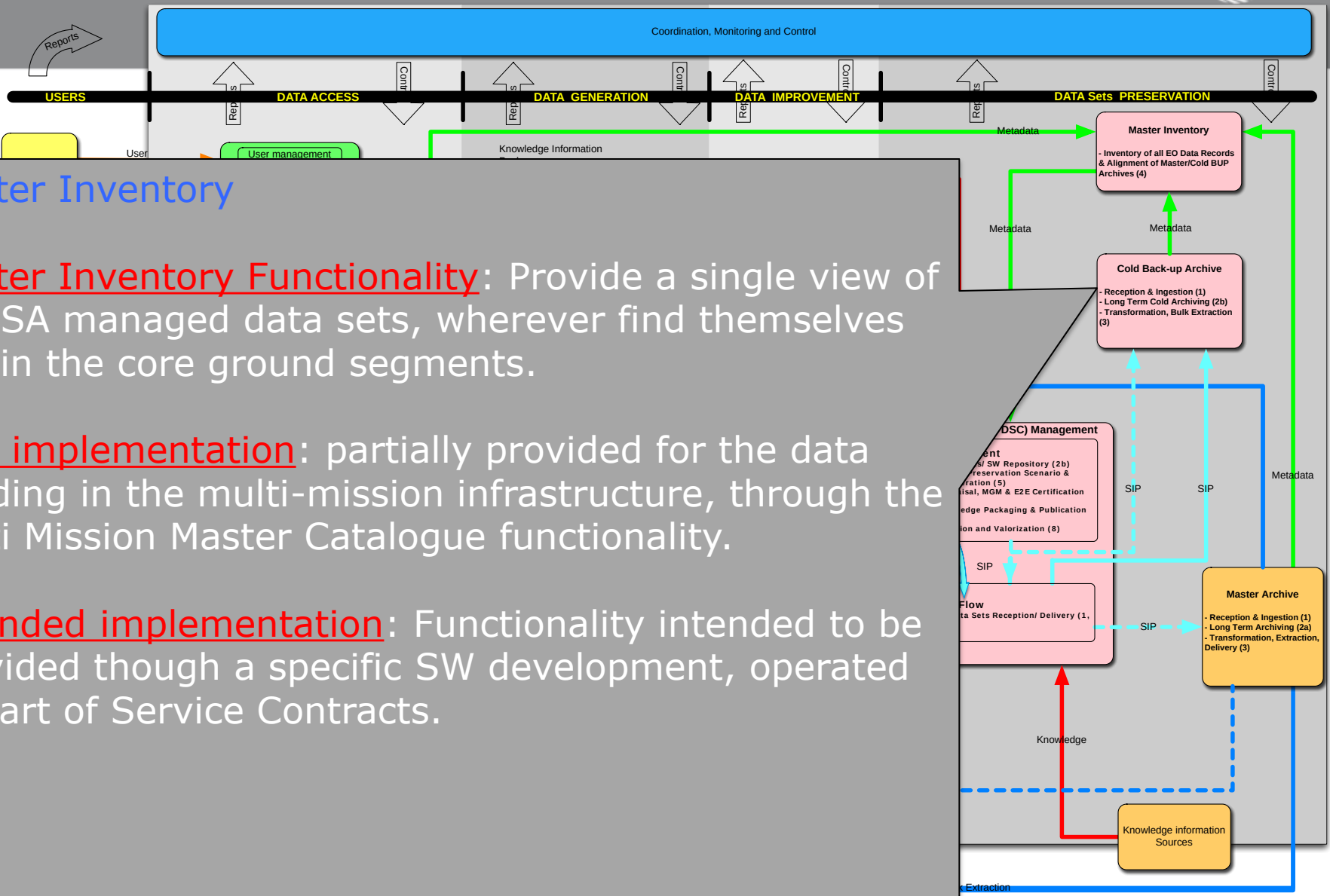
PDGS Operations concept Functional Elements

Master Inventory

Master Inventory Functionality: Provide a single view of all ESA managed data sets, wherever find themselves within the core ground segments.

Past implementation: partially provided for the data residing in the multi-mission infrastructure, through the Multi Mission Master Catalogue functionality.

Intended implementation: Functionality intended to be provided though a specific SW development, operated as part of Service Contracts.



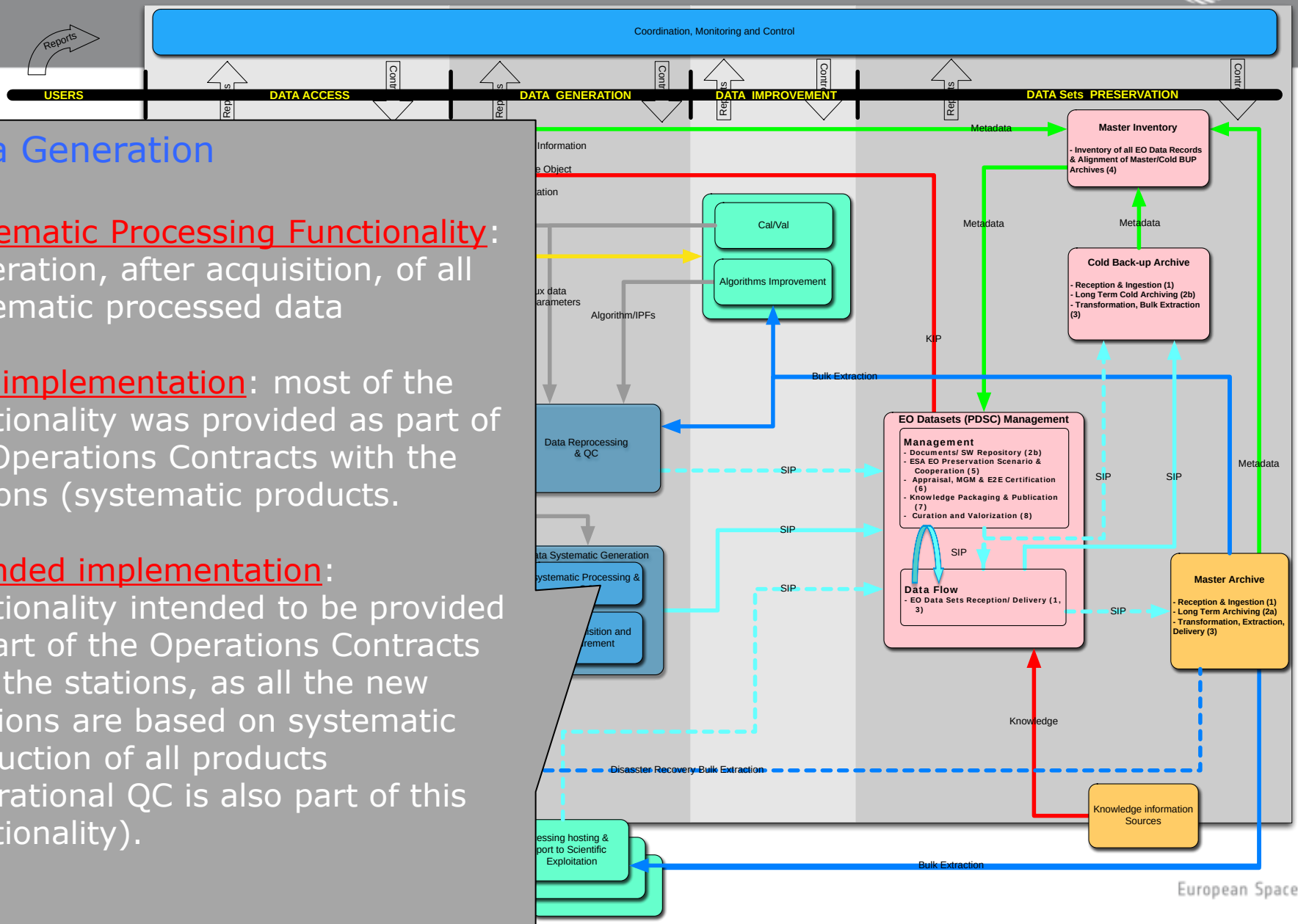
PDGS Operations concept Functional Elements

Data Generation

Systematic Processing Functionality: Generation, after acquisition, of all systematic processed data

Past implementation: most of the functionality was provided as part of the Operations Contracts with the stations (systematic products.

Intended implementation: functionality intended to be provided as part of the Operations Contracts with the stations, as all the new missions are based on systematic production of all products (operational QC is also part of this functionality).



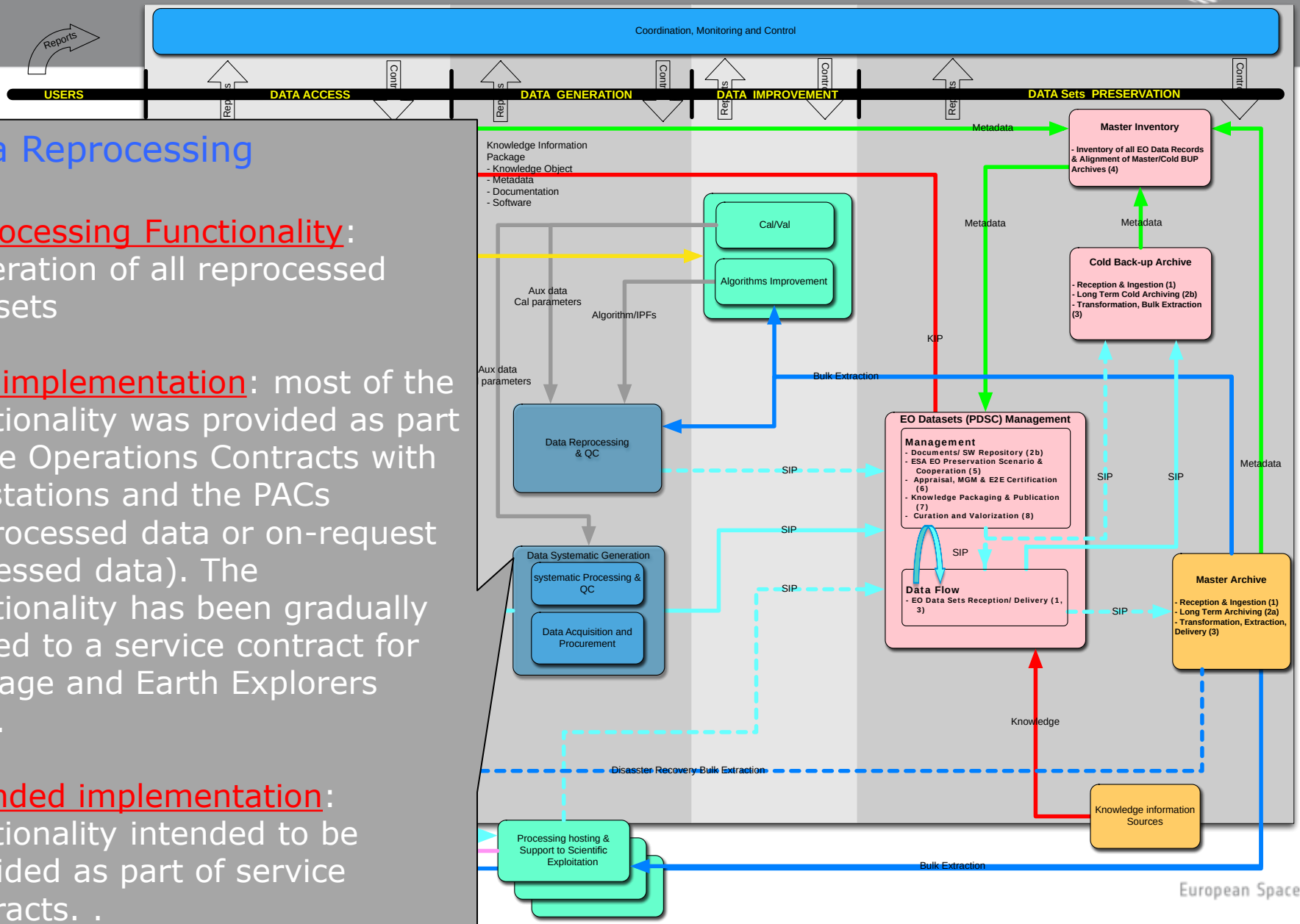
PDGS Operations concept Functional Elements

Data Reprocessing

Reprocessing Functionality: Generation of all reprocessed datasets

Past implementation: most of the functionality was provided as part of the Operations Contracts with the stations and the PACs (reprocessed data or on-request processed data). The functionality has been gradually moved to a service contract for heritage and Earth Explorers data.

Intended implementation: functionality intended to be provided as part of service contracts. .



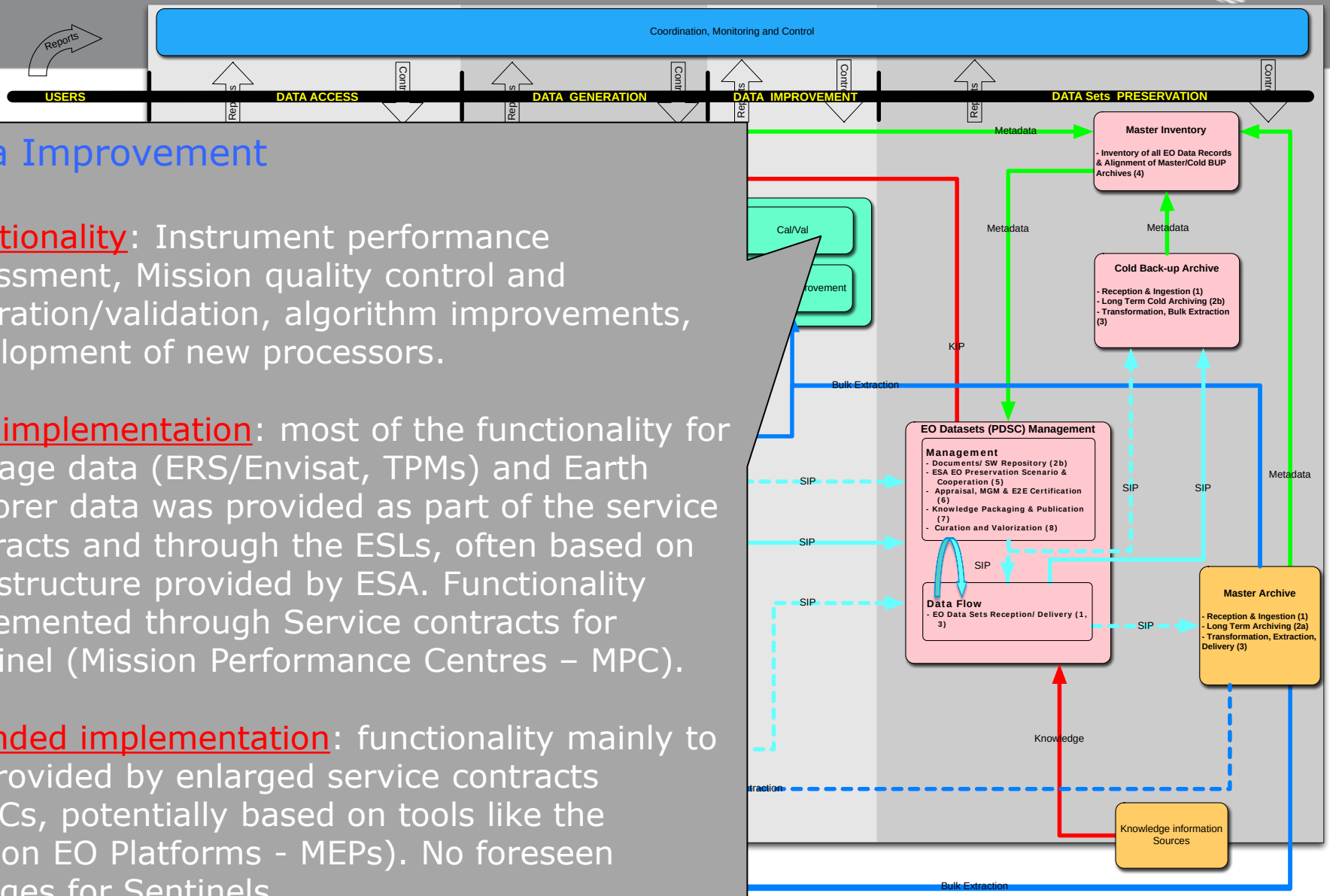
PDGS Operations concept Functional Elements

Data Improvement

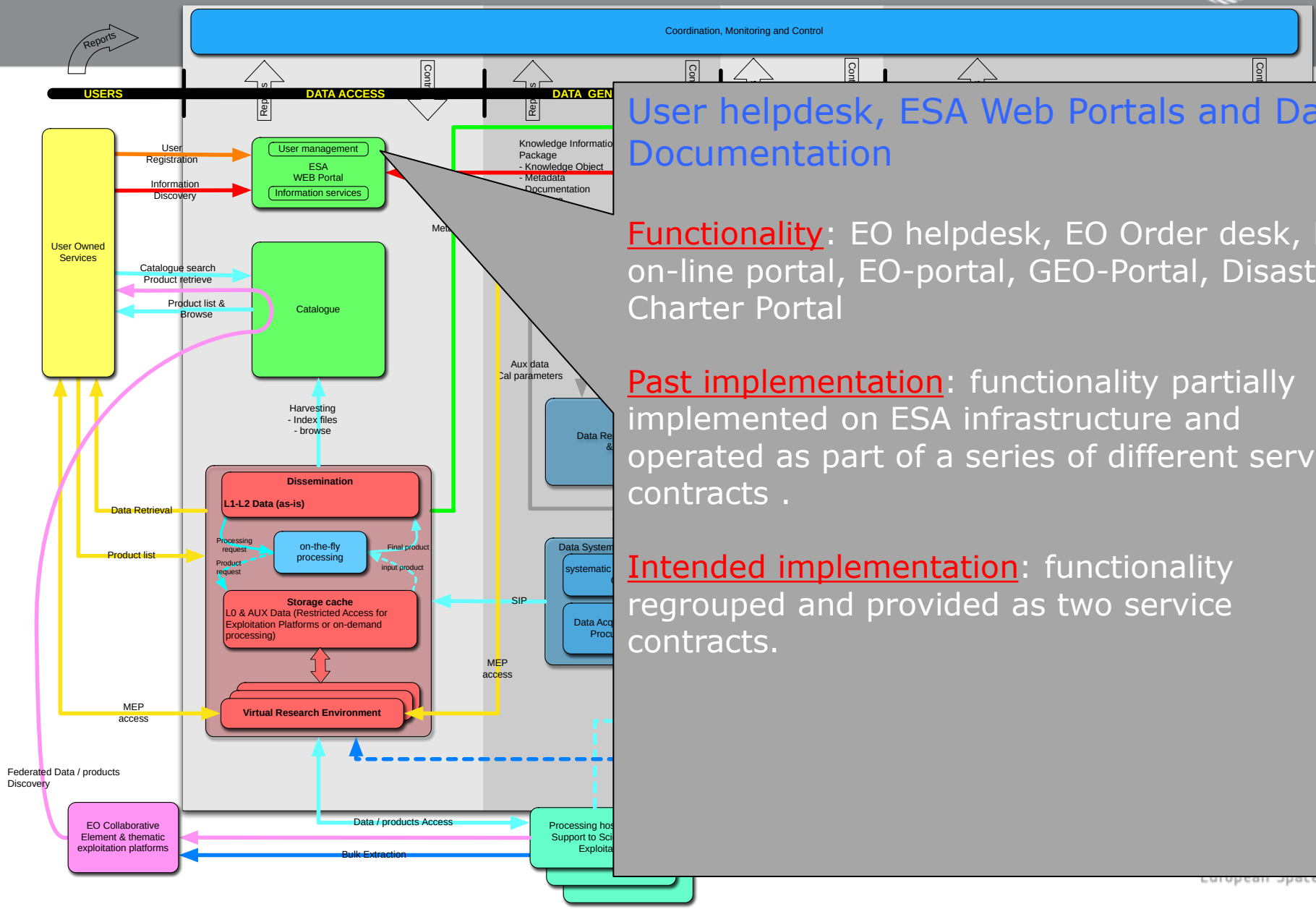
Functionality: Instrument performance assessment, Mission quality control and calibration/validation, algorithm improvements, development of new processors.

Past implementation: most of the functionality for heritage data (ERS/Envisat, TPMs) and Earth Explorer data was provided as part of the service contracts and through the ESLs, often based on infrastructure provided by ESA. Functionality implemented through Service contracts for Sentinel (Mission Performance Centres – MPC).

Intended implementation: functionality mainly to be provided by enlarged service contracts (DISCs, potentially based on tools like the Mission EO Platforms - MEPs). No foreseen changes for Sentinels.



PDGS Operations concept Functional Elements



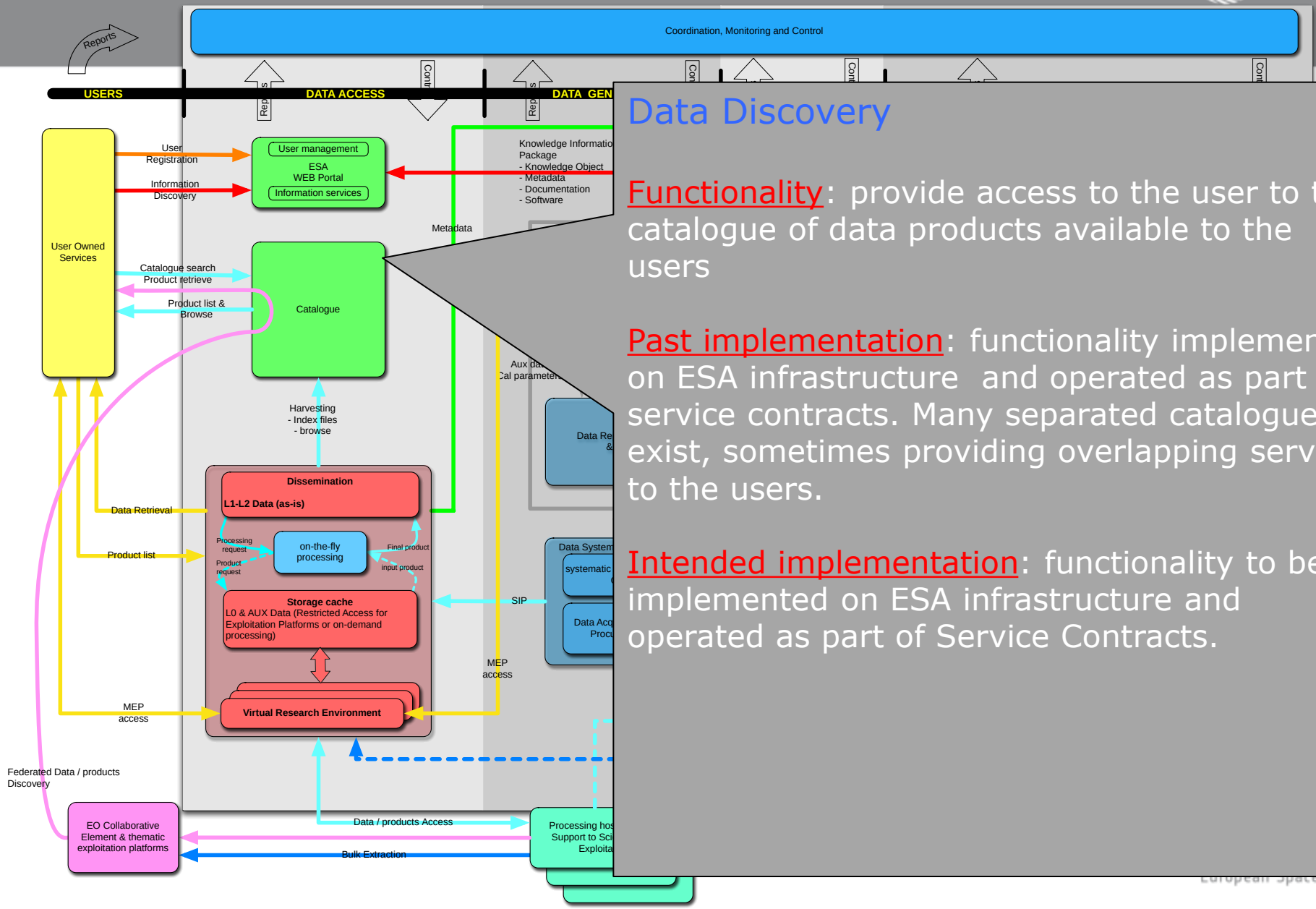
User helpdesk, ESA Web Portals and Data Documentation

Functionality: EO helpdesk, EO Order desk, EO on-line portal, EO-portal, GEO-Portal, Disaster Charter Portal

Past implementation: functionality partially implemented on ESA infrastructure and operated as part of a series of different service contracts .

Intended implementation: functionality regrouped and provided as two service contracts.

PDGS Operations concept Functional Elements



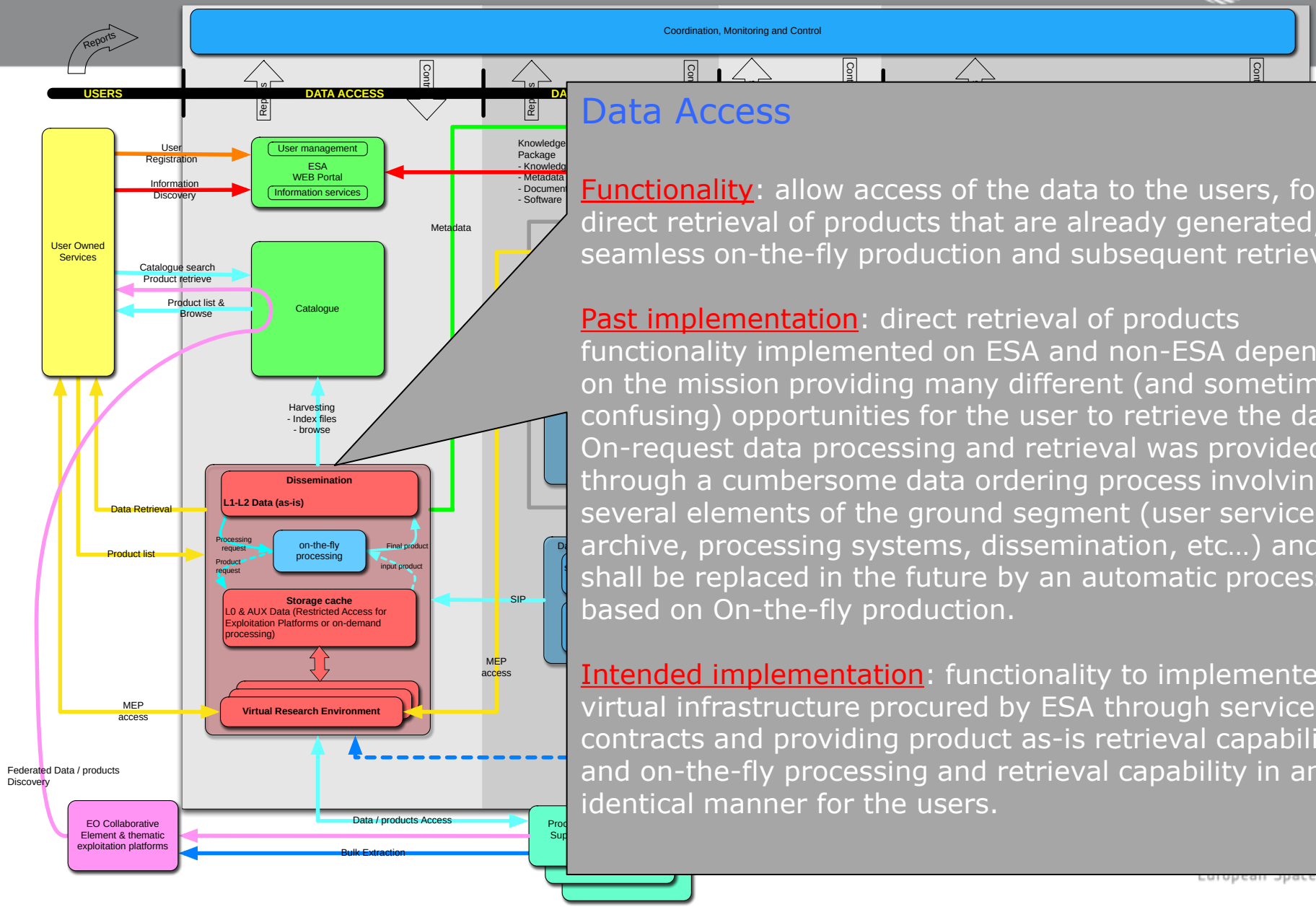
Data Discovery

Functionality: provide access to the user to the catalogue of data products available to the users

Past implementation: functionality implemented on ESA infrastructure and operated as part of service contracts. Many separated catalogues exist, sometimes providing overlapping services to the users.

Intended implementation: functionality to be implemented on ESA infrastructure and operated as part of Service Contracts.

PDGS Operations concept Functional Elements



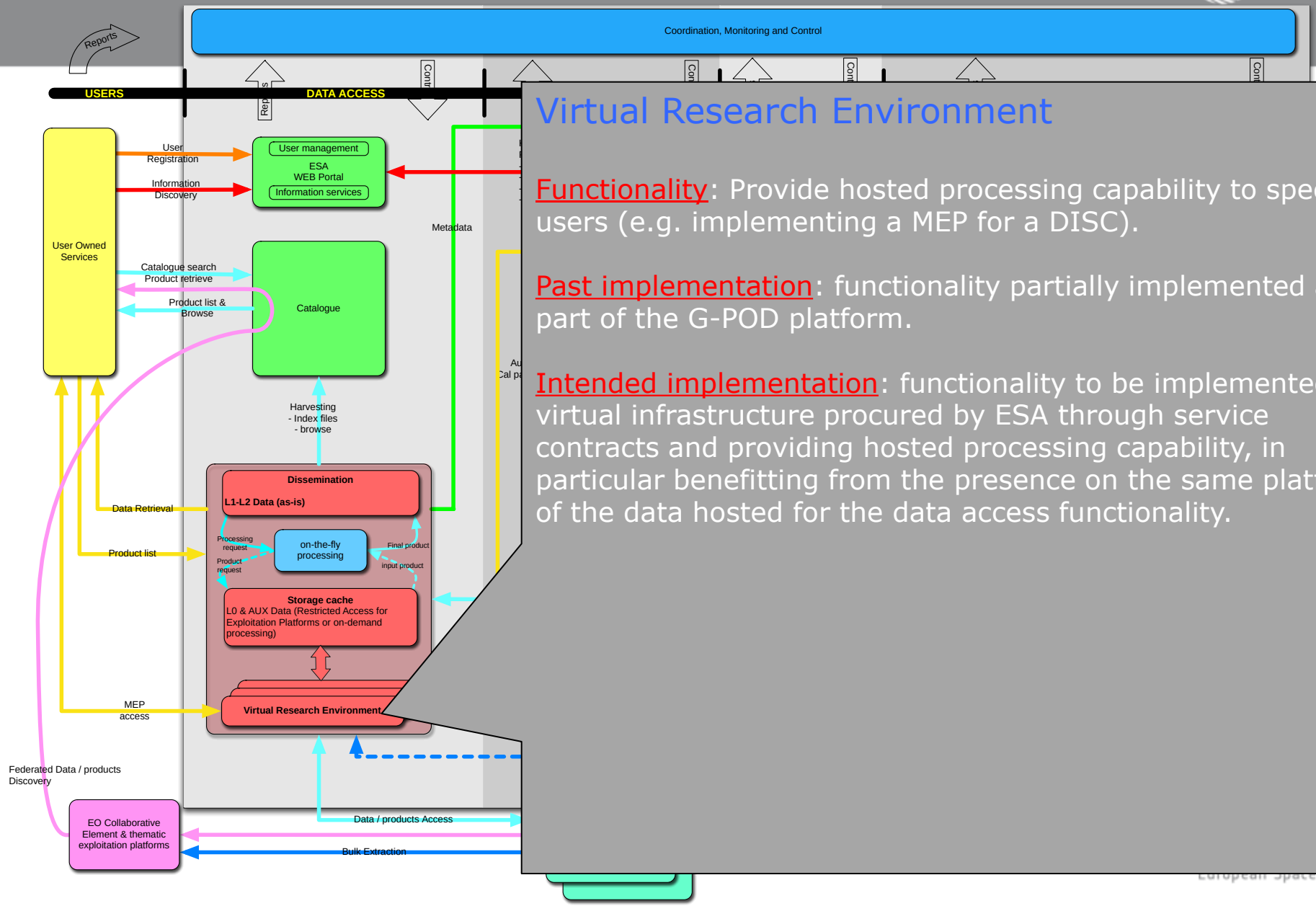
Data Access

Functionality: allow access of the data to the users, for direct retrieval of products that are already generated, or seamless on-the-fly production and subsequent retrieval.

Past implementation: direct retrieval of products functionality implemented on ESA and non-ESA depending on the mission providing many different (and sometimes confusing) opportunities for the user to retrieve the data. On-request data processing and retrieval was provided through a cumbersome data ordering process involving several elements of the ground segment (user services, archive, processing systems, dissemination, etc…) and shall be replaced in the future by an automatic process based on On-the-fly production.

Intended implementation: functionality to implemented on virtual infrastructure procured by ESA through service contracts and providing product as-is retrieval capability, and on-the-fly processing and retrieval capability in an identical manner for the users.

PDGS Operations concept Functional Elements



Virtual Research Environment

Functionality: Provide hosted processing capability to specific users (e.g. implementing a MEP for a DISC).

Past implementation: functionality partially implemented as part of the G-POD platform.

Intended implementation: functionality to be implemented on virtual infrastructure procured by ESA through service contracts and providing hosted processing capability, in particular benefitting from the presence on the same platform of the data hosted for the data access functionality.

Thank you very much for your attention