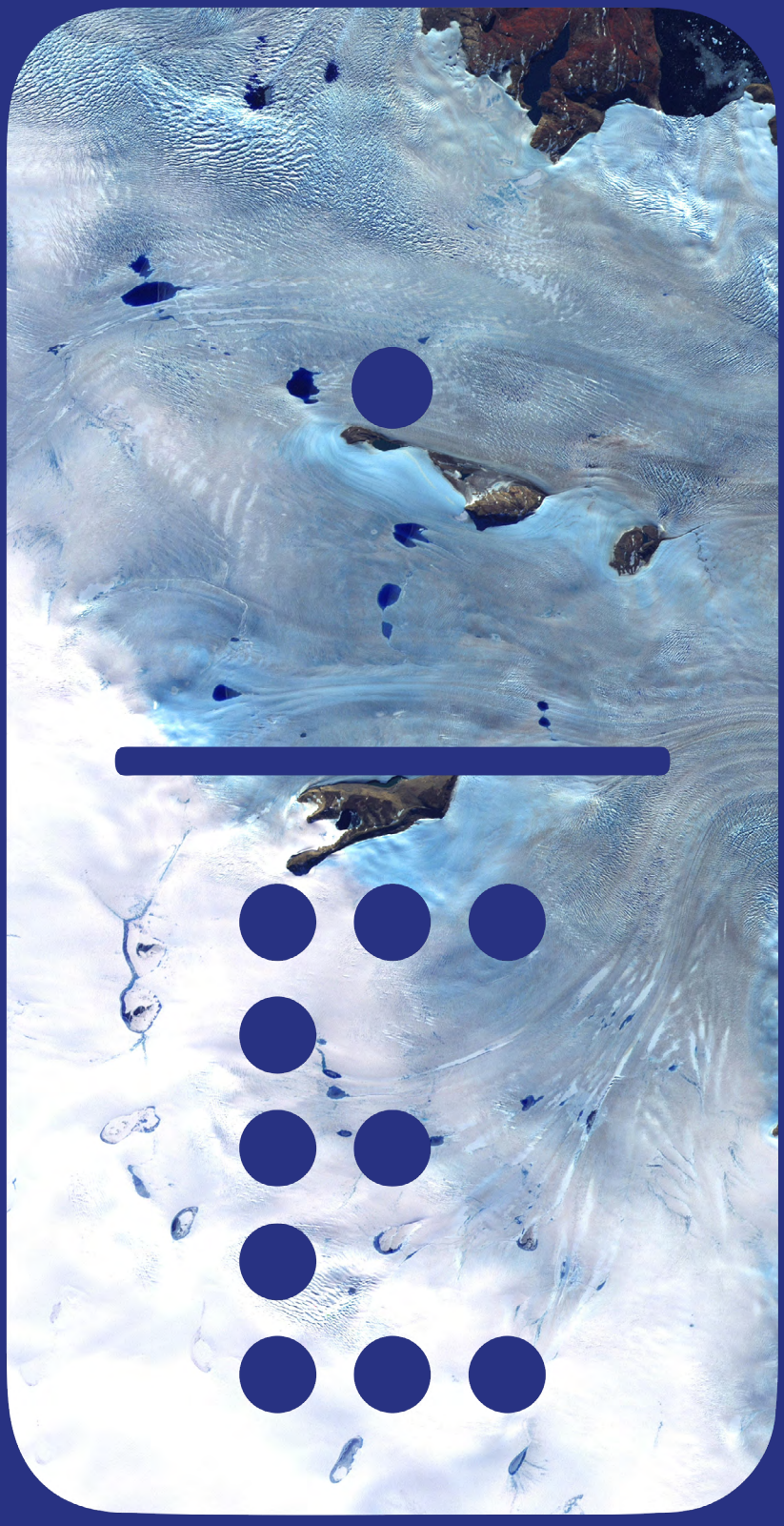
Technical Interfaces and Standards in the Domino Architecture

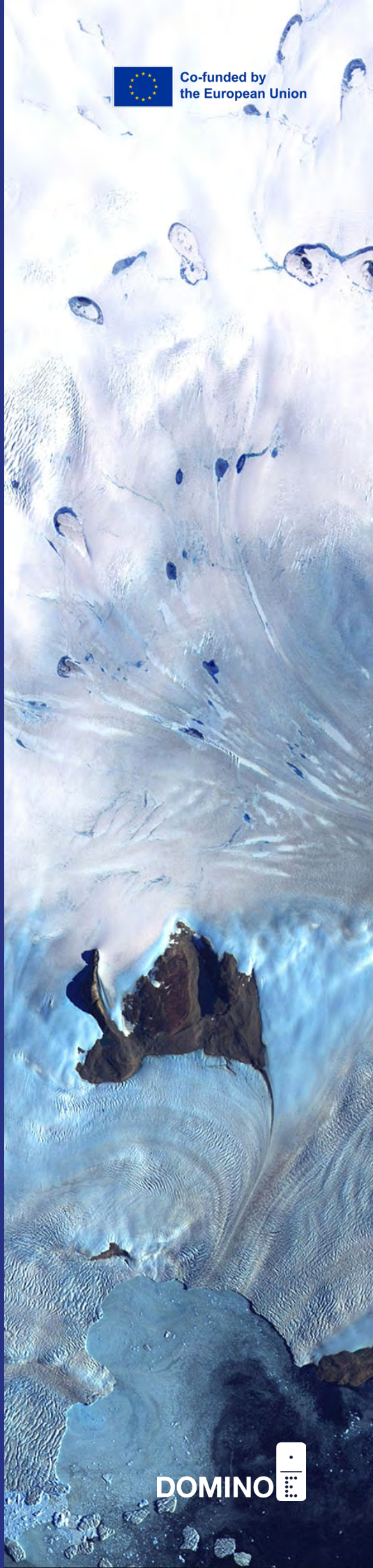
whitepaper



Co-funded by the European Union

DOMINO

Chapters



EXECUTIVE SUMMARY

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1 EXECUTIVE SUMMARY

The Domino architecture represents a groundbreaking framework in European Earth observation (EO), fostering collaboration between industry and scientific communities to create innovative EO solutions. This whitepaper explores the technical interfaces and standards that form the backbone of the Domino architecture, focusing on how these elements empower Small and Medium Enterprises (SMEs) and support governmental objectives. By leveraging established standards, the Domino framework enables seamless integration, enhances market potential for SMEs, and supports European independence in EO technology.

> Our goal with the Domino architecture is to establish a common standard within the community, much like the IT industry did with USB. By creating a unified approach, we can ensure that all essential components seamlessly connect and work together, regardless of who develops them. This approach will lead to a more cohesive, end-to-end system that ultimately delivers the highest quality and value for the customer.

Daniel Novak

Program Manager
AIRBUS

THE FUTURE OF EARTH OBSERVATION

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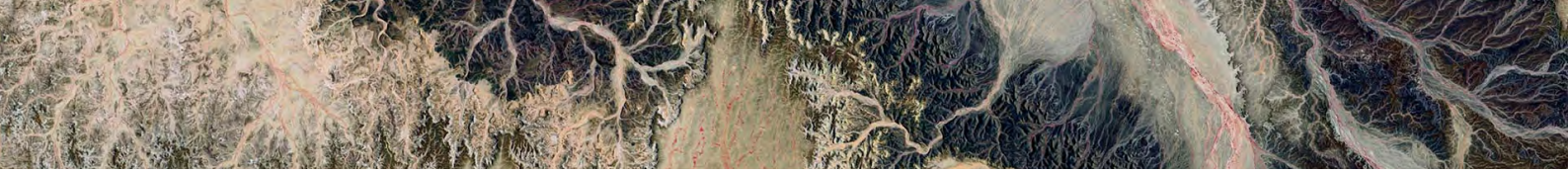


2 THE FUTURE OF EARTH OBSERVATION

The European space industry is at a critical juncture, where collaboration and innovation are paramount to maintaining competitiveness and achieving strategic goals. The Domino framework addresses these challenges by creating a collaborative environment where industry and science work together throughout the entire EO development lifecycle—from initial concept to final validation of modular EO building blocks.

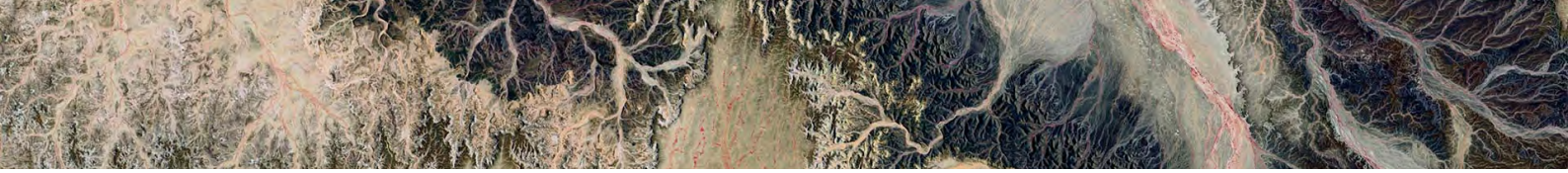
This approach breaks down traditional silos, fostering a more efficient and innovative EO ecosystem. By integrating the efforts of various stakeholders, including SMEs, the framework enables the development of specialized components that can be easily integrated into larger systems. This collaborative model not only accelerates innovation but also ensures that the solutions developed are both technically robust and commercially viable.

2.1 MARKET SITUATION AND TRENDS

The Earth observation market has evolved significantly from its origins as a purely institutional domain to a dynamic commercial sector characterized by innovation and growth. While the United States, China, and India dominate their respective markets, often making them challenging for European manufacturers to penetrate, there are substantial opportunities in other regions.

In particular, developed countries in the Middle East and Asia, with substantial budgets and ambitions to enhance their space capabilities, present significant opportunities for European EO technology. These countries often seek to develop their local space industries through cooperation and partnerships, making industrial and commercial collaborations essential for success in these markets.

Additionally, a broader group of developed countries are striving to increase their EO capabilities, driven by the need for autonomy in civilian and military intelligence. This segment is marked by intense competition and price sensitivity, requiring European players to offer both innovative and cost-effective solutions.



Emerging markets, primarily driven by sovereignty and prestige, are also seeking to establish their own space capabilities. However, budgetary constraints in these regions lead to strong competition, particularly in the „entry-level" segment, where many global players vie for dominance.

Europe's leading EO companies, such as Airbus, have established strong positions in the global market. Airbus, for instance, holds 22% of the global EO market, second only to Maxar Technologies, which dominates with 52% market share. Airbus's success has been built on decades of investment, innovation, and institutional support, as well as a robust global distribution network.

However, the rise of „NewSpace" initiatives—privately funded projects often involving small satellite constellations—has introduced new dynamics into the EO market. These initiatives, characterized by lower costs and rapid deployment, are reshaping market expectations and increasing competitive pressures.

Emerging space nations, particularly China, have recognized these new dynamics and are rapidly advancing their capabilities. Supported by strong government backing, Chinese manufacturers are deploying ambitious EO constellations that threaten to outpace traditional leaders in terms of both technology and market share.

For the European space sector to maintain and expand its leadership in this fast-evolving market, it is imperative to focus on technological excellence and the development of innovative, high-performance systems. Institutional support and continuous innovation will be key to competing effectively in a global market that is becoming increasingly competitive, particularly in light of the aggressive advancements by new and emerging space powers.

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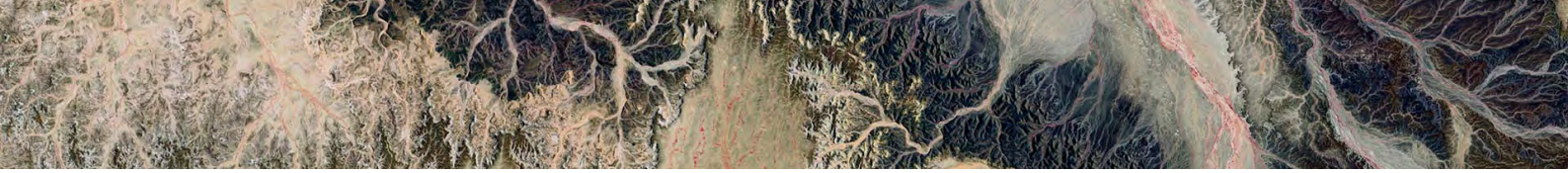


2.2 EUROPE'S EARTH OBSERVATION CAPACITY

The European Earth observation market is increasingly driven by the need for systems that offer rapid responsiveness, frequent revisits, and multi-mission capabilities. As demands grow in areas like border surveillance, disaster response, and maritime security, there is a clear trend towards more specialized EO systems that can provide real-time data and integrate seamlessly with other sources.

Modern EO systems are becoming more agile and capable, with advancements like AIRBUS' Pleiades NEO constellation showcasing the ability to task satellites multiple times a day and deliver high-resolution data quickly. This reflects the market's shift towards greater reactivity and timeliness.

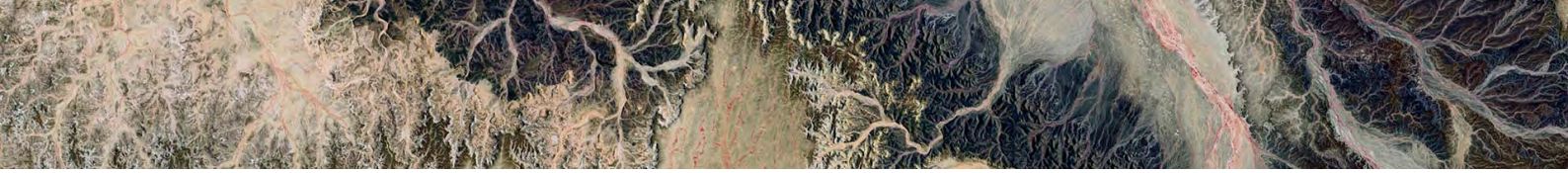
Additionally, the market is moving towards automation and AI-driven services to handle the vast amounts of data generated. This shift is crucial for applications requiring fast, accurate decision-making, reducing reliance on human operators and enhancing the efficiency of EO operations.

In summary, the key trends shaping the European EO market include increased responsiveness, specialization, automation, and the need for integrated, inter-operable systems. These trends are driving the industry towards more efficient and innovative EO solutions.

> Domino revolutionizes Earth Observation with its cloud-native architecture and the introduction of standards that enable consistent system development. Most importantly, the modular Domino structure, comprised of components with defined roles and interfaces, allows for flexible construction. Users can select, evolve, or create Dominoes as needed. This adaptability is crucial to Domino.

Matthieu Vansteene

Solution Architect
Capgemini



2.3 USER NEEDS & REQUIREMENTS FOR FUTURE EARTH OBSERVATION SYSTEMS

Future Earth observation (EO) systems need to address several critical challenges that current systems fail to overcome. Traditional, monolithic EO systems are often rigid and lack the flexibility required to adapt to evolving user needs. A significant issue arises when customers manage multiple EO systems—whether owned or accessed through third parties—that do not interoperate effectively. This lack of interoperability prevents users from optimizing system capacities and achieving coordinated mission objectives.

KEY PAIN POINTS FOR END-USERS

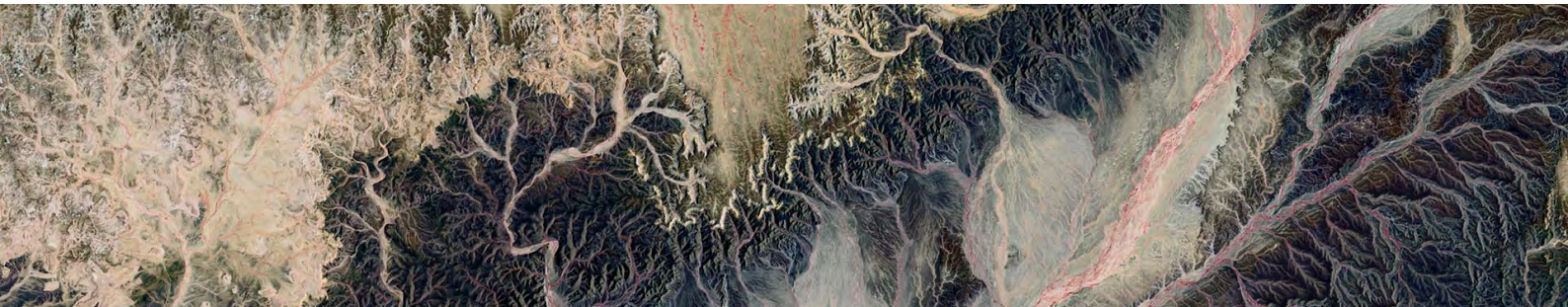
LACK OF COORDINATION:
Users face difficulties in managing resources across different EO assets due to the absence of coordination between them.

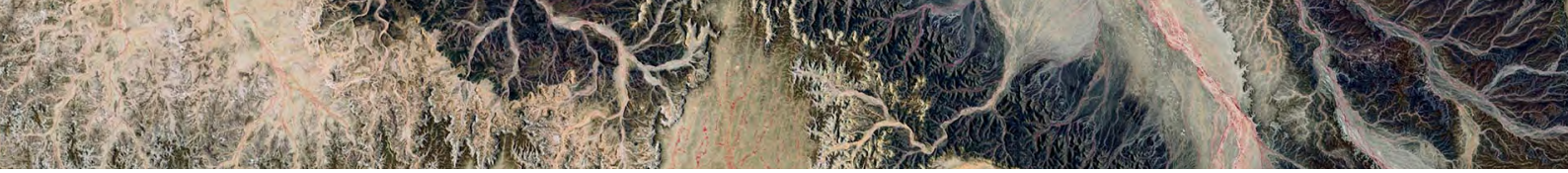
NO PRIORITIZATION:
There is no system in place to prioritize tasks across multiple EO systems, leading to inefficiencies.

OPTIMIZATION CHALLENGES:
Without harmonized security and operational protocols, users cannot fully optimize EO assets for tasks like site surveillance.

HIGH RESOURCE DEMANDS:
Current systems require significant human resources due to manual operations and the need for expert knowledge, leading to increased operational complexity.

UNDERUTILIZED ASSETS:
Legacy and new EO capacities are often underutilized, with no mechanisms for maximizing return on investment, such as selling acquisition slots to third parties.





USER REQUIREMENTS

USER-FRIENDLY INTERFACES:

Systems should be accessible to end-users who are not experts in the technical subsystems, enabling them to meet operational needs without extensive training.

AUTOMATED OPERATIONS:

Increased automation is necessary to reduce the reliance on manual operations and expert knowledge, making the systems more efficient and easier to manage.

INTEROPERABILITY:

Future systems should be able to integrate and coordinate between multiple EO assets, both owned and external, to optimize mission planning and execution.

PRIORITIZATION & OPTIMIZATION:

There should be mechanisms for prioritizing tasks and optimizing the use of EO assets to achieve mission objectives effectively.

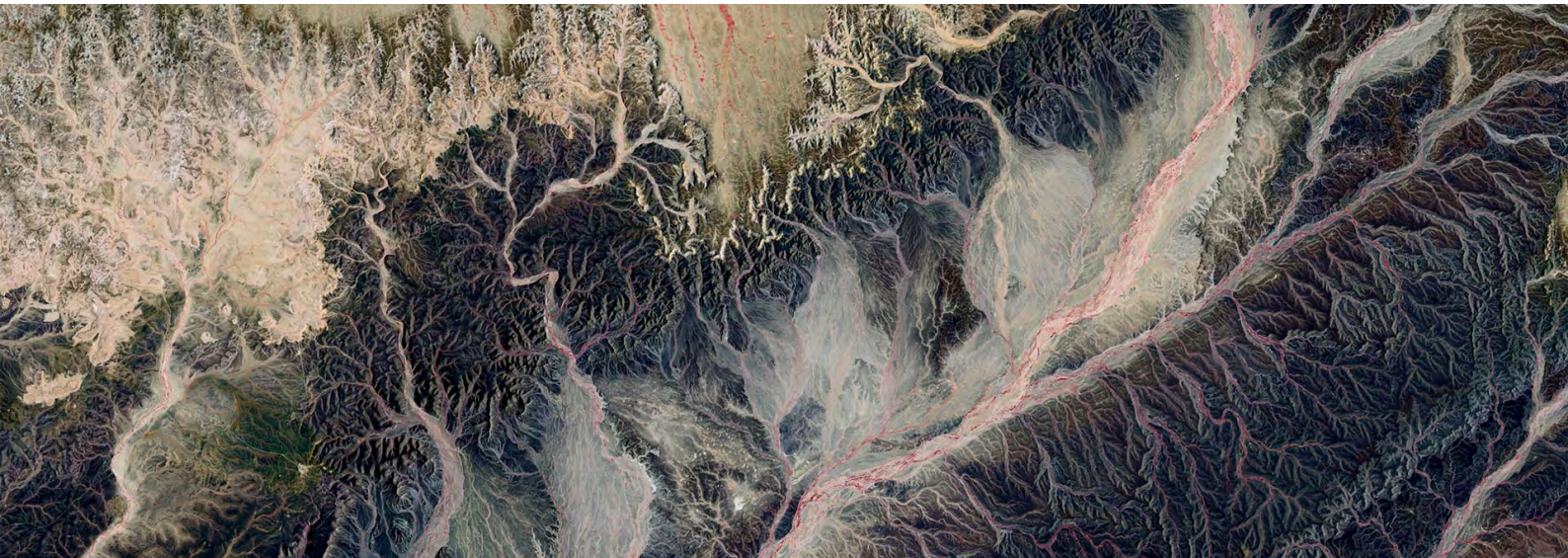
SECURITY MANAGEMENT:

Enhanced security protocols and a dedicated security manager role are crucial to maintaining secure operations across all assets.

COMPREHENSIVE SUPPORT:

Support operators should be equipped to handle global administration, supervision, and anomaly analysis, ensuring smooth and continuous operation of the ground segment.

By addressing these needs and incorporating these requirements, future EO systems will be better equipped to meet the dynamic demands of users, enhance operational efficiency, and maximize the value derived from Earth observation assets.



THE DOMINO ARCHITECTURE

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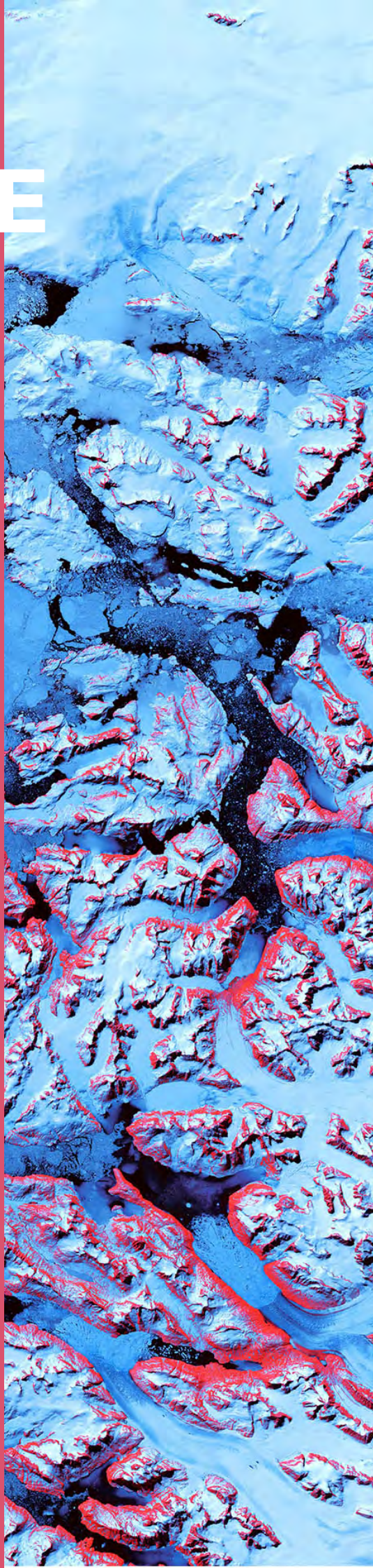
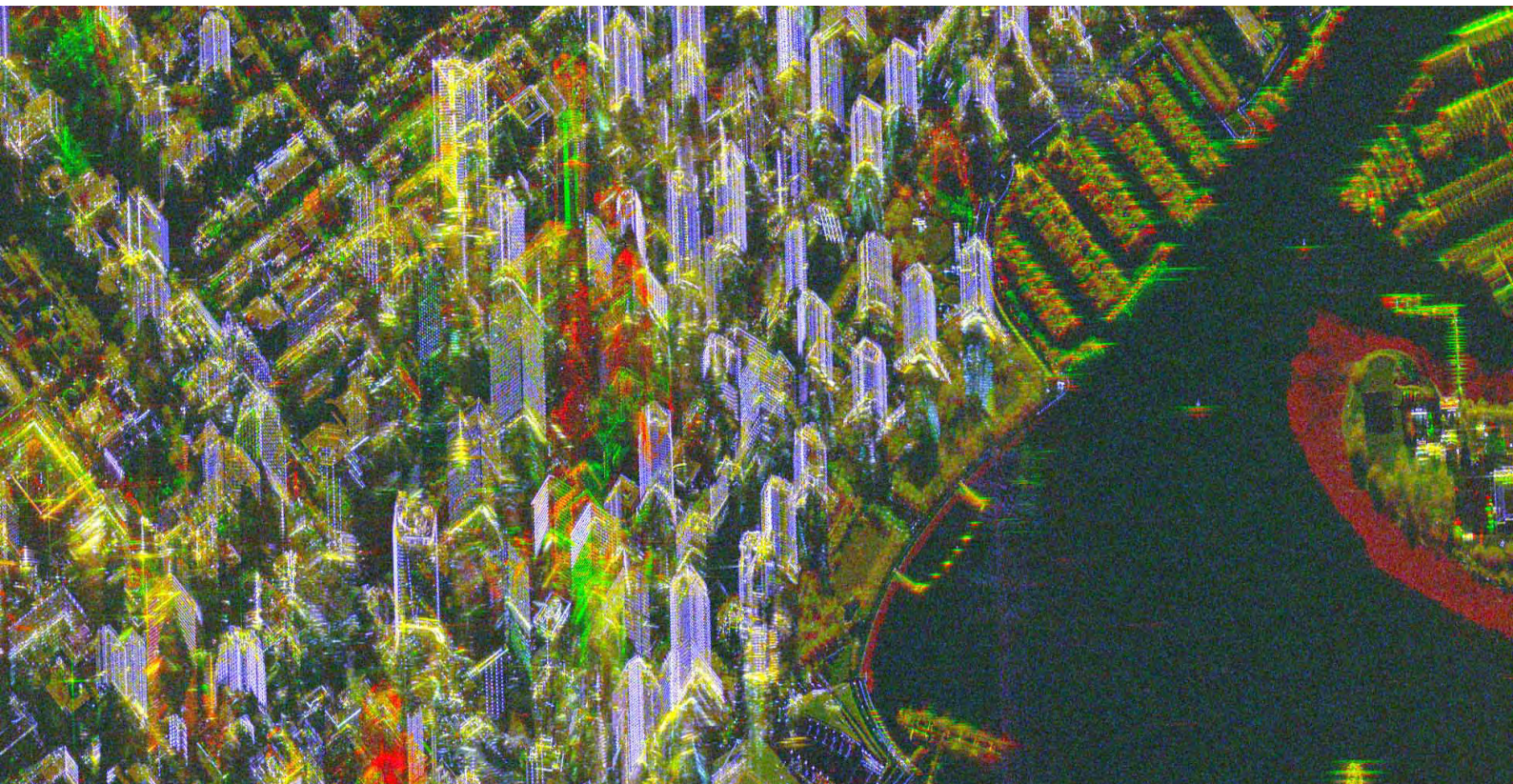


3 THE DOMINO ARCHITECTURE

The Domino architecture is a modular, secured and evolutive architecture for federated EO system built upon a foundation of well-established functions split and standardized interfaces, ensuring that all components within the ground system can communicate and work together seamlessly. Sharing standards between industry, governmental bodies and research institutes eliminates the need to reinvent the wheel, allowing stakeholders to leverage existing expertise while focusing on developing cutting-edge solutions.

The Domino architecture is reusing as much as possible standards such as those established by the Open Geospatial Consortium (OGC), the Consultative Committee for Space Data Systems (CCSDS) and European Space Agency (ESA). Together, these standards provide the basics for data exchange and are expanded by additional agreed interfaces, ensuring that information from various EO sources can be integrated into a cohesive system. For example, the OGC Application Programming Interface (API) standard enables the execution of computing processes, the retrieval of meta data describing their purpose and functionality and the retrieval of the results of the process execution. The ESA's HTTPS API REST standard is used to discover and download data from the different processing Dominoes.



3.1 DOMINOES AND THE FLEXIBLE GROUND SYSTEM

The Domino architecture centers around a Flexible Ground System framework, implemented through specialized dominoes. These modular components address distinct aspects of Earth Observation ground systems, with some focusing on core Ground System (GS) operations and others dedicated to managing various satellite constellations.

DOMINO'S PERIMETER:

- VHR, HR — dedicated to a homogenous constellation
- Multi — multi-mission
- EXT — external system

DOMINO'S INSTANCES

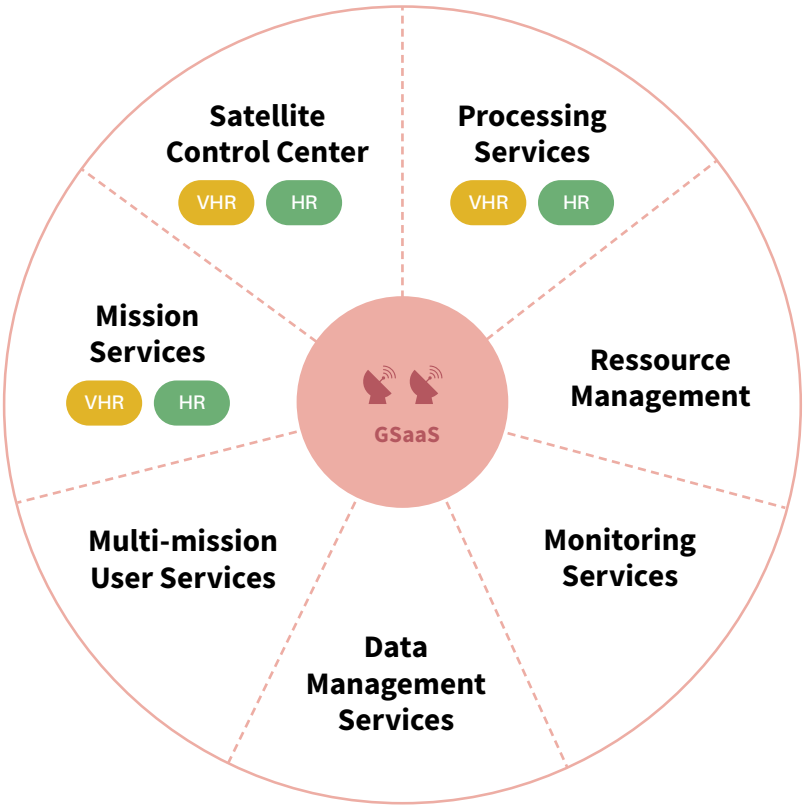
- 1 — one unique instance of this domino
- n — could be many instances deployed without "redundancy" dimension

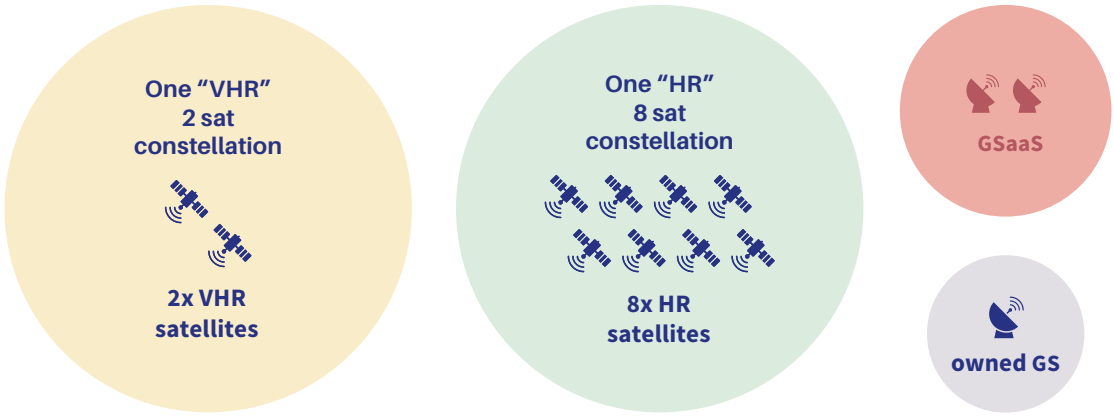
DOMINO'S MODE

- 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





Currently, the Domino framework primarily supports optical imagery, encompassing both High Resolution (HR) and Very High Resolution (VHR) satellite constellations. However, the architecture’s inherent flexibility allows for future expansion to accommodate diverse imaging modalities, such as radar or hyperspectral imaging. Furthermore, the Domino architecture transcends proprietary and single-mission limitations by enabling communication with external missions, fostering a multi-mission approach that optimizes resource utilization while delivering optimal results to users.

> The Domino we are working on will allow network providers to loan their stations to you - and this has not been done here before. By using shared ground stations, you don’t need to invest in your own hardware station, so you can decrease the cost to access space. And that will mean more actors into space, more data that we can share.

Philippe Pavero

Engineer
AIRBUS

3.2 DOMINOES AS MODULAR BUILDING BLOCKS

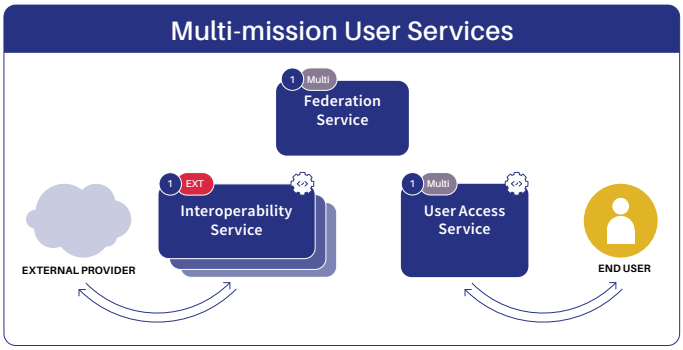
A Domino is a modular and adaptable component within a larger Earth observation ground system, designed to be tailored to specific mission requirements. Its flexibility is manifested in its ability to support a range of EO missions or be dedicated to a single, specialized task. Each Domino can be customized with a combination of mandatory and optional functionalities, optimizing performance and resource utilization for its designated role. Furthermore, a Domino can be delivered as a service for on-demand access or as a standalone product for integration into existing systems. To address diverse performance needs, a Domino can be deployed on premises or on cloud in order to be scaled. This ensures adaptability to varying workloads and user demands.

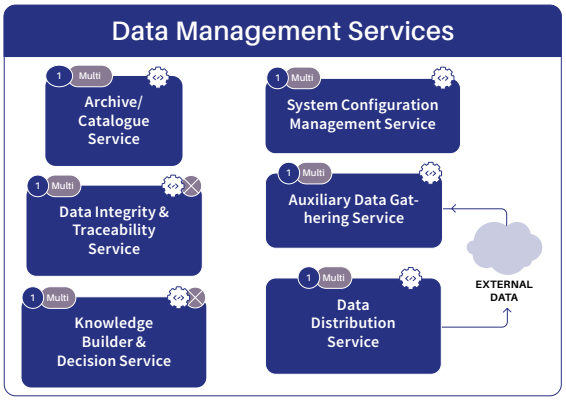
By combining these characteristics, Dominoes provide a flexible and adaptable building-blocks for building complex EO ground systems. They enable efficient resource management, seamless integration of diverse functionalities, and scalable performance to meet the evolving needs of the EO community. To better illustrate the functional areas of each Domino, they have been assigned to specific categories and services in the following graphic.

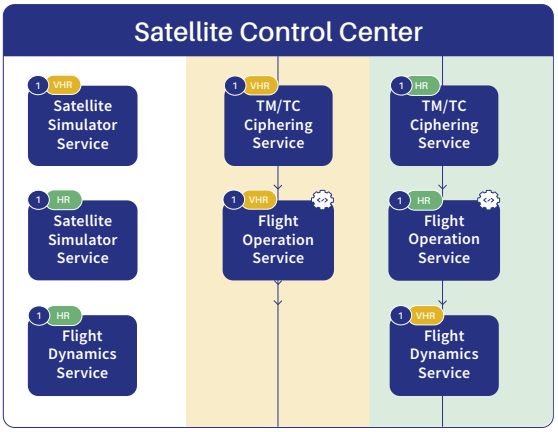
> Weather remains a major uncertainty that affects all Earth Observation satellites. Currently, we focus on optical sensors, but other sensor types, like radar or infrared, could be used when weather or light conditions make optical imaging difficult. Our framework can, however, adapt to these different scenarios, allowing for Things like radar-based Imaging when Clouds are present. While our current focus is on optical missions, our algorithms are designed to support these evolving needs.

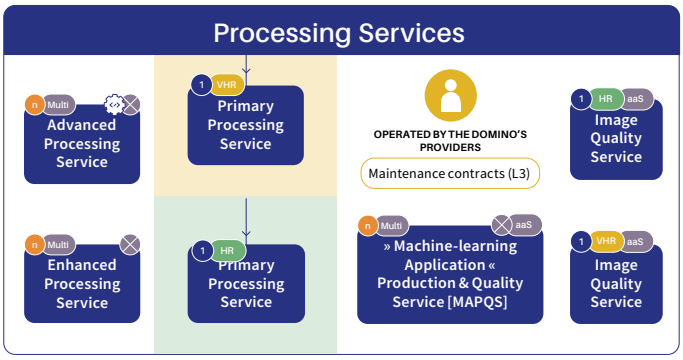
Gauthier Picard

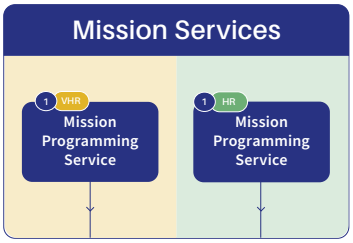
Senior Research Scientist
ONERA

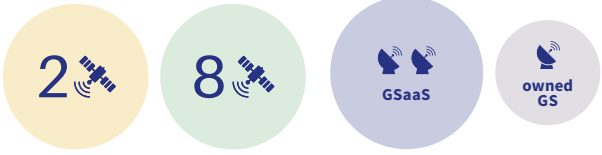












HR & VHR dedicated to an homogenous constellation

Multi multi-mission

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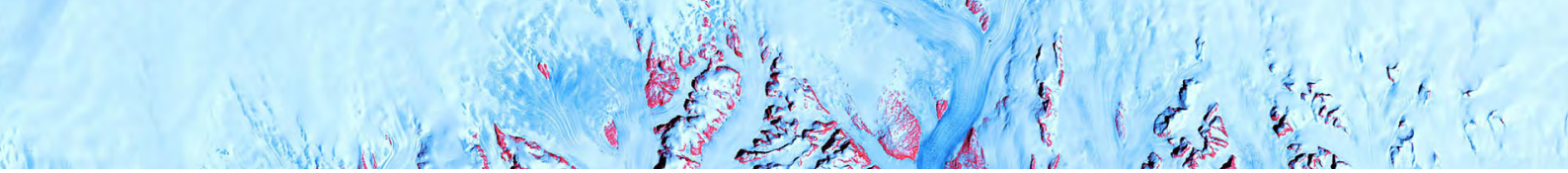


3.3 INTERFACE DESIGN PRINCIPLES

The interfaces within the Domino architecture are designed with key principles in mind: modularity, scalability, and flexibility. Modularity ensures that each component or „Domino" can be developed independently while still being compatible with the larger system. Scalability allows the system to handle increasing amounts of data and users without a loss in performance, which is critical as the demand for EO data grows. Flexibility ensures that the system can adapt to end-users' needs, new technologies and standards as they emerge, future-proofing the investment made by stakeholders.

WHAT IS A DOMINO?

A domino provides a valuable SERVICE useful to any Earth Observation ground segment.

A DOMINO ...

... autonomously produces outputs from a set of inputs.

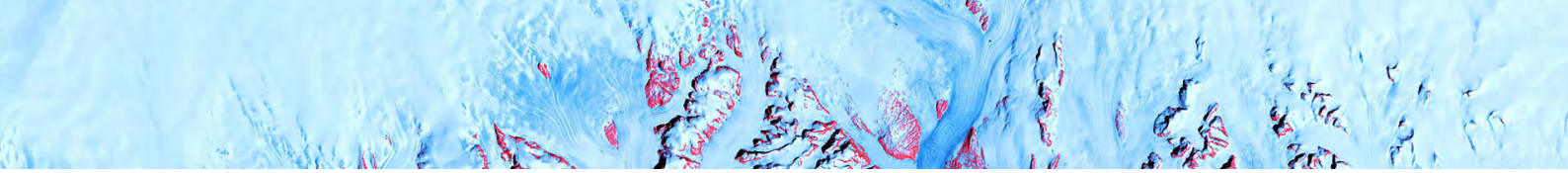
... provides a define set of functions.

... can be deployed on a cloud.

... is independent from other dominoes infrastructure.

... is accountable for its performances.

... is interchangeable by another implementation respecting the same interfaces.



3.4 THE DOMINO ARCHITECTURE DATAPACK

The Domino-X project has laid the foundation for the Domino architecture by developing a ground segment system architecture with stable and public breakdowns and interfaces, ensuring the right level of granularity and low coupling between building blocks. This modular approach facilitates the creation of an ecosystem of component providers, where different entities can contribute specialized solutions that integrate seamlessly into the overall system.

In addition, Domino-X introduced offers such as Public Cloud and Ground Station as a Service, allowing for more flexible and scalable access to Earth Observation (EO) systems. One of its core goals was to reduce the operating costs of EO systems by employing advanced concepts of operations, which account for human factors and automation, particularly in image quality management.

The project also enabled the team to gain expertise in Artificial Intelligence (AI)/ Machine Learning and Federation Layer technologies. These functional bricks, developed in Domino-X, are critical to the evolution of the Domino architecture, particularly in automating tasks and improving the interoperability of EO systems. The work done in Domino-X thus set the stage for more innovative, cost-efficient, and highly integrated EO solutions in the Domino framework.

With the Domino Datapack, Domino-X has created a central information base that contains information on the key terms, specifications, interfaces, software and hardware standards of the Domino architecture. The Datapack is aimed at all developers in SMEs and the entire EO industry who want to contribute to the further development of individual Dominoes.

DEVELOP YOUR DOMINO

GET THE DOMINO DATAPACK

(klick on the link)

THE DOMINO-E CONTRIBUTION

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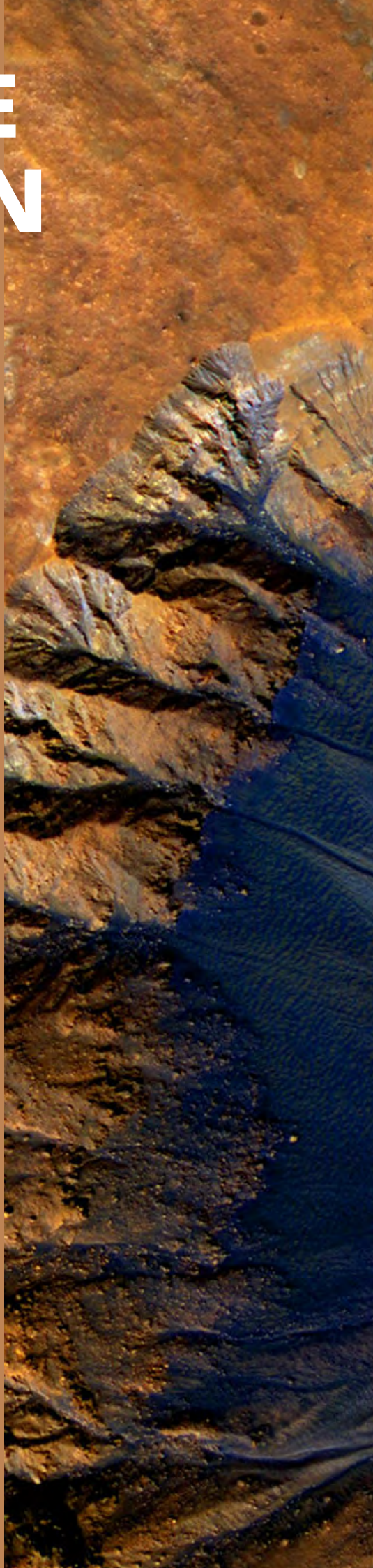


4 THE DOMINO-E CONTRIBUTION

The Domino-E project plays a pivotal role in enhancing the Domino architecture by contributing three key components: the Federation Domino (Coverage Service), the Mission Booking Service (Satellite Communication and Resource Management Domino), and the Virtual Assistant Service (User Access Domino). Each of these components addresses specific challenges in EO, leveraging the technical interfaces and standards described earlier.

4.1 FEDERATION DOMINO (Coverage Service)

The Federation Domino's role is designed to manage and optimize Earth Observation coverage requests across several federated EO missions. Its primary function is to efficiently distribute coverage requests among all EO systems available to expedite their completion. The Federation Service interacts with the User Access Service (UAS) and the Mission Planning Service (MPS) of each federated mission. It provides several key functionalities. Firstly, it distributes coverage requests to multiple EO missions to maximize efficiency and minimize processing time. Secondly, it evaluates and adjusts the distribution of requests as needed to optimize resource utilization. Lastly, it monitors the progress of each request and provides real-time updates to the end-user. By adhering to established standards and protocols, the Federation Domino ensures seamless integration with other components within the Domino architecture.

4.2 SATELLITE COMMUNICATION AND RESOURCE MANAGEMENT DOMINO (Mission Booking Service)

Effective management of satellite communication and resources is essential for the success of EO missions. The Mission Booking Service addresses this need by providing a standardized interface for scheduling and managing satellite resources. Using state-of-the-art algorithms, this service connects without con-

flicts multiple satellite constellations with various GSaaS (Ground Station as a Service) networks. Thanks to on-demand booking services offered by GSaaS, the booking service is able to address dynamic needs of each mission and to provide optimized contact solutions based on criteria such as cost, capacity and reactivity. The booking service relies on CCSDS protocols compliant with GSaaS to ensure standardized and reliable communication between satellites and ground stations. By adhering to these protocols, the Mission Booking Service ensures that the resources are used efficiently, and the data acquisition process is optimized for speed and accuracy.

4.3 USER ACCESS DOMINO
(Virtual Assistant Service)

The User Access Domino enhances the user experience by providing a virtual assistant service that interacts with EO data on behalf of the user. This service employs cognitive technologies to understand user queries and retrieve the most relevant data. The interface for this service is built upon established user interaction standards, ensuring that it is intuitive and easy to use. By simplifying the access to complex EO data, the User Access Domino makes it easier for end-users, including non-experts, to leverage the full potential of the EO data available through the Domino architecture.

> DOMINO-E introduces a federation layer that changes how requests are handled. Typically, users must choose a specific system or satellite constellation to fulfil their requests. In DOMINO-E, users submit their requests to this federation layer, automatically dispatching them to the most suitable missions. This means users don't need to worry about which system will handle their observation—it just gets done in the most efficient way possible.

Cédric Pralet

Senior Research Scientist
ONERA

MARKET OPPORTUNITIES

5

5 MARKET OPPORTUNITIES

SMEs play a critical role in the Domino framework, developing specialized components that add value to the overall system. The standardization of interfaces ensures that these components can be easily integrated into larger systems, enabling SMEs to compete on a level playing field with larger companies. This empowerment of SMEs is a key driver of innovation within the European EO industry, fostering a vibrant marketplace where new ideas and technologies can thrive. The market potential for EO is vast, with applications ranging from environmental monitoring to disaster management. By developing components that adhere to established standards, SMEs can tap into this growing market and provide system integrators with the tools they need to create comprehensive EO solutions. This not only benefits the SMEs themselves but also strengthens the overall competitiveness of the European EO sector.

5.1 THE DOMINO ECOSYSTEM

The Domino concept emerged from a collaborative effort, and its continuous development thrives on this shared commitment. This collaborative spirit has been a hallmark of all Domino projects to date. From the initial Domino-X to Domino-A, Domino-E, and MESEO, each iteration has benefited from the combined expertise and shared vision of various partners. This collaborative approach ensures that Domino remains a versatile and adaptable framework, capable of meeting the evolving needs of the EO community and is shared and agreed between all the stakeholders.

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

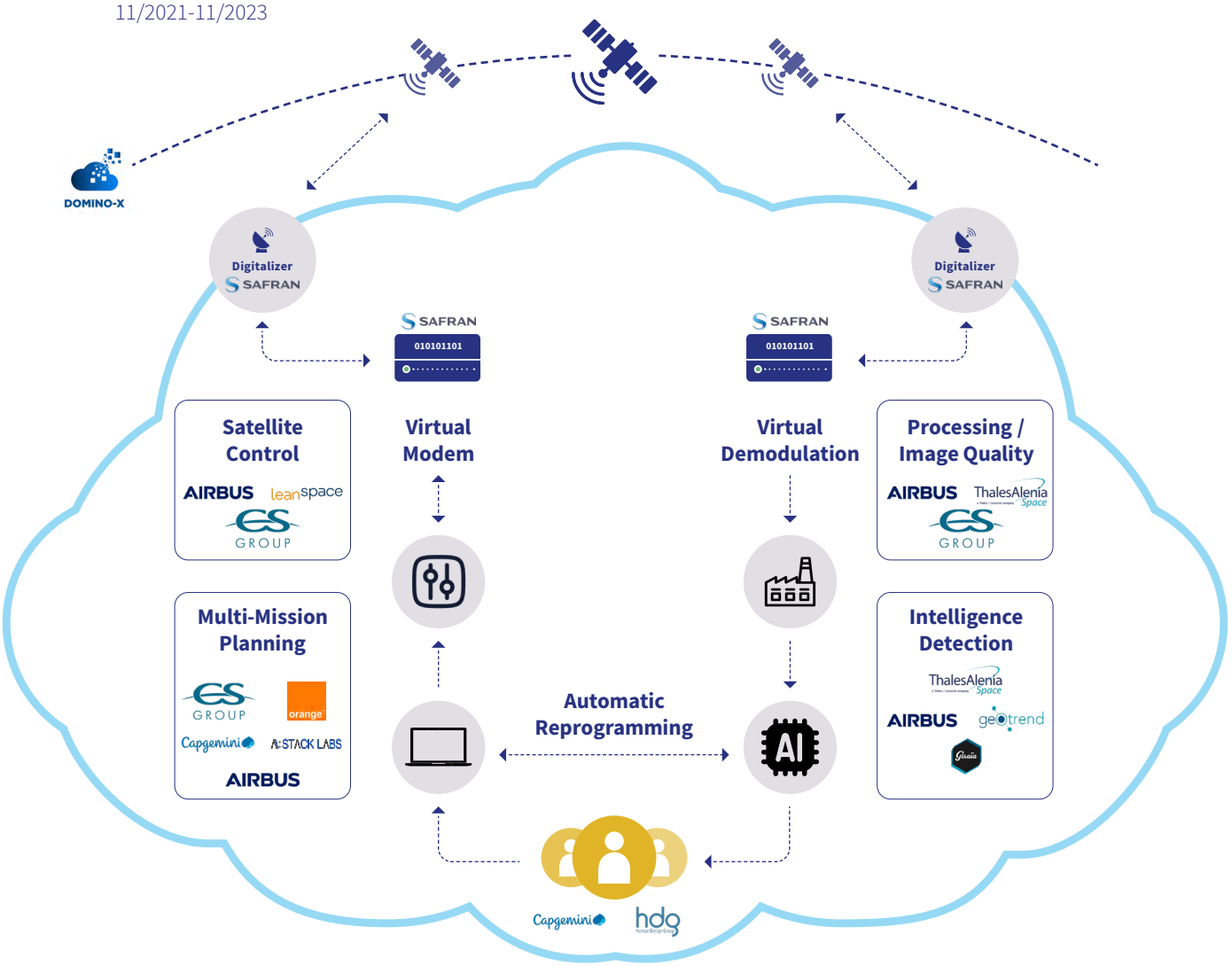


Figure 1. Overview of the industrial players of the DOMINO-X project involved in multiple key parts of the EO ground segment

AIRBUS gmv ONERA
DOMINO-E (HE EC)
11/2022-11/2025
https://domino-e.eu/
TILDE
VVA Capgemini iTTi

gmv AIRBUS creotech
MESEO (HE EC)
12/2023-12/2026
https://meseoproject.eu/
SATLANTIS
SOVITV
SISTEMA
RESOLVO
UBOTICA

AIRBUS hdg
DOMINO-A (GSTP ESA)
02/2024-02/2026
leanspace

DOMINO-X laid the foundation for the Domino concept, focusing on the development of modular and interoperable components for EO ground systems. It demonstrated the feasibility of building flexible and scalable systems using a building block approach. Eleven industrial partners led by Airbus have been supported by the French Plan de relance and CNES together with significant investment from the industry to ensure that Domino-X addressed real-world challenges and produced practical solutions for the EO community. The involvement of multiple space agencies in Domino-X was crucial for defining common standards and protocols for data exchange and interoperability.

DOMINO-E enhances accessibility to Earth observation imagery by providing technology that grants users seamless access to diverse multi-mission data and acquisition assets. Its multi-mission, multi-layer federation system, featuring cognitive assistants, scheduling, and optimization algorithms, represents a paradigm shift towards user-centricity in the space industry. This fosters EU independence in Earth observation technology development, empowers the EU space sector to capitalize on the data-driven space market, and strengthens European competitiveness by supporting SMEs in creating multi-mission services.

MESEO (MULTI-MISSION EFFICIENT AND SECURE HIGH CAPACITY END-TO-END EO) aims to design, prototype, and demonstrate an open, flexible, and scalable multi-mission End-to-End Earth Observation system for processing massive satellite data. By building a collaborative digital ecosystem, MESEO enhances the security of the Domino ground segment. This includes enforcing security measures at both system and function levels and prioritizing a trustworthy, cloud-based security approach to safeguard data sovereignty.

DOMINO-A demonstrates the flexibility of the Domino architecture by extending it to a radar constellation, using the Airbus Next Generation Synthetic Aperture Radar (NGSAR) ground segment as a reference. Further investigations improve standardized interfaces by adding rules and governance to APIs, and develop immersive environment Dominoes for ground system operators. Finally, Domino-A develops a Flight Operation Service Domino to integrate a platform-as-a-service for space operations.

All Domino projects, the involvement of technology companies ensures that the services are built on cutting-edge technovlogies, providing users with powerful and efficient tools for managing and exploiting EO data.

DOMINO-X

DOMINO-X.SPACE

DOMINO-E

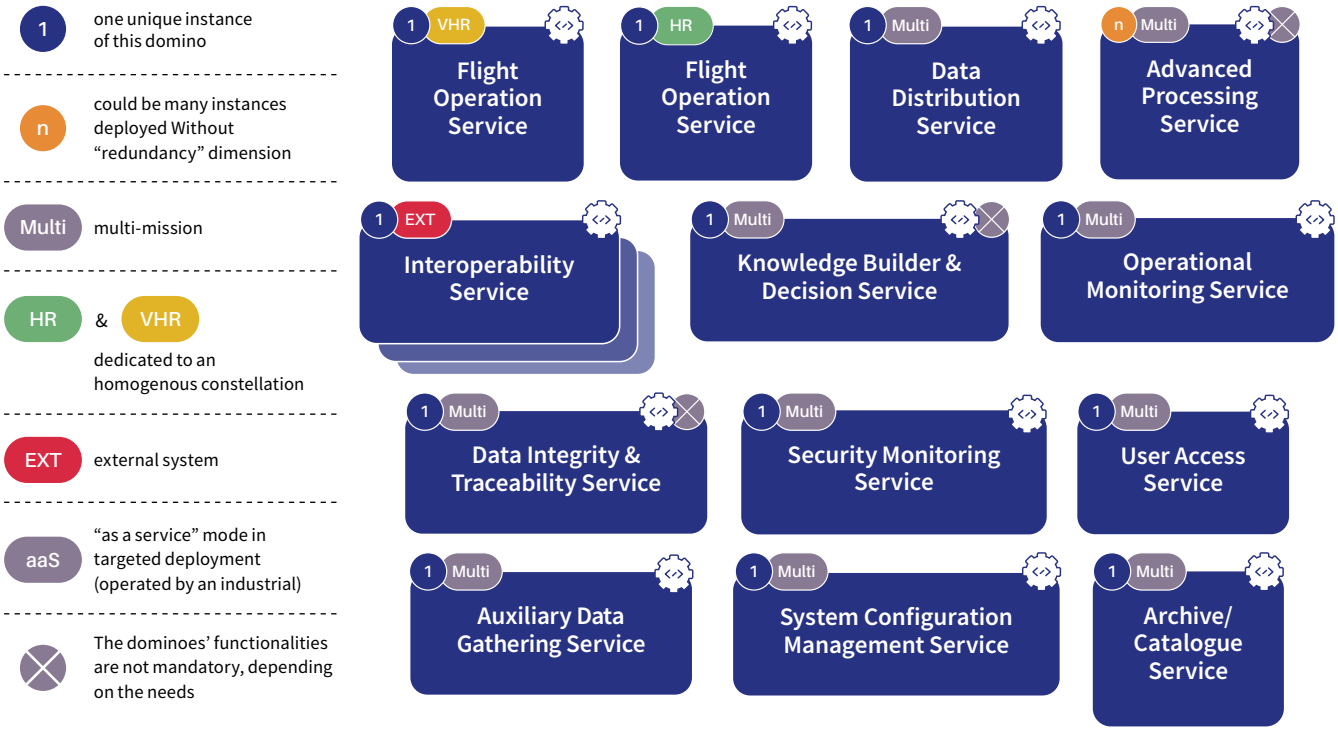
DOMINO-E.EU

MESEO

MESEOPROJECT.EU

5.2 A FUTURE MADE OF DOMINOES

The Domino framework has already demonstrated its viability with a number of operational Dominoes contributing to a market-ready system. Dominoes that have been prioritized for implementation due to their potential to significantly advance the capabilities of the federated EO ecosystem are those relative to the image processing chain, including analytics, to the federation and the antenna booking system.



However, the potential for future development remains vast. Numerous additional Domino implementations can be envisioned to further enhance Ground Segment workflows, optimize data processing and analysis capabilities, and even interoperate with external satellite constellations to increase the system's performance, robustness and resilience.

The possibilities are extensive and adaptable to the evolving needs of the EO community. With time, more types of EO missions can benefit from Domino based ground systems, be it optical, radar, hyperspectral or other missions, all of them possibly interoperable between each other. A Domino label of compliance may be envisaged as a market of Domino-ready products and solutions emerge. This label would allow for domino products to stand out in the eyes of system integrators. As the landscape of Dominoes matures, a technical governance with many actors would be established.

GOVERNMENTAL AND INDUSTRY IMPLICATIONS

6

6 GOVERNMENTAL AND INDUSTRY IMPLICATIONS

The adoption of the Domino architecture has significant implications for both governmental bodies and the broader industry. Their interests are intertwined since all seek more value out of their systems and subsystems over time, and the Domino architecture allows to do just that: more flexibility in terms of deployment of the ground segments, and in terms of consortium composition. EO systems with more value can be delivered faster and with better economics. Agreeing on certain key standards, just like in any other domain, benefits all stakeholders, the end users as well as the manufacturer.

6.1 FOR GOVERNMENTS

Governments play a crucial role in the success of the Domino architecture by supporting policies and initiatives that encourage the adoption of standardized EO frameworks. By doing so, they can ensure that national and EU-wide objectives in space and data sovereignty are met. Moreover, the use of established standards within the Domino framework ensures that government investments in EO technology are future-proof and can be easily integrated with other systems. Furthermore, thanks to the flexibility provided by a domino architecture, governments, agencies and institutions can more easily enforce policies on content made or operated locally for their missions, on sovereignty, on content made by SMEs or Mid Caps. In terms of technical governance of the domino architecture, it is natural that public entities play a key role in governing the evolution of the standards, since such entities do not have bias with respect to individual commercial entities.

6.2 FOR THE INDUSTRY

For the industry, particularly large system integrators like Airbus, the Domino architecture offers a collaborative framework that fosters innovation and accelerates the development of new EO solutions. By utilizing standardized interfaces, these companies can more easily integrate components from various SMEs, creating comprehensive systems that meet the diverse needs of their clients. This not only enhances the competitiveness of European companies but also ensures that they can respond quickly to emerging market opportunities.

The adoption of standardized interfaces within the Domino architecture presents significant opportunities for SMEs. By lowering the entry barriers, these standards enable SMEs to concentrate on innovation rather than the complexities of integration. By developing components that adhere to these standards, SMEs can ensure compatibility with the broader EO ecosystem, opening up new market opportunities. Moreover, standardized interfaces offer benefits for individual programs. Integration time is reduced, mitigating risks of schedule and cost overruns. From the perspective of the Domino supplier, standardized interfaces allow for a focus on internal functionalities rather than the complexities of external integration. This streamlined approach fosters increased investments and a more strategic product development focus.

> The Domino approach fosters both collaboration and competition simultaneously. On the one hand, it enables organizations to focus on their specific domains, developing modules that can be integrated and sold as part of a cohesive system. On the other hand, it introduces an element of competition, as those responsible for selling the complete system can selectively choose the best module for a particular application.

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FUTURE DIRECTIONS AND CONCLUSION

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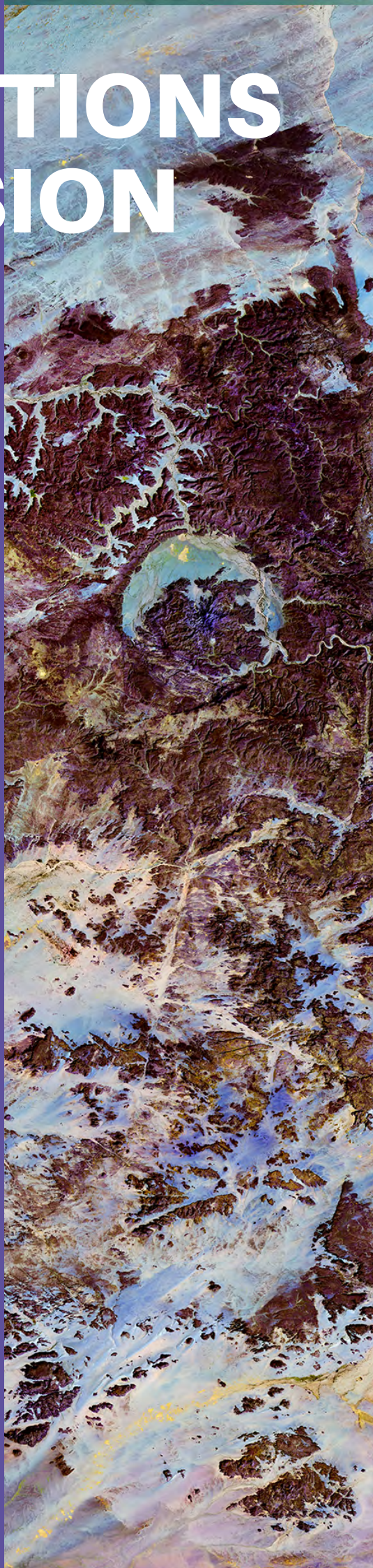


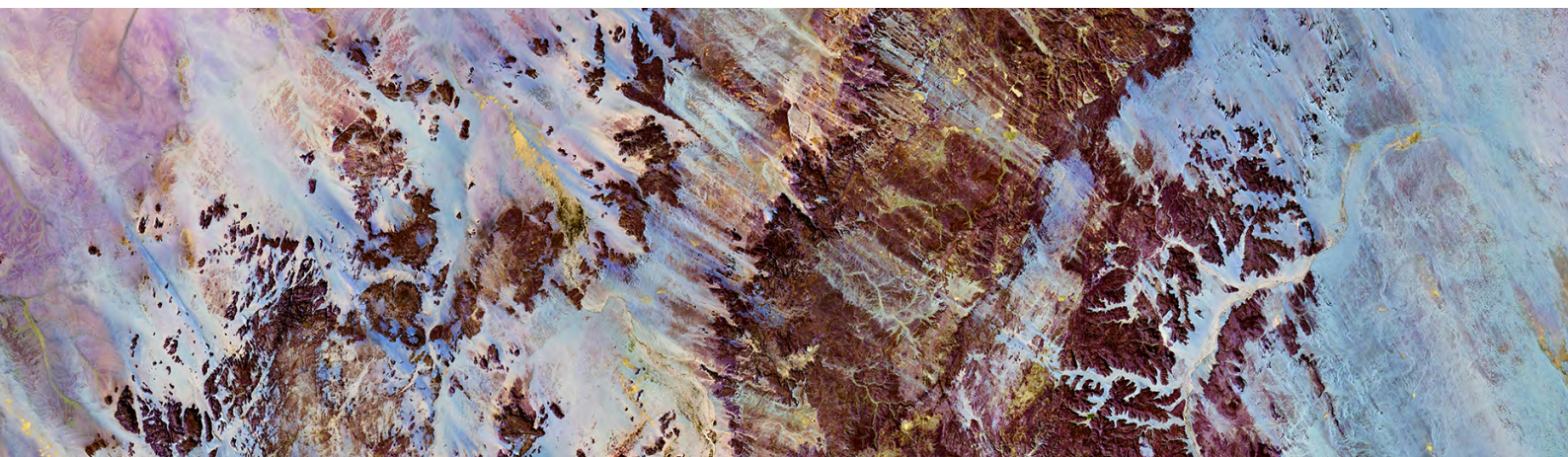
7 FUTURE DIRECTIONS AND CONCLUSION

The Domino architecture, an evolving framework, is already a success story. Important industrial players have reached consensus on many detailed technical aspects, and several operational programs have begun adopting it. In fact, some space players are already qualified as Domino providers. As SMEs, governments, and industry leaders continue to engage with this process, they will ensure that Europe maintains its leading position in EO innovation. The current architecture, with its standardized interfaces, is already facilitating collaboration and accelerating innovation.

As the demand for EO data continues to grow, so too will the need for new standards and interfaces that can handle this increased complexity. The Domino framework is designed to be flexible, allowing for the continuous evolution of these standards. This adaptability ensures that the framework remains relevant and effective, regardless of future technological developments.

The Domino architecture represents a significant step forward in the way EO data is processed, integrated, and utilized. By fostering collaboration between industry, science, and SMEs, it creates a rich ecosystem that benefits all stakeholders. For governments, it offers a pathway to achieving strategic objectives in space technology. For SMEs, it provides a platform for innovation and market growth. And for the broader industry, it ensures that European companies remain competitive in the global EO market.

The Domino architecture is poised for further growth and refinement. Future developments may include support for additional EO mission types, such as hyperspectral and radar frequency measurements, as well as ongoing enhancements to security and performance. As the Domino story continues to unfold, it is clear that this framework will play a pivotal role in shaping the future of Earth observation in Europe and beyond.



IMPRINT

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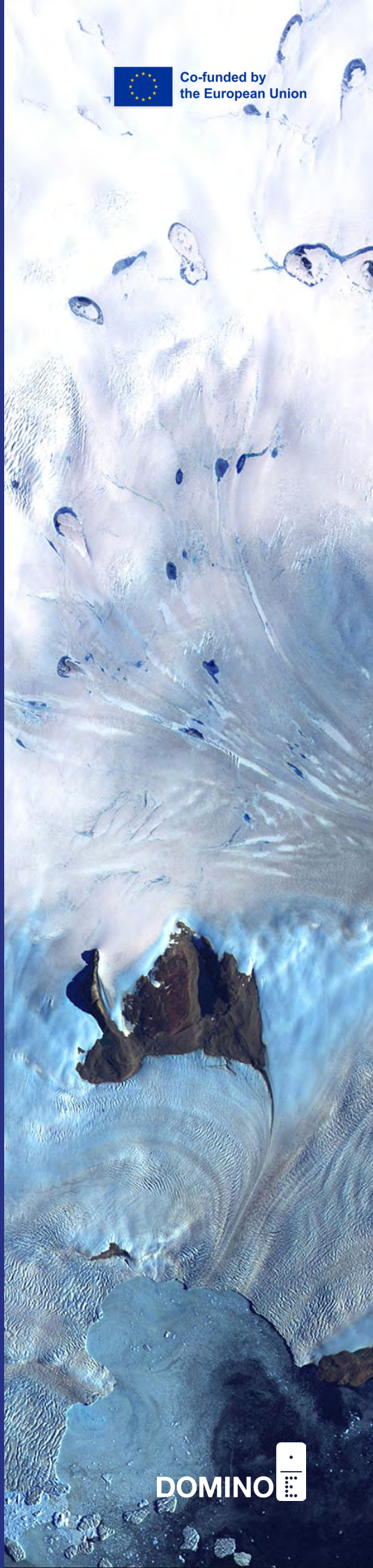

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