The Domino-E Webinar Series: Unlocking the Future of Earth Observation

**Webinar Session 3: The Domino Ecosystem
Business Opportunities for SME's**

31.03.2025, 10:30 - 12:00 CET

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At a Glance

The Domino-E project

- Aims to revolutionize satellite operations through open architecture and advanced technologies

- A collaborative project bringing together 7 partners from 5 countries

- Funded under Horizon Europe, the EU's key funding program for research and innovation

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At a Glance

The Domino-E Webinar Series
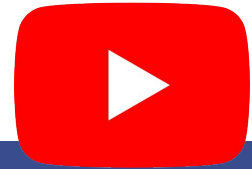
SESSION #1: THE DOMINO ARCHITECTURE - A NEW ERA OF EARTH OBSERVATION

Schedule

10:30 - 10:45	Onboarding and Welcome
10:45 - 11:00	History and State-of-the-art for EO mission management by J. Vinuesa (ADS)
11:00 - 11:15	Introduction to the Domino Vision by J. Vinuesa (ADS)
11:15 - 11:55	Federated Earth Observation Architecture; Interview and Q&A with D. Novak (ADS)
11:55 - 12:00	Announcement Webinar #2; Closing

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Date & Time: 19.03.2025; 10:30 – 12:00 CET

SESSION #2: DEVELOPING WITHIN DOMINO - EXAMPLES FROM DOMINO-E

Schedule

10:30 - 10:40	Onboarding and Welcome
10:40 - 10:50	What is a Domino? by M. Anranter/ T. Stollenwerk (Oikoplus)
10:50 - 11:10	Domino #1: Satellite Communication and Resource Management by P.Pavero (ADS) and J. Rezler (iTTi)
11:10 - 11:30	Domino #2: Coverage Service by M. Devant (Capgemini), C. Prálet (ONERA, tbc), Cyrille de Lussy (ADS, tbc)
11:30 - 11:50	Domino #3: Virtual Assistant by R. Skadins (Tilde)
11:50 - 12:00	Announcement Webinar #3; Closing

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Date & Time: 25.03.2025; 10:30 – 12:00 CET

SESSION #3: THE DOMINO ECOSYSTEM: BUSINESS OPPORTUNITIES FOR SME'S
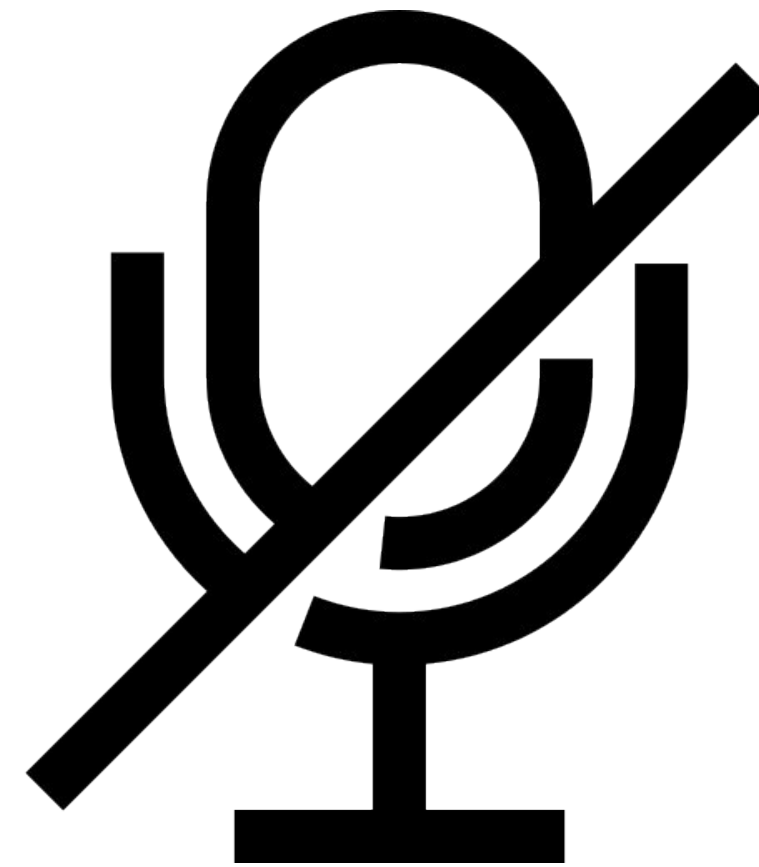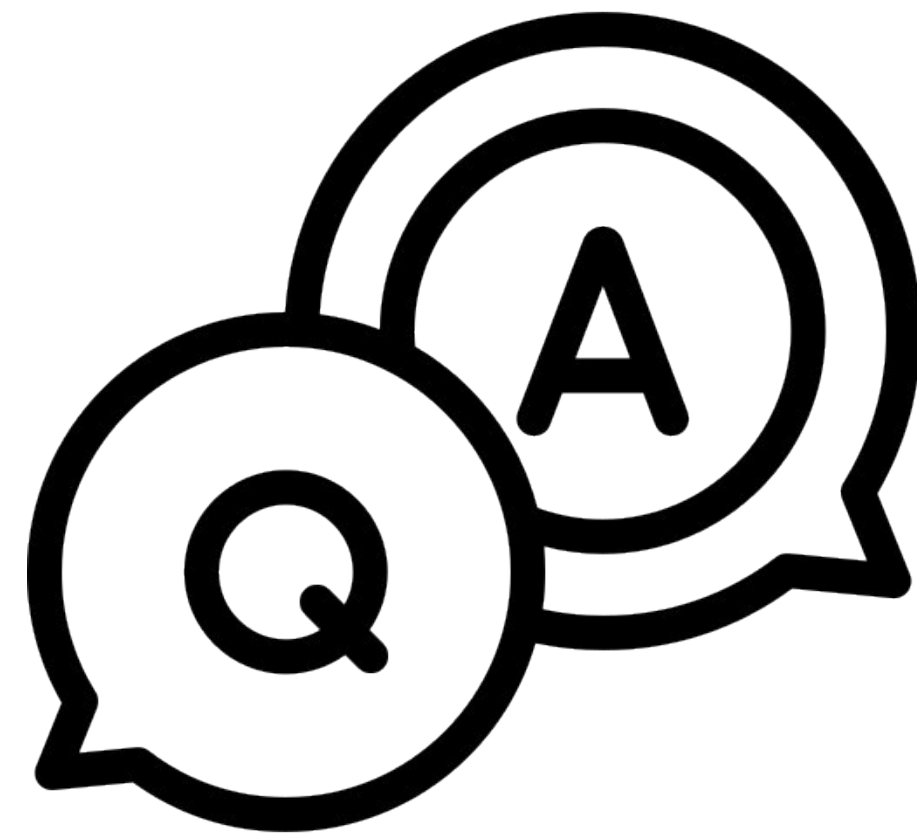
Schedule

10:30 - 10:40	Onboarding and Welcome
10:40 - 11:00	Business models and opportunities in the EO market by A. Atencyia-Yepez (GMV)
11:00 - 11:40	Roundtable discussion: Where is European EO heading? With: S. Derrien (Capgemini), D. Novak (ADS), G. Taberski (iTTi)
11:40 - 11:50	In a nutshell: Joining the Domino Ecosystem by J. Vinuesa (ADS)
11:50 - 12:00	On-demand materials & webinar closing

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Date & Time: 31.03.2025; 10:30 – 12:00 CET

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Housekeeping Rules

Interaction & Recording

Introduction

What is to come?

Business models for Domino development

Domino architecture

SME's

EO ground segments

DOMINO vision

Domino-E whitepaper

Domino-E Ressources

Business opportunities Domino-E

Future of satellite-based Earth Observation

SESSION #3: THE DOMINO ECOSYSTEM: BUSINESS OPPORTUNITIES FOR SME'S

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Business Models and Opportunities in the Earth Observation Market

Amaya Atenciy-Yepez (GMV)

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DOMINO-E supporting market needs

DOMINO-E aligns with the evolving trends in the EO and small satellite sector, ensuring that its multi-mission federation layer remains relevant and valuable to both institutional and commercial users.

Increased Operational Needs:
> DOMINO-E aligns with this need by enabling multi-mission coordination, ensuring timely image acquisition and delivery

Demand for Cost-Effective and Scalable EO Solutions:
> DOMINO-E's multi-mission federation layer addresses this by offering seamless integration and optimization across multiple EO assets.

Shift from Raw Data to High-Level Data-Driven Services:
> DOMINO-E's focus on automated planning, scheduling, and AI-driven processing supports this transformation.

Democratization of EO Data:
> DOMINO-E facilitates efficient data access and processing through its federated system, helping overcome technical and resource barriers.

Growing B2B Market & SME Involvement:
> DOMINO-E aims to engage SMEs by allowing them to develop services for the federation layer, increasing competitiveness and fostering innovation.

Market Challenges: Standardization, Competition, and Regulatory Issues:
> DOMINO-E's approach to interface standardization and compliance positions it well to tackle these barriers.

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Insights from the DOMINO-E Project

DOMINO-E:

_as a_ **federated**, **standardized**, modular EO architecture

GOAL:

Enhancing collaboration & lowering market entry barriers for SMEs
Focus on business models, certification & commercialization strategies

The Impact of DOMINO Architecture on EO Collaboration and SME Entry:

Unlocking opportunities through modular, federated Earth Observation

DOMINO Market:

End-users (institutional and government market)
System Integrators and SME (industry)

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Benefits of **federated** and shared Infrastructure for EO Efficiency

➢ Cloud-based EO processing **reduces duplication**

➢ **Lower costs** for governments, agencies, and SMEs

> Use Case: Multi-stakeholder flood monitoring coordination

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The Role of **federated** in EO Interoperability

➢ DOMINO Architecture standardization at EU level

contributes to **reusability** and **profitability** for all

European stakeholders.

➢ Ensuring **seamless** EO **data access** across missions

➢ Standardization enables **cross-sector & international**

collaboration

➢ Federated ground segments streamline **multi-mission**

coordination

➢ Enables **resource pooling**

➢ Integrating Copernicus, ESA & commercial platforms

> **Use Case: Climate monitoring agencies benefiting from automated EO insights**

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Benefits of Certification and Compliance for Market Adoption

- ➢ DOMINO Certification ('Stamp') for pre-approved EO services
- ➢ Certified DOMINOEs ensure system compatibility
- ➢ Certification increases investor confidence
- ➢ Certified services can be exported to global clients
- ➢ Simplifies procurement & boosts local EO development: Creates a trusted marketplace for modular EO solutions

> **Use Case: DOMINO-certified flood detection tool for National Agency**

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Challenges

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Challenges for Commercialization & Market Adoption

➢ Legacy EO systems create resistance to federated models

➢ Regulatory challenges limit EO data-sharing & interoperability

➢ Resistance from legacy systems & large EO firms

➢ Need for harmonized standards & phased integration

➢ Regulatory & security concerns with cross-border data sharing

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SME Challenges: Managing Competition with Established EO Players

➢ **Need for Standardization:** The absence of common technical standards for EO data sharing and integration

➢ Competition with **Established Players**: differentiation crucial.

➢ SMEs face challenges **competing with large EO firms**

➢ **Differentiation** through high-value AI-driven services

➢ **Specialization** in **AI-based** EO analysis, modeling & predictive analytics

➢ **Regulatory & Security Barriers** limit EO data-sharing & interoperability

➢ **Technical Challenges**: Complexity of Data Handling - integrate multiple EO missions from different sources, which increases data volume and interoperability issues.

Business Model Evolution for SMEs

From Data to Intelligence

Transition from raw data to analytics-as-a-service :

Shift from raw EO data sales to AI-powered decision support

Subscription-based EO analytics services replacing image sales & real-time insights

Marketplace for AI tools, analytics, and EO processing modules

> Use Case: Precision farming service from SMEs using AI-driven EO monitoring

Lowering Barriers for SMEs in the EO Market with DOMINO-E

- ➢ SMEs can now enter EO without proprietary infrastructure

- ➢ Pay-per-use & subscription models provide cost-effective EO access and shared services

> Use Case: Deforestation monitoring service from SMEs using AI-driven EO monitoring

New Revenue Streams for SMEs & Industry Integrators

- ➤ **B2B & B2G sales** models expand SME opportunities

- ➤ **SMEs can develop modular AI analytics for EO marketplace**

- ➤ **System integrators** benefit from modular ground segments

Examples using DOMINO

B2G: EU Environmental Agency: Pollution monitoring via AI-driven tasking
Government:
AI tools for urban growth, climate analytics, maritime monitoring
Real-time agriculture analytics
Maritime Surveillance

B2B to system integrators: Ground Segment Modules: Advanced Data Processing Services; Data Integrity and traceability service.

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Conclusion and Next Steps

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Conclusion

➢ DOMINO-E transforms EO through **collaboration** & **modularity**

➢ DOMINO-E reshapes EO commercialization & **SME accessibility**

➢ SMEs **gain access and innovate** more

➢ SMEs **reduce costs & scale** with modular EO solutions

Next Steps

➢ Boosts **public-private** EO collaboration

➢ Standardization is key to unlocking global EO potential: Expanding standardization & regulatory compliance

➢ Use of EU support mechanisms (e.g. Horizon Booster)

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Questions?

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In a Nutshell: Joining the Domino Ecosystem

Jean-Francois Vinuesa (Airbus Defence and Space)

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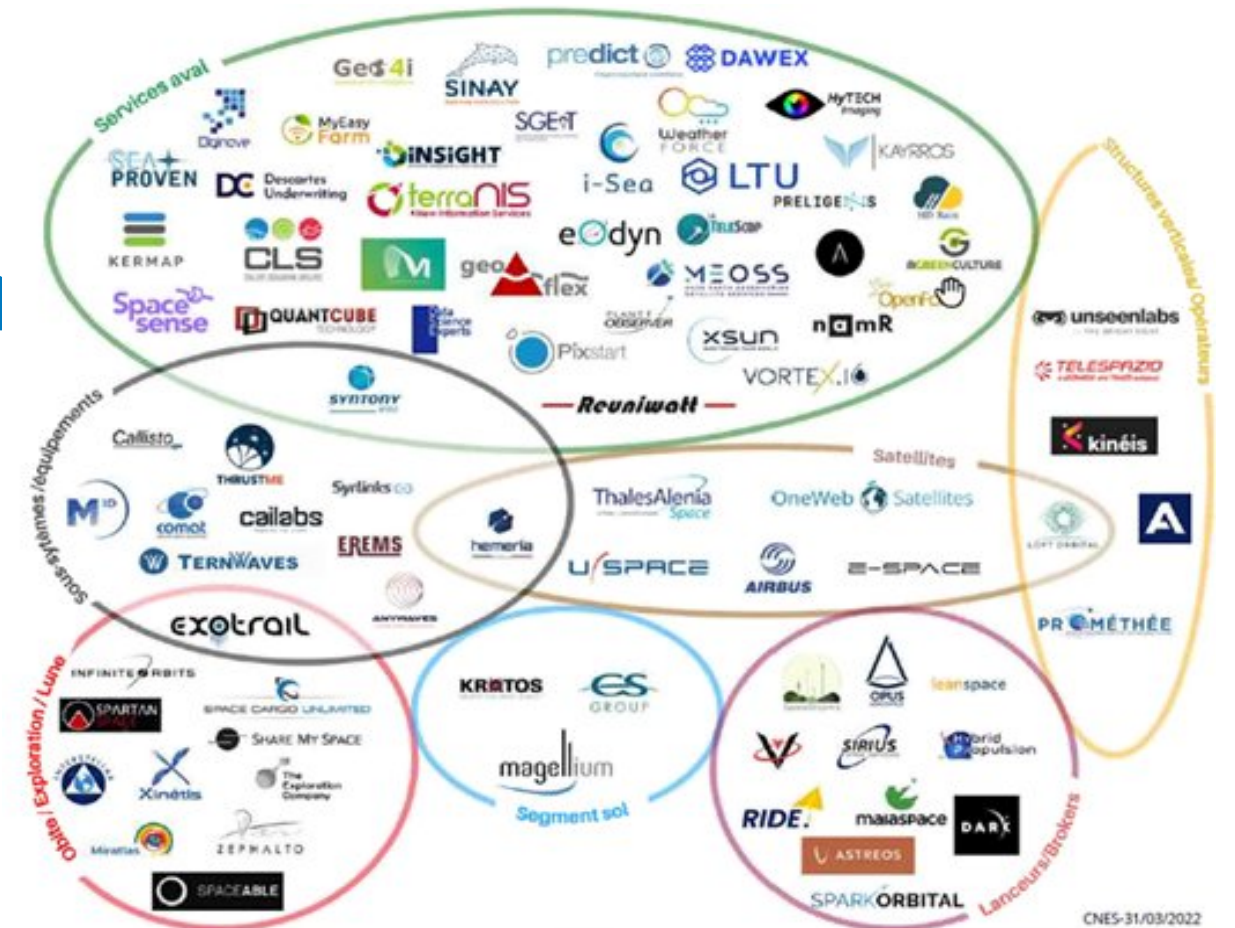
Trends for future Earth Observation Ground Systems

Master the complexity & variability of systems
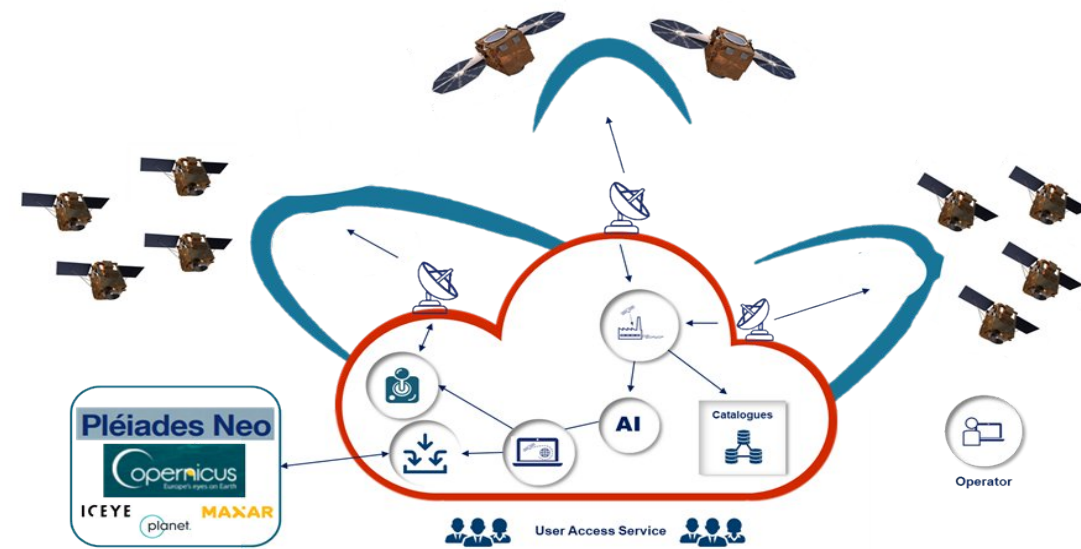
Benefit from massive innovation from New Space
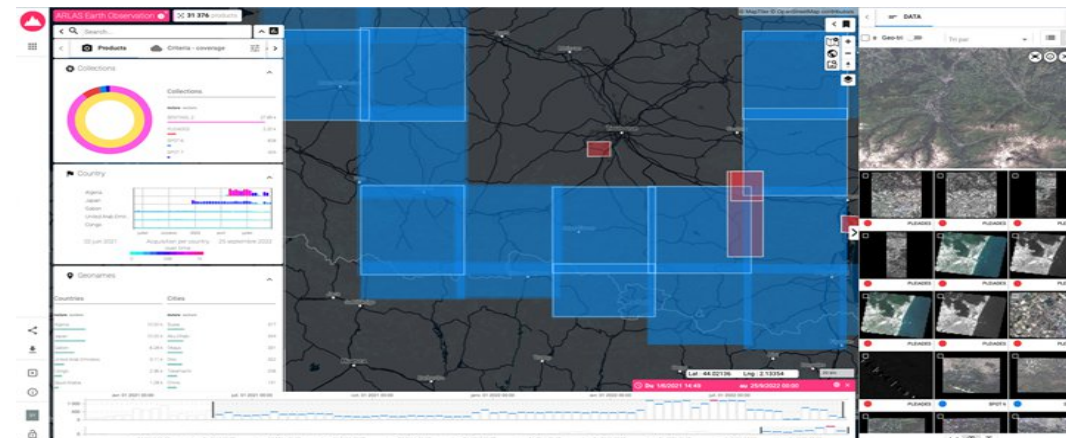
Technical & business trends for EO GS

Reduce CAPEX & OPEX costs
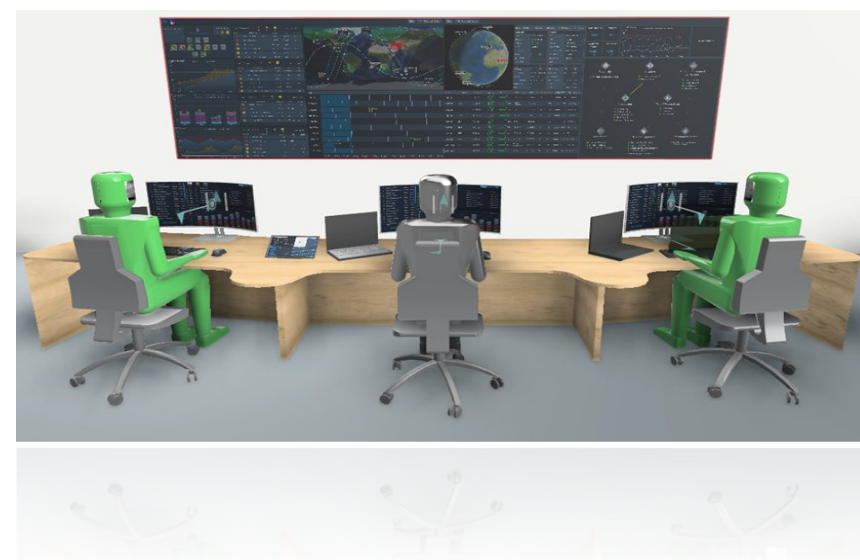
Inject awaited new features

Increase competitiveness on planning & prices

Domino standardized modular architecture

- **Standardized and public GS architecture addressing institutional, defence and export markets**
- **Covering a wide range of system use cases, including new features for increased reactivity & automation**
- **Constellation-ready**
- **Cloud-ready and IT-agnostic**
- **As a service approach whenever relevant**
- **Will to on-board space agencies & industry, facilitating the emergence of an ecosystem of Domino providers**

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# Added values of modular and standardized architecture

Better value proposition for clients

- Easier to set up the best industrial scheme
- Easier to provide the best technical solution against customer needs
- Less risky to implement evolutions on a complex system
- Increased confidence level
- Easier on CAPEX/OPEX calibration/decision
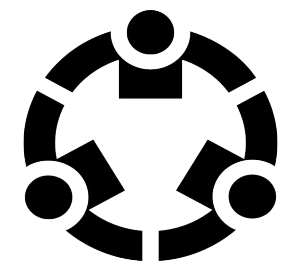
Derisked schedules if industrial schemes are complex

- Clearer sharing of responsibilities at the start of a program (gains during engineering and integration)
- Less risky engineering and IVV phases, fewer potential escalations
- Derisk development from supply chain
- More secured margins
- Focus on the content (performances) and not on interfaces
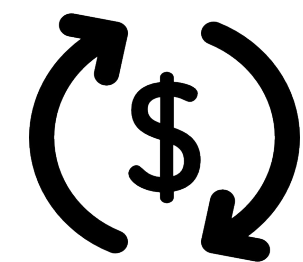
Incentivised investments

- Clear and stable technical conditions for the integration of E2E systems
- Facilitated product strategy and reuse maximization
- More accessible maintenance and evolution contracts for the client

Domino architecture - Overview

Domino architecture - Overview

> Focus on Federation chain

Central role of the **[Federation Service]**

➢User requests management

➢Services discovering of other dominoes

➢Organisation of production workflows

➢Local and external systems optimisation

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Domino architecture - Overview

> Focus on Federation chain

Federation Multi-Mission Objectives

End User

FS

UAS

INTS

INTS

INTS

External Systems

Commercial IF

Commercial IF

Commercial IF

Sovereign Missions

PPS Processing

MPS Mission

FOS Control FDS

Mission Specific 1

PPS Processing

MPS Mission

FOS Control FDS

Mission Specific 2

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Domino architecture - Overview

> Focus on Mission & Control chains

Control chain could be quite "sensible",

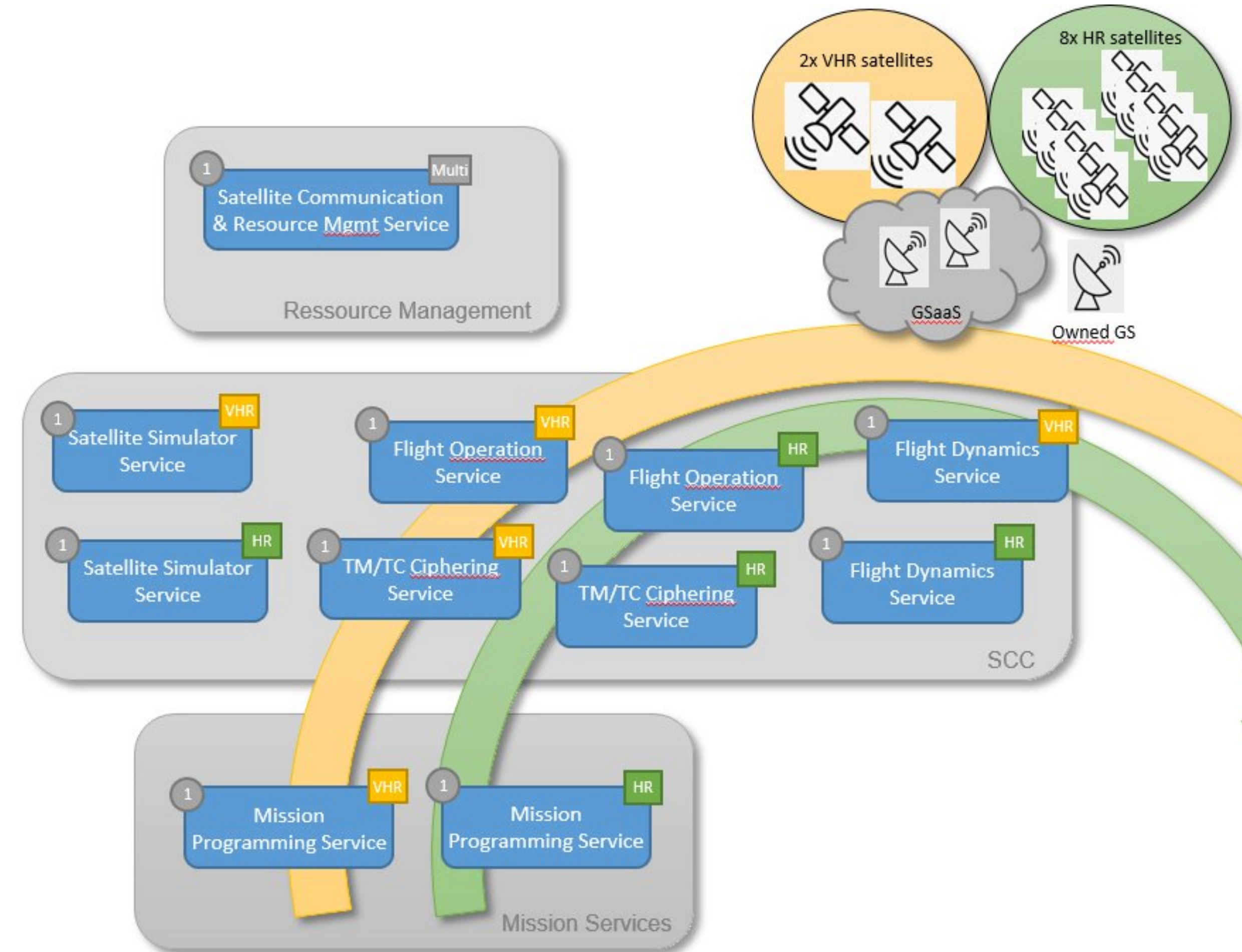particularly the Satellite simulator and TM/TC

keys

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Domino architecture - Overview

> Focus on Image chain

Industrial breakdown of the Image chain:

➢ The **[Primary Processing Service]** dominoes are dedicated to one mission (homogeneous constellation)

➢ The **[Advanced Processing Service]** and **[Enhanced Processing Service]** are multi-mission

The **[Image Quality Service]** (calibration) and **[Machine-learning Application Production & Quality Service]** (MAPQS) is mainly foreseen "as a service".

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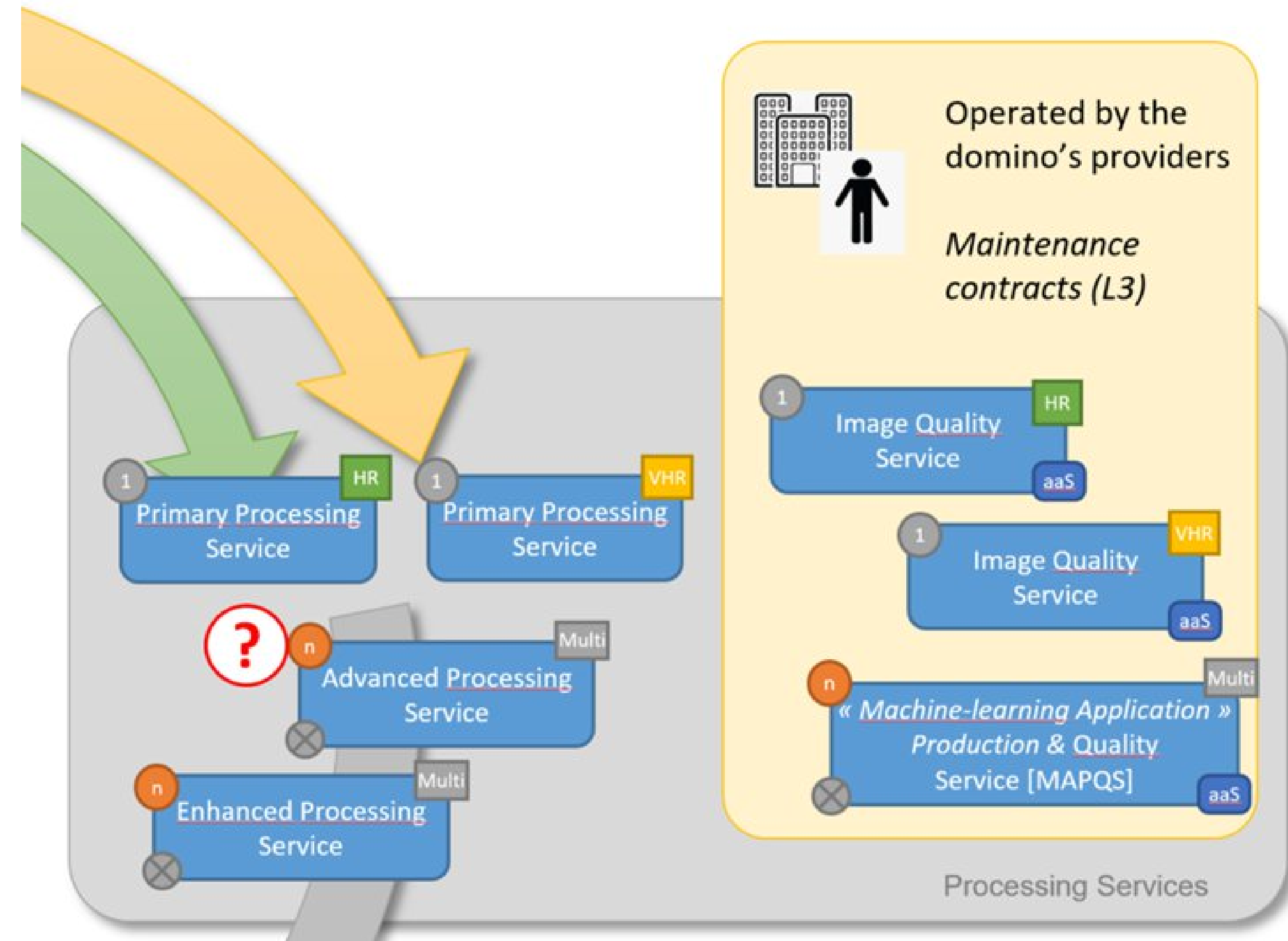
Domino architecture - Overview

> Focus on Data Management
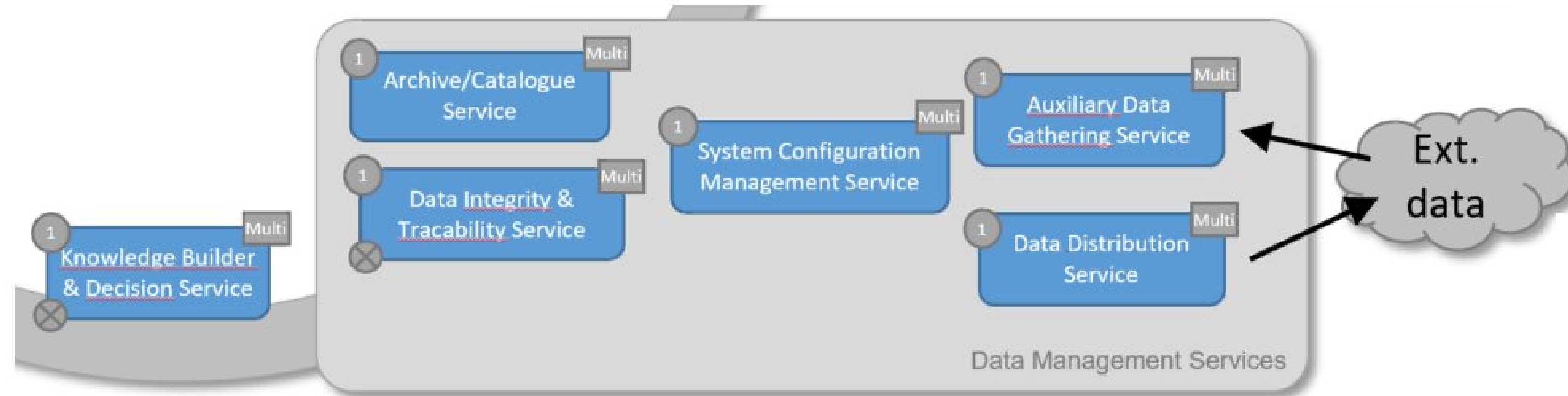
> Focus on Monitoring
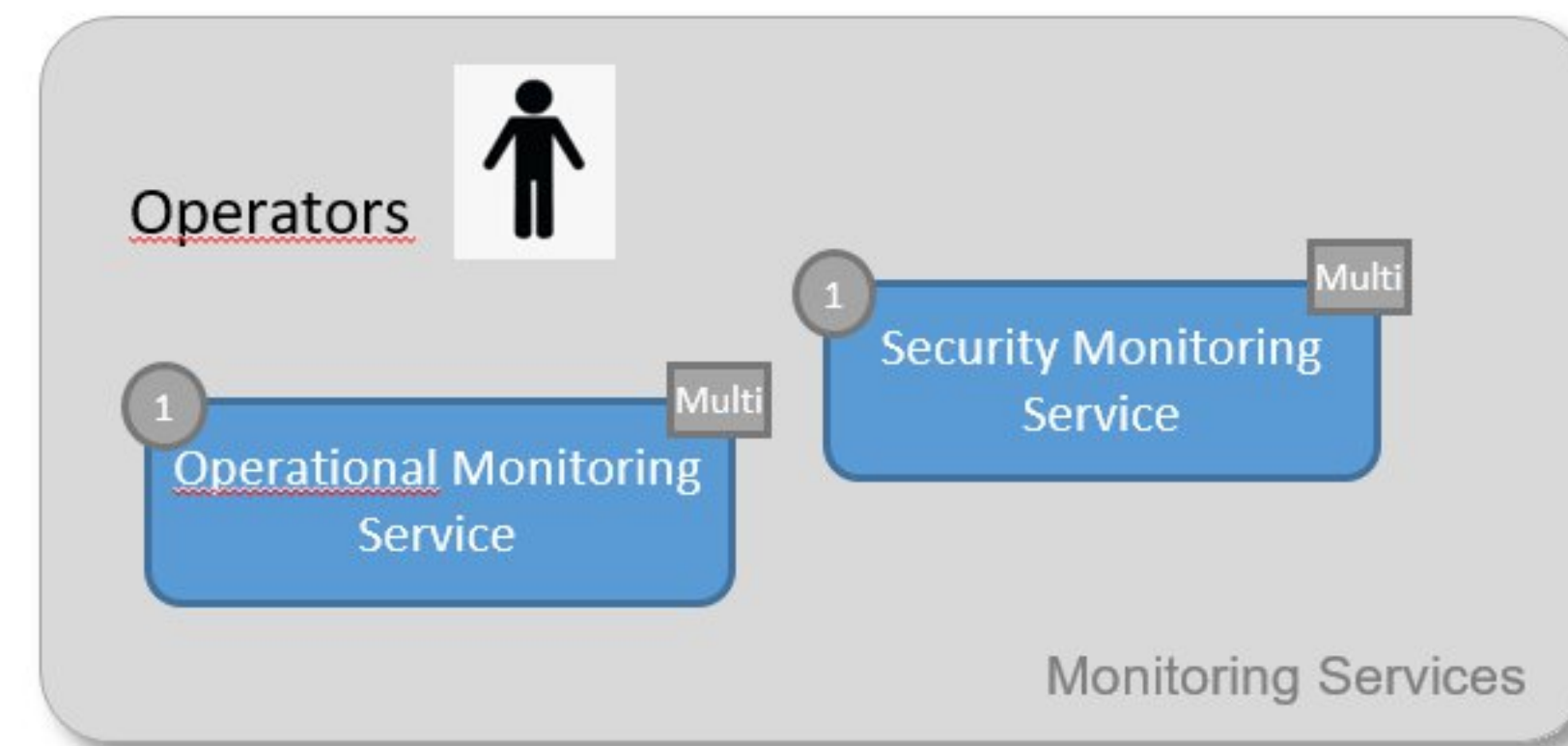
How to use this modular GS?

1. Conops
Particularities of the mission
=> Selection of the needed dominoes

Unselected dominoes:
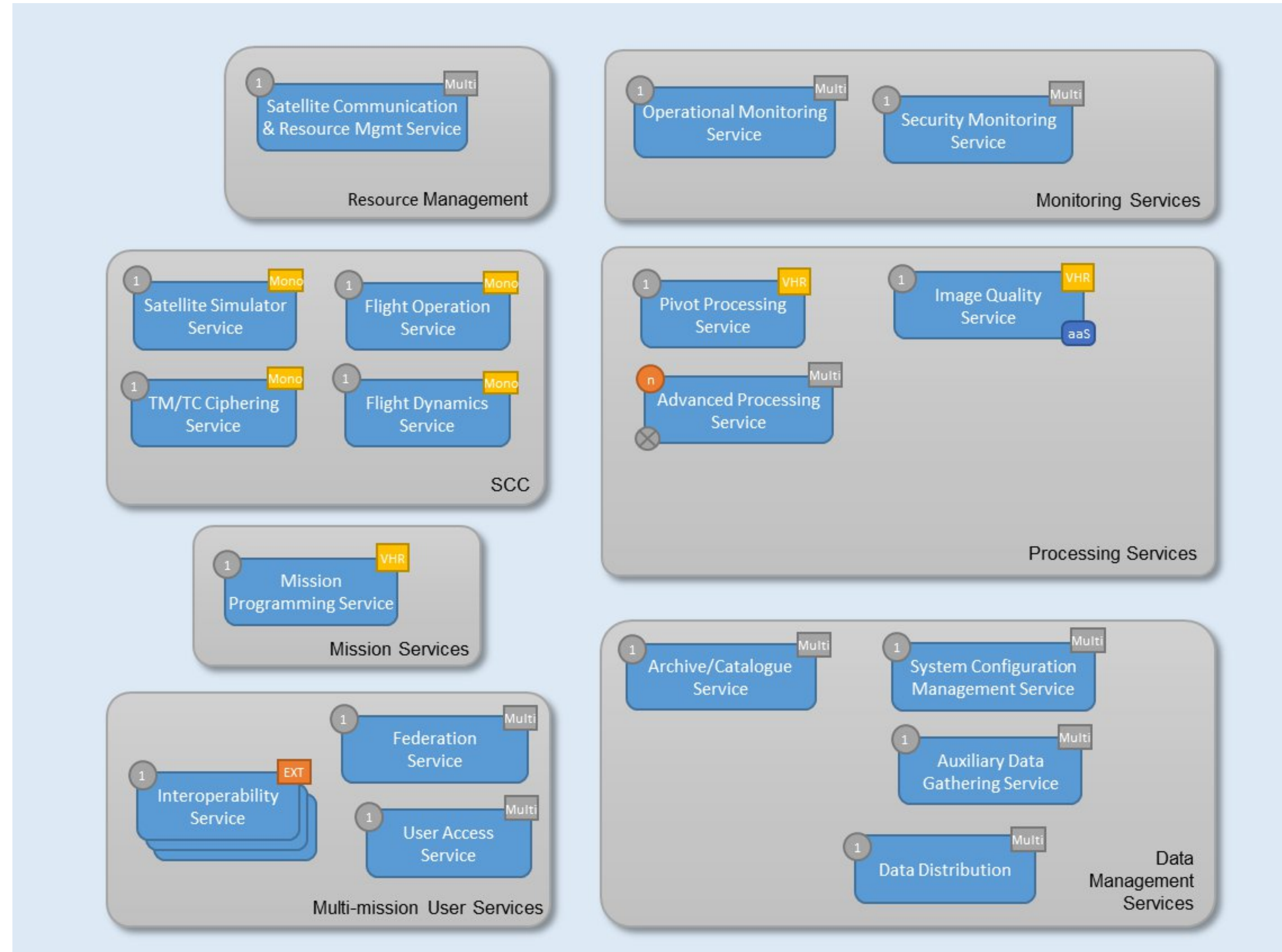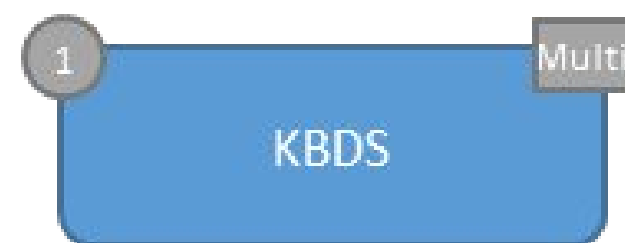
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How to use this modular GS?

1. Conops
Particularities of the mission
=> Selection of the needed dominoes

2. Industrial strategy
Choice of the dominoes' providers

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How to use this modular GS?

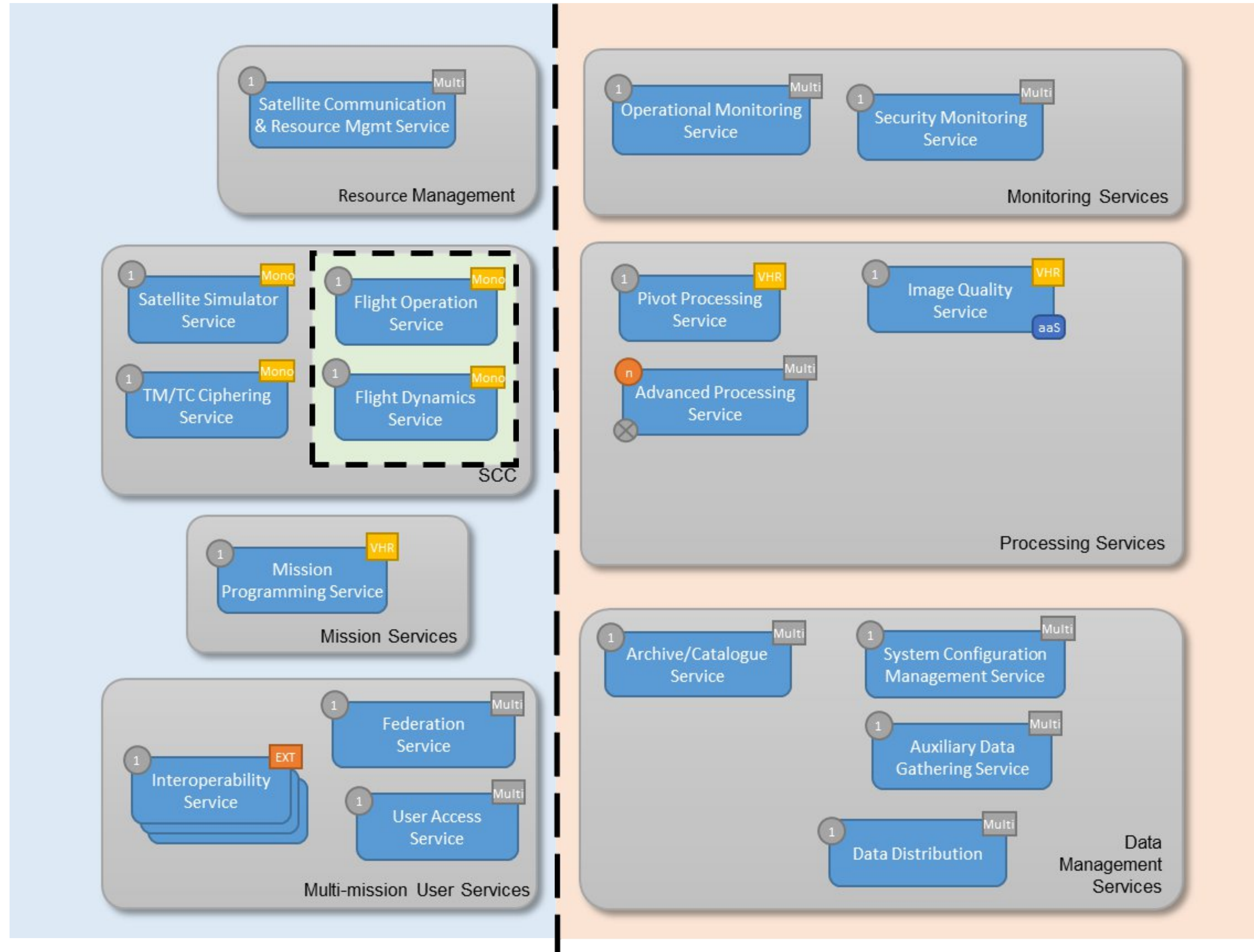**1. Conops**
  Particularities of the mission
  => Selection of the needed dominoes

2. Industrial strategy
  Choice of the dominoes' providers

3. Deployment strategy
  Where will we deploy ?

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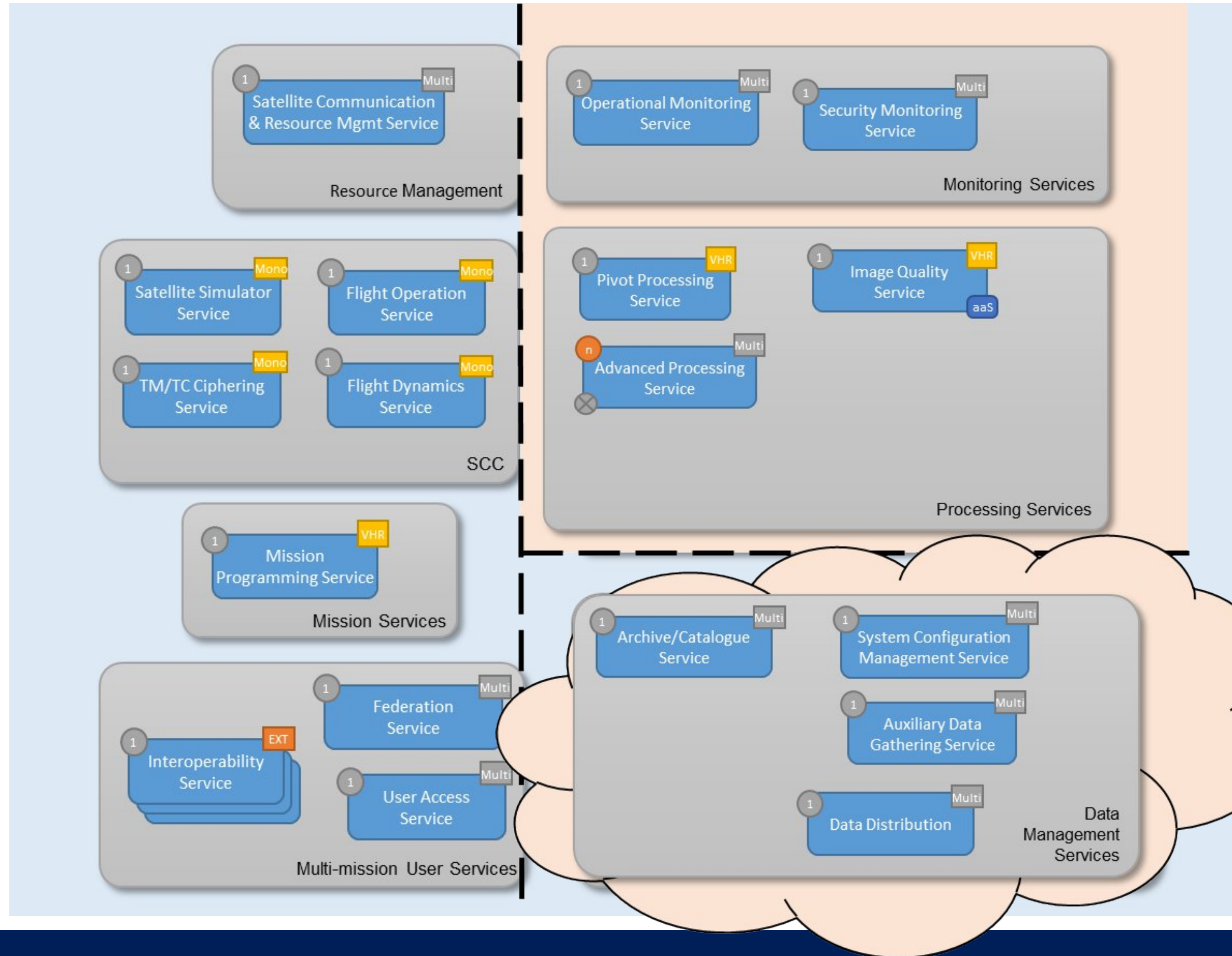
Dominoes open for development – BUY Foreseen

DOMINO'S PERIMETER:

- **VHR** — dedicated to an homogenous constellation
- **HR** — dedicated to an homogenous constellation
- **Multi** — multi-mission
- **EXT** — external system

DOMINO'S INSTANCES

- **1** — one unique instance of this domino
- **n** — could be many instances deployed Without "redundancy" dimension

DOMINO'S MODE

- **aaS** — "as a service" mode in targeted deployment (operated by an industrial)

DOMINO'S OPTIONALITY

- ⊗ — The dominoes' functionalities are not mandatory, depending on the needs

1 VHR Flight Operation Service

1 HR Flight Operation Service

1 Multi Data Distribution Service

n Multi Advanced Processing Service

1 EXT Interoperability Service

1 Multi Knowledge Builder & Decision Service

1 Multi Operational Monitoring Service

1 Multi Data Integrity & Traceability Service

1 Multi Security Monitoring Service

1 Multi User Access Service

1 Multi Archive/Catalogue Service

1 Multi Auxiliary Data Gathering Service

1 Multi System Configuration Management Service

How to use this modular GS?

Domino architecture

Conops

Industrial strategy

Deployment strategy

Request for proposal

Ground segment architecture at PDR level

The Domino architecture is already at **PDR level**.

Technical transformation accompanied by an **industrial** transformation

System integrator in confidence

Requirements
DOMINO-A
Incl. Perfo and Secu

Output of DOMINO-X
PUBLIC, Standard

ICD DOMINO-A

Cloud
Guidelines

https://domino-x.space/

Provider
Domino-A

Output of DOMINO-X
PUBLIC, Standard

ICD DOMINO-B

Cloud
Guidelines

https://domino-x.space/

System integrator in confidence

Requirements
DOMINO-B
Incl. Perfo and Secu
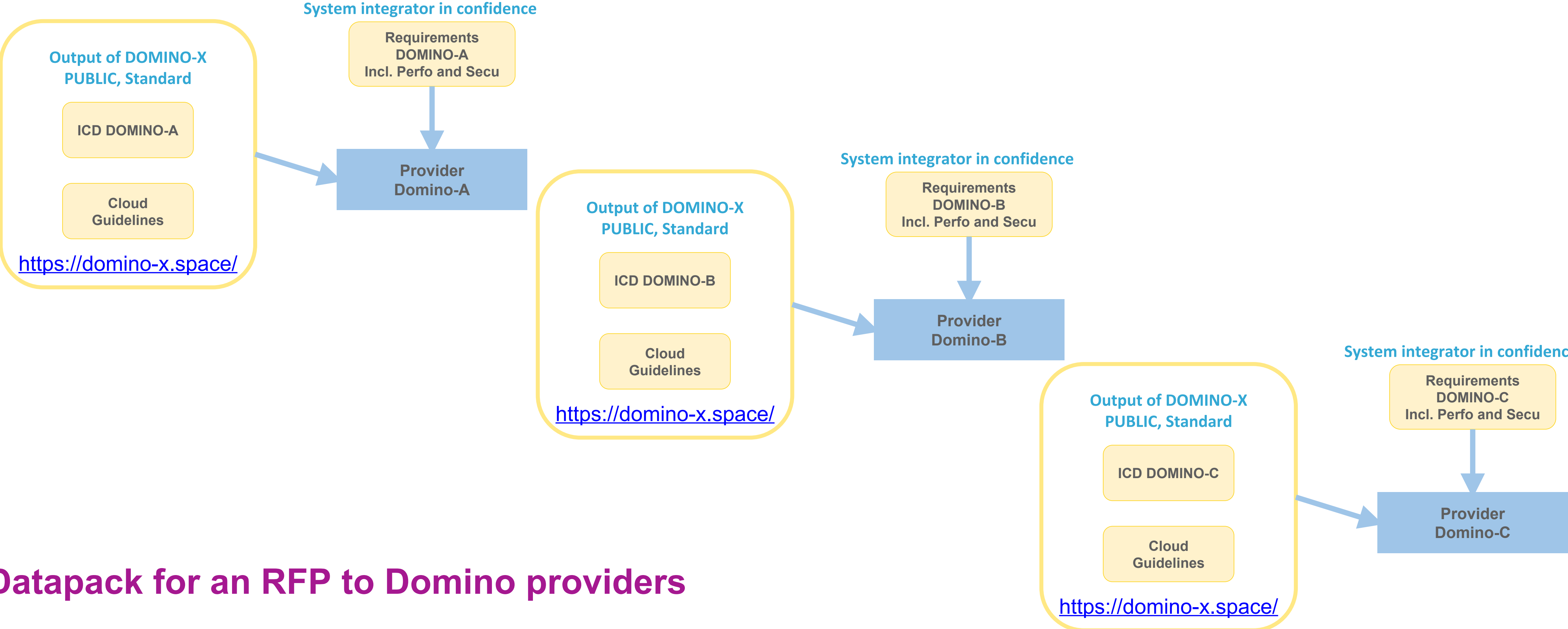
Provider
Domino-B

Datapack for an RFP to Domino providers

Output of DOMINO-X
PUBLIC, Standard

ICD DOMINO-C

Cloud
Guidelines

https://domino-x.space/

System integrator in confidence

Requirements
DOMINO-C
Incl. Perfo and Secu

Provider
Domino-C

General SWOT applicable to integrators and providers

	Helpful *to achieve the objective*	**Harmful** *to achieve the objective*
Internal origin *Attributes of the organisation*	**Strengths** Compatibility with ESA projects Reduced recurring cost & planning Agreed with Integrators Ease industrial strategy core/non core strategy Geo return easier	**Weaknesses** Security Transition roadmap is complex CAPEX NREC Maintenance is more complex Duration of the sales cycle
External origin *Attributes of the environment*	**Opportunities** GSaaS compatibility CCSDS standardization Evolutivity New market Funding opportunity Extension to SAR, SIGINT capabilities	**Threats** Limited maturity level Adoption reluctance due to make or buy strategy Difficulty to take a decision

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Status of external engagement with key actors

French and German space national agencies: promotion of architecture and raising awareness externally

ESOC/ESA: regular follow up on the projects

CCSDS: presentation to workshops

European Commission: aware and actively manifesting interest and on-going HE funding

End to End Integrators: Airbus (all home countries), TAS involved in Domino-X, OHB Systems and Digital Connect awareness

GS / Subsystem providers: interest from 3 large ones so far from outside the consortia

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Domino Saga is to be continued

DOMINO-X (CNES/DGE)
11/2021-11/2023

Reference System Service (ESA)
2021-2025

AIRBUS   werum   es GROUP

MESEO (HE EC)
12/2023-12/2026

creotech
SATLANTIS
SOVITY
AIRBUS
SISTEMA   RESOLVO   UBOTICA
gmv

Adaptative PDGS Evolving Technolgy

AIRBUS
SPIDER (EC EDF)
2024-2026
+30 EU partners

Data Management and System Security

Interconnect multiple Domino-based systems

DOMINO-E (HE EC)
11/2022-11/2025

VVA Valdani Vicari & Associati
AIRBUS
OIKOPLUS
iTTi
gmv
TILDE
ONERA THE FRENCH AEROSPACE LAB
Capgemini

Coverage service (Federation Domino)
Communication booking service (Sat Comm & Res Man Domino)
Virtual Assistant Service (User Access Domino)

Radar Ground Seg ment (SAR Dominoes)
API Governance (Domino Interfaces)
Immersive environment (OMS Domino)
PaaS for space operation (FOS Domino)

Deploy ground segment following (at least partially) Domino architecture

Export customers

AIRBUS   hdg Human Design Group
leanspace   SURICATS

DOMINO-A (GSTP ESA)
02/2024-02/2026

RFI/RFP In Q3-2025

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Questions?

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Domino-E: On-demand Materials

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Domino-E Whitepaper: Technical Interfaces and Standards in the Domino Architecture

[Whitepaper Download - Domino-E](#) (clickable link)

- **Collaborative Architecture:** Discover how Domino-E enables collaboration between **SMEs and larger organizations.**

- **Interfaces and Standards:** Find essential guidelines for **seamless integration** within the Domino-E ecosystem.

- **What is a Domino?** Clear definition and explanation of its **modular concept** and functionality.

- **Developer Resources:** Access the **Domino-X data package** via the **download link**—crucial for developers.

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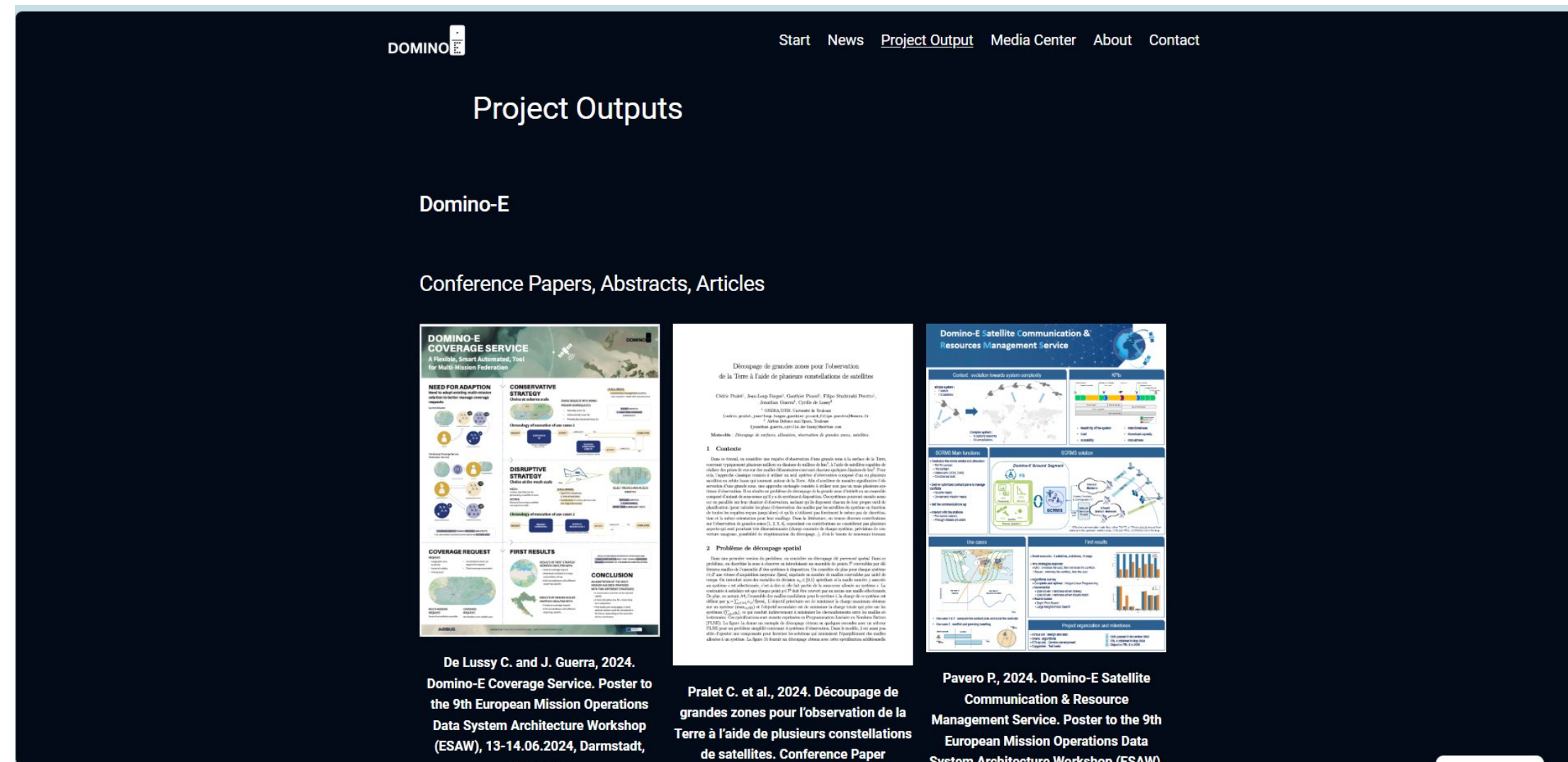the European Union

Domino-E On-demand Webinar Streaming

DominoE HEurope - YouTube
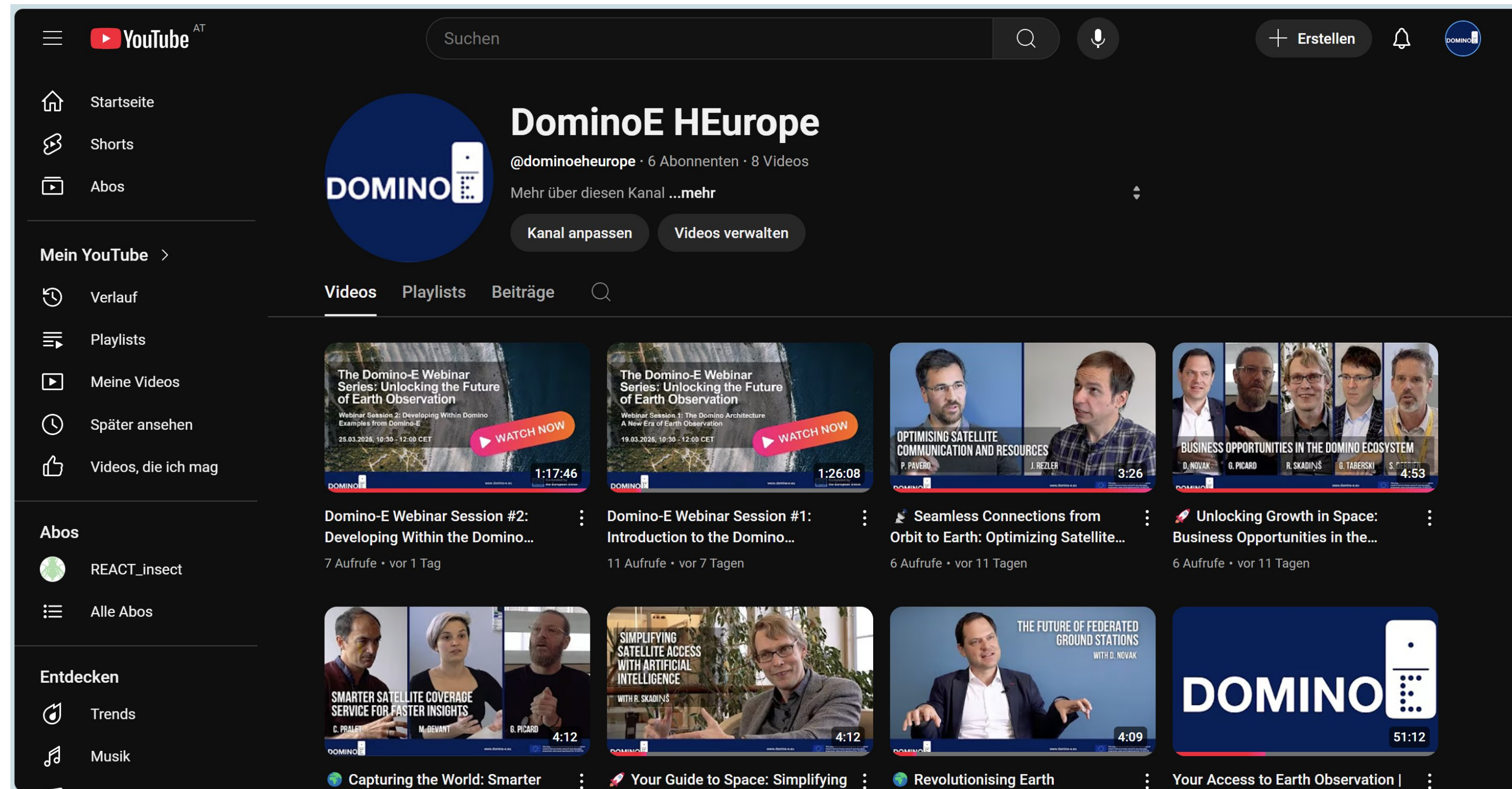
- Recording from public stakeholder workshop, Jan 2023

- all webinar session recordings
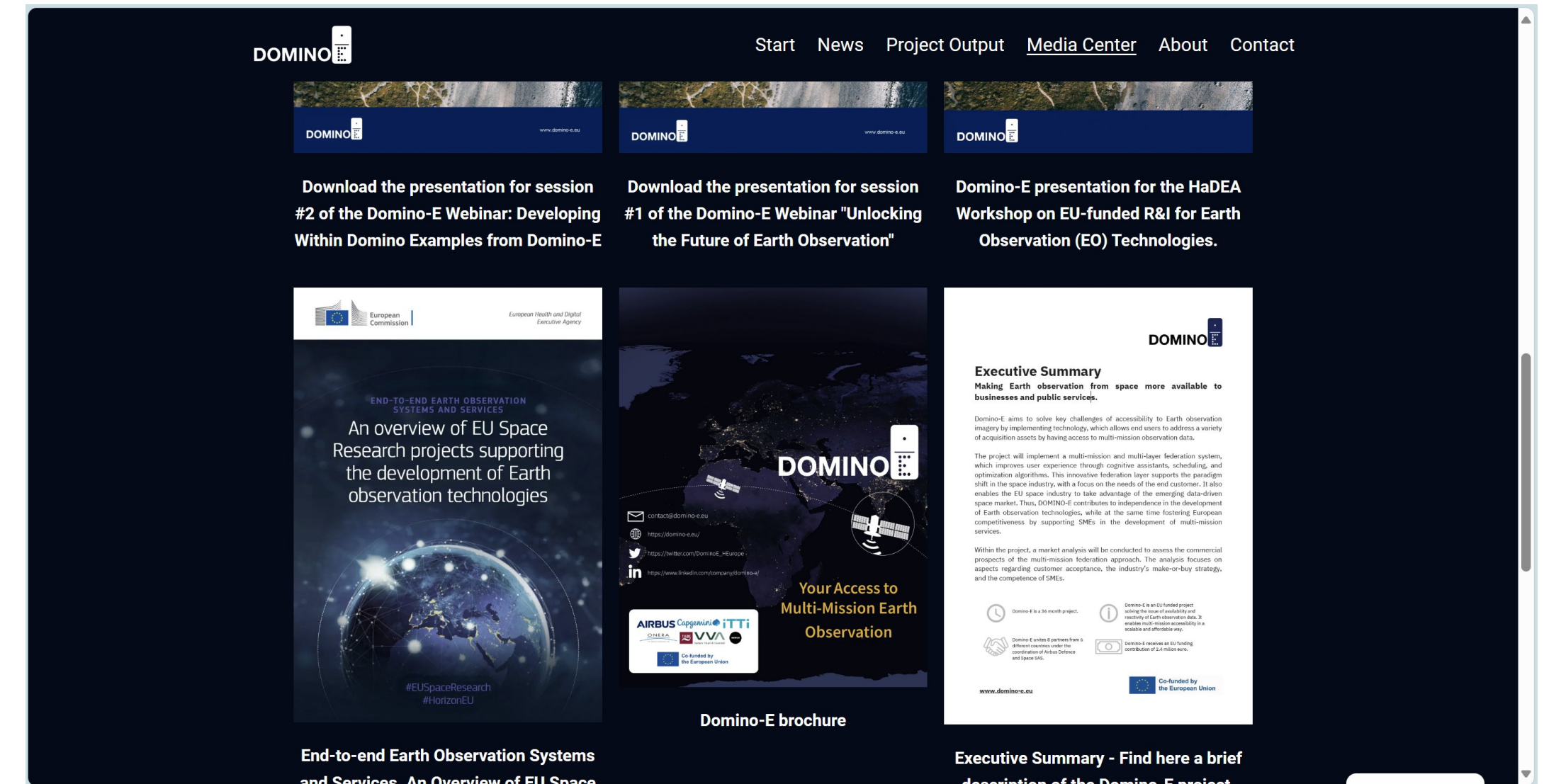
- all webinar teaser movies and short statements

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Domino-E Project Website

Project Output - Domino-E

- **Conference Papers and Posters**
- **Project Deliverables**
- **Domino-X Documentation**

Media Center - Domino-E

- **Project Brochures & Press Releases**
- **Webinar Videos**
- **Webinar Presentation Slides**

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Thank you!

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