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DOMINO

# Demonstration of the VAS
# D29

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**Abstract**

This document presents the demonstration of the Virtual Assistant Service (VAS) developed within the DOMINO-E project. The VAS showcases how generative AI can enhance the usability of Earth Observation (EO) systems by enabling users to interact with complex satellite data services through natural-language dialogue.

The demonstration illustrates two main scenarios: exploring existing Copernicus catalogues to locate suitable imagery, and creating new programming requests when no appropriate images are available. In both cases, the VAS guides the user step by step — from selecting satellite constellations and defining acquisition parameters to formulating image acquisition requests for the Coverage Service (CS) and the Satellite Communication and Resources Management Service (SCRMS).

Through this intuitive, conversational interface, the VAS lowers the technical barrier to accessing EO data, helping users focus on their goals rather than on system complexity. A demonstration video, provided as an annex to this document, complements the written description by illustrating the interaction flow in practice.

List of participants

| Participant No | Participant organisation name | Country |
|---|---|---|
| 1 (Coordinator) | Airbus Defence and Space SAS | FR |
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## Applicable documents

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| Domino-E Description of Work | Version 1 | 29/09/2022 |
| Domino-E Grant Agreement 101082230 | Ares(2022)7032529 | 11/10/2022 |
| Domino-E Consortium Agreement | VF | 14/11/2022 |
| D2.2 Use Case Definition | Version 2.0 | 02/10/2023 |
| D5.2 Design and interface requirement for Virtual Assistant Service | Version 1.1 | 18/12/2023 |
| D5.3 Algorithm of Virtual assistant Service | Version 1.1 | 30/08/2024 |
| D5.4 Virtual Assistant Prototype | Version 1.0 | 30/01/2025 |
| D6.1 Design and interface requirement for multi-mission test beds | Version 1.0 | 31/05/2024 |
| D6.2 Design and interface requirement for Virtual Assistant test bed | Version 1.0 | 30/05/2024 |
| D6.8 Performance assessment report for the Virtual Assistant Service | Version 1.0 | 10/10/2025 |
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## Document Change Record

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# 1. INTRODUCTION

## 1.1 Scope

This document presents the **Demonstration of the Virtual Assistant Service (VAS)** developed within the scope of the **DOMINO-E project**. Building on the design, implementation, and evaluation work described in earlier deliverables – *D5.3 Algorithm of Virtual Assistant Service*, *D5.4 VAS Prototype*, and *D6.8 Performance assessment report for the Virtual Assistant Service* – this deliverable provides a practical illustration of the VAS in operation. Its main objective is to demonstrate how the VAS supports end users in interacting with Earth Observation (EO) data and services through a natural-language conversational interface.

The demonstration focuses on realistic usage scenarios implemented in the DOMINO-E Testbed, showing how the VAS guides users through typical tasks such as searching for existing EO products in the catalogue and creating new programming requests. These interactions highlight the VAS's capability to interpret user intentions, query connected services, and provide meaningful, context-aware responses. The demonstration also reflects the strong integration of the VAS with other core DOMINO-E components – namely the **User Access Service (UAS)** and **Coverage Service (CS)** – which together enable seamless end-to-end workflows.

While previous deliverables focused on the design principles, algorithms, and performance of the system, the current document provides a **visual and interactive perspective**, illustrating how the VAS operates from an end-user point of view. The demonstration is complemented by a **video annex**, which showcases the VAS in live action and provides an accessible overview of its conversational capabilities, responsiveness, and integration within the DOMINO-E ecosystem.

In summary, this deliverable serves as both a technical and communication tool – demonstrating the maturity of the VAS prototype and its potential to enhance user experience not only within DOMINO-E but also in other Earth Observation and data-driven systems.

## 1.2 Structure of the document

This document is organized into several chapters, each focusing on a specific aspect of the VAS demonstration:

- Chapter 1 – Introduction:
  Provides the background and objectives of the deliverable, outlines its connection to previous VAS-related developments within the DOMINO-E project, and summarizes the purpose of the demonstration.
- Chapter 2 – Definitions and Acronyms:
  Lists the key terms, abbreviations, and acronyms used throughout the document to ensure clarity and consistency.
- Chapter 3 – Demonstration Environment:
  Describes the DOMINO-E setup used for the demonstration, including the integration of

the VAS with other system components and the configuration of external services. This section provides a condensed overview of the environment previously detailed in the VAS Performance Evaluation deliverable.

- **Chapter 4 – User Guide and Demonstration Scenarios:**
  Presents a short, illustrative guide for users, highlighting the main capabilities of the VAS through selected demonstration scenarios. Screenshots and dialogue examples are used to show how users can interact with the system to perform key tasks.
- **Chapter 5 – Conclusions:**
  Summarizes the main outcomes of the demonstration and reflects on the VAS's maturity, usability, and potential for broader integration beyond the DOMINO-E context.
- **Annex – Demonstration Video:**
  Includes a reference to the accompanying demonstration video that visually showcases the capabilities and operation of the VAS in the DOMINO-E Testbed environment.

# 2. DEFINITION AND ACRONYMS

The following table lists acronyms used in this document:

| Acronyms & Definitions | |
|---|---|
| *AI* | Artificial Intelligence |
| *CS* | Coverage Service |
| *EO* | Earth Observation |
| *KB* | Knowledge base |
| *NLU* | Natural Language Understanding |
| *VA* | Virtual Assistant *or* Bot |
| *VAS* | Virtual Assistant Service |
| *UAS* | User Access Service |

Table 1: Acronyms & Definitions

# 3. ENVIRONMENT OF TESTS

The demonstration of the VAS is carried out in the DOMINO-E Testbed, a shared cloud-based environment that hosts all major DOMINO E components. The testbed enables seamless interaction between the UAS, the CS, and the SCRMS, allowing the VAS to be shown as an integral part of the overall system workflow.

During the demonstration, the VAS operates as a component embedded within the UAS, providing users with a conversational interface to perform tasks such as product search in the catalogue, geographical area selection, and creation of new programming requests. The demonstration highlights how users can interact naturally with the system and how the VAS assists them in building and submitting requests that are processed by the connected DOMINO-E services.

## 3.1 Testbed Configuration

The DOMINO-E Testbed is built on a cloud-based infrastructure hosting containerized microservices. It includes shared storage, network routing, and monitoring tools such as Prometheus and Grafana for tracking performance and resource usage.

All user interactions within the testbed are logged and managed through the VAS Management System, which records dialogue data, system responses, and key performance indicators.

Access to the testbed is restricted to project partners and available only for the duration of the DOMINO-E project. After the project's conclusion, the complete testbed — including UAS, CS, and SCRMS — will be decommissioned.

## 3.2 Standalone Demonstration Environment

To ensure the VAS demonstration remains accessible beyond the project lifetime, a standalone demonstration environment has been deployed. This environment hosts the VAS as an independent web-based chatbot with functionality equivalent to that available in the UAS-integrated version.

The standalone demonstrator allows users to explore the main features of the VAS, including conversational queries, satellite data search, and the creation of new programming requests. In this environment, the VAS does not send requests to the Coverage Service; instead, it displays the generated request parameters on screen, allowing users to review and understand how such requests would be constructed in a fully integrated setup.

## 3.3 Access and Demonstration Setup

The following instances are available for demonstration purposes:

- User Access Service with integrated VAS chatbot UI: https://coverage-service-e2e.domino-e-testbed.com/user-requests
- VAS Management System: https://va-tilde.domino-e-testbed.com/

- Standalone VAS Webchat UI (available also after the DOMINO-E Testbed is commissioned at the end of the project): https://va.tilde.com/scontent/prodk8sbotdomin0/media/staging/uas.html

The demonstration video (Annex) showcases the VAS operating within the DOMINO-E Testbed environment, while a standalone version is also available to illustrate the main functionalities in an independent setup.

# 4. User Guide and Demonstration Scenarios

The Virtual Assistant Service acts as an intelligent conversational interface between end users and the complex world of satellite-based Earth Observation (EO). Its mission can be summarized simply:

> No need to speak satellite.

Many users who could benefit from EO data are unfamiliar with the technical terminology, parameters, and operational procedures required to formulate satellite acquisition or processing requests. The VAS lowers these barriers by enabling users to interact in natural language – through conversation rather than forms, codes, or manuals.

The assistant interprets user intentions, helps them specify geographical areas, select relevant satellites, and define image acquisition parameters, while simultaneously checking system constraints and available data. It guides users step by step through the process of creating valid programming requests or searching for existing images that meet their needs.

In short, the VAS transforms the complexity of satellite tasking into a guided, human-like dialogue – helping users understand, decide, and act.

To simplify the presentation, we do not provide a detailed step-by-step user manual for the VAS. Instead, users are guided through all key functions of the system using concrete examples, illustrated with screenshots in this document and demonstrated in the attached video. This approach allows users to understand the capabilities and workflow of the VAS in a practical, hands-on manner.

## 4.1 Where to Start

For this demonstration, we will use the VAS deployed in the DOMINO-E Testbed, which provides a fully integrated environment where the Virtual Assistant Service operates together with the CS and the SCRMS. This setup allows for end-to-end scenario validation and demonstrates the full capabilities of the system. The testbed version of VAS can be accessed here: https://coverage-service-e2e.domino-e-testbed.com/

For long-term demonstration purposes and public presentations outside the project, a standalone version of the VAS has also been created. This version showcases the core functionality of the Virtual Assistant without requiring access to other DOMINO-E components that might not be available outside the project. The standalone VAS can be accessed here: https://va.tilde.com/scontent/prodk8sbotdomin0/media/staging/uas.html

Field Code Changed

To start the demonstration, open the User Access Service in the DOMINO-E Testbed and log in with your credentials. Once logged in, you will see the main UAS window, which shows a list of user requests that are already in progress. From this window, you can open the chat interface to begin interacting with the Virtual Assistant Service (Figure 1). As soon as the chat opens, the VAS introduces itself and explains how it can help you (Figure 2). It will guide you through exploring satellite data, creating new user requests, and navigating the system, providing helpful instructions and answering your questions along the way.

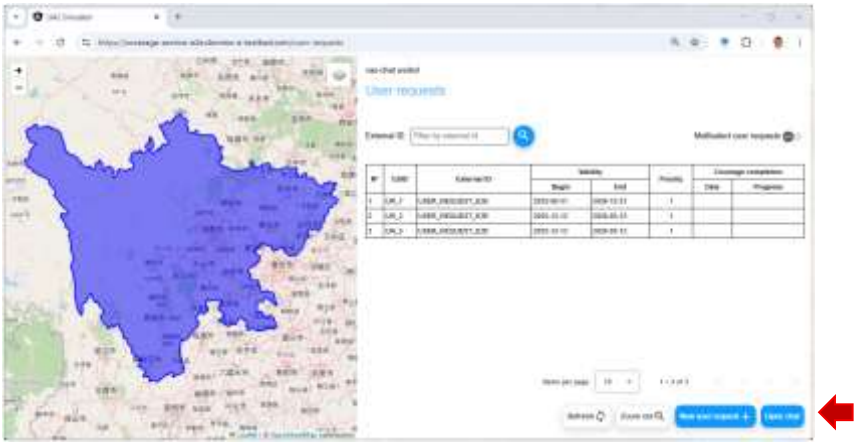

Figure 1. User Access Service and Virtual Assistant in it.

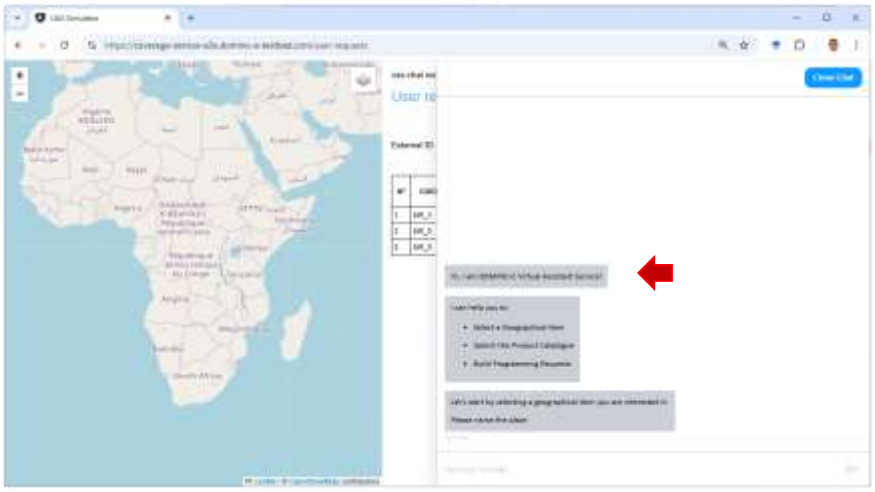

Figure 2. Virtual Assistant Service - Introduction.

## 4.2 Searching for satellite images

Let's start with one of the most common things you'll want to do — finding existing satellite images. The Virtual Assistant is here to make that effortless, just like chatting with a knowledgeable guide.

As soon as you open the chat, the assistant gets straight to the point:

"Please name the place"

You can simply type the name of a place – let's try "Brussels." (Figure 3)

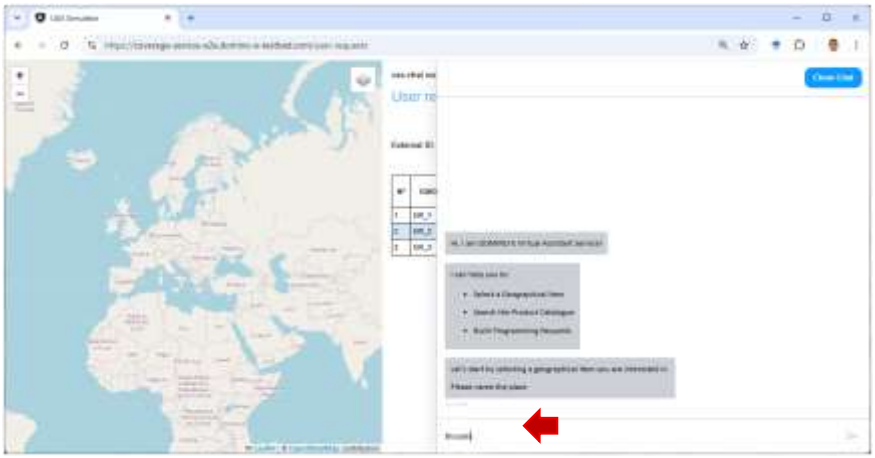

Figure 3. Virtual Assistant Service – Specifying an Area of Interest (step 1).

In a moment, the map zooms in, and you see the Brussels area highlighted on the screen. If it looks good, you can just confirm it (Figure 4). But if you want to focus on something more specific, you can adjust the boundaries or pick a different location manually.

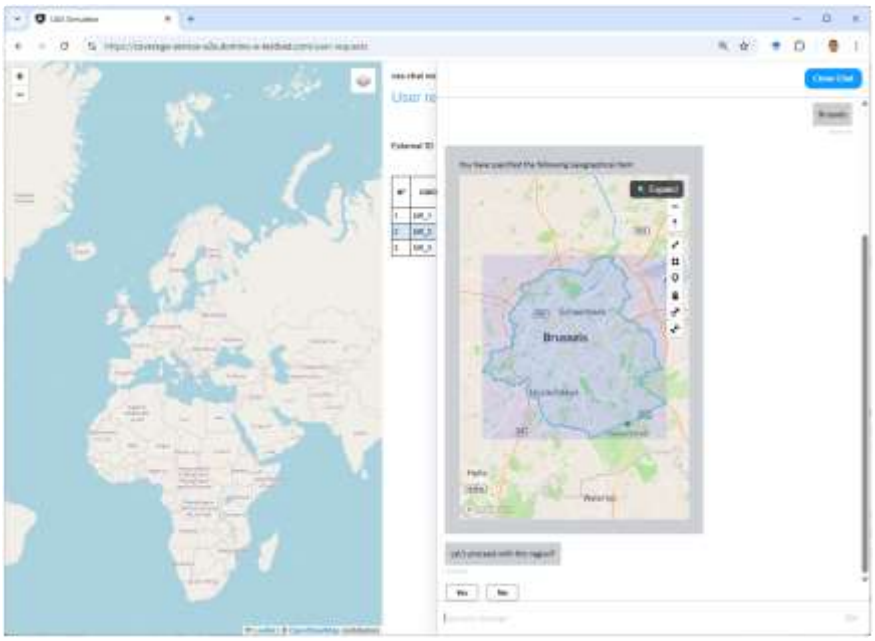


Figure 4. Virtual Assistant Service – Specifying an Area of Interest (step 2).

Once your region is set, the assistant offers you two paths forward (Figure 5):

- Search for existing satellite images, or
- Order a new one by creating a programming request.

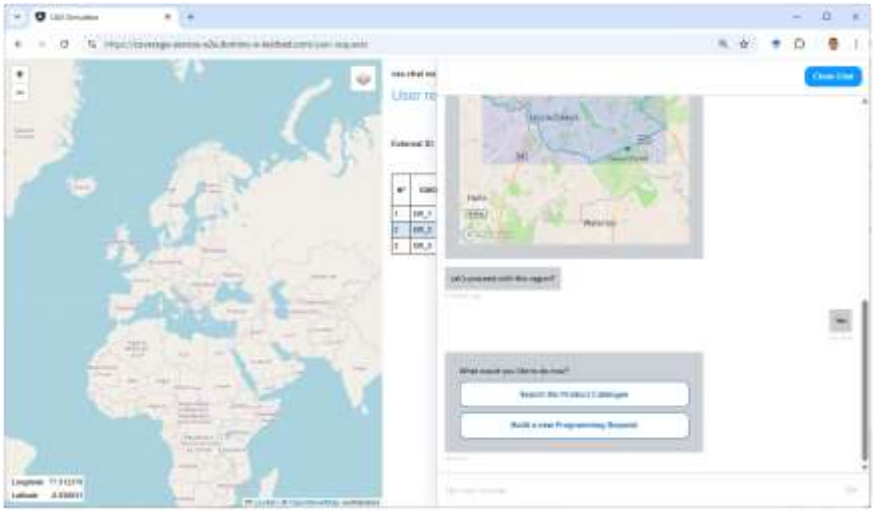

Figure 5. Virtual Assistant Service – What would you like to do now?

For now, let's choose to search the product catalogue. The assistant double-checks your region, then shows you a list of available catalogues (Figure 6) from the Copernicus database – these correspond to different satellite constellations. You can simply select one if you already know which satellite you're interested in, or you can ask the assistant to explain what each constellation does and what kind of data it provides (Figure 7).

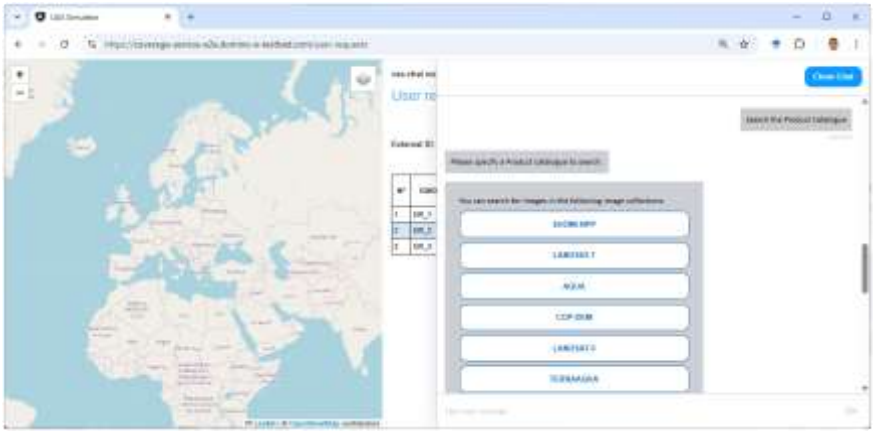

Figure 6. Virtual Assistant Service – Image Collections.

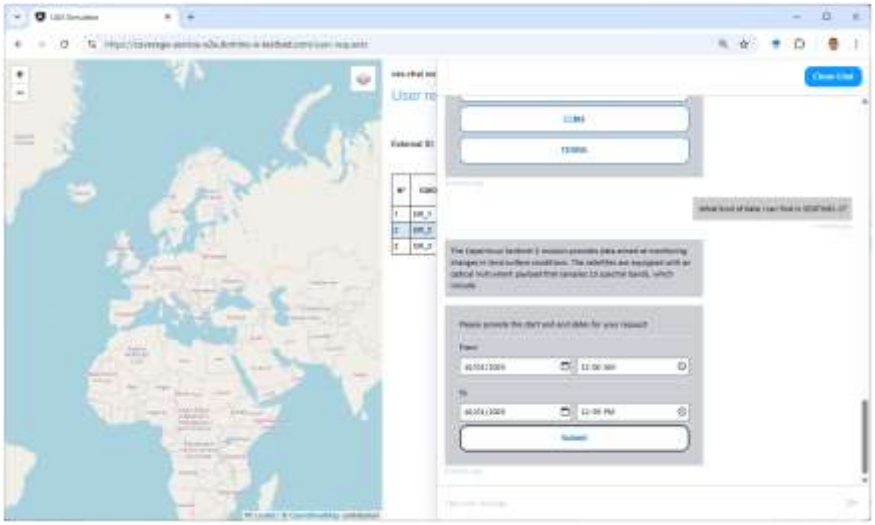

Figure 7. Virtual Assistant Service – Questions about Image Collections.

Next, the assistant asks for a date range – when the images should have been captured (Figure 7). You provide the dates, and within seconds, the results appear. You now see a list of satellite images that match your query. Each result comes with a small preview, key details like acquisition time, and links to obtain them (Figure 8).

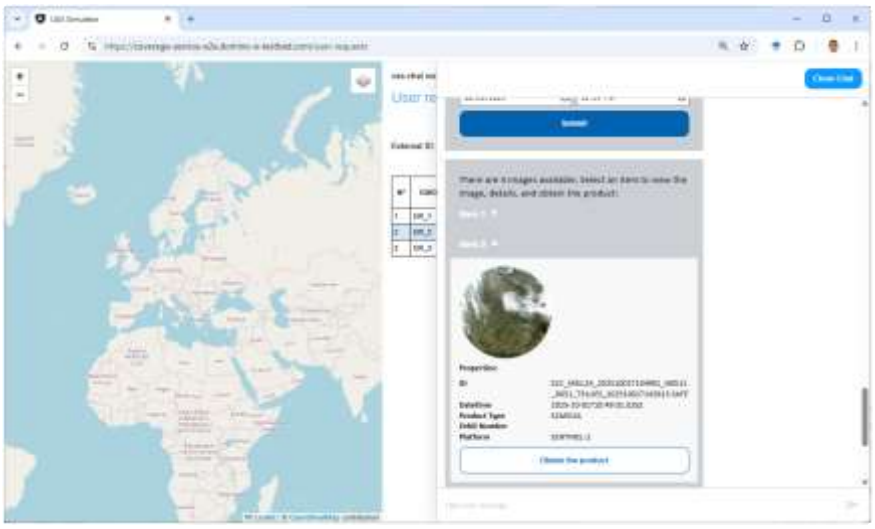

Figure 8. Virtual Assistant Service – Results of Image Search.

And just like that, you've found the satellite data you were looking for – without ever leaving the conversation.

### 4.3 Creating a New Programming Request

What if the image you need doesn't exist yet? No problem – the Virtual Assistant can help you request a new acquisition. This is where the VAS truly shines: it transforms your natural-language conversation into a formal request that can later be processed by CS and SCRMS.

The flow starts exactly like an image search. You tell the assistant the area you care about (or draw the polygon on the map) and then choose "Create a new programming request." (Figures 3 to 5) The assistant will:

- Show available constellations, satellites and download stations
- Ask for a time span when you want the acquisition to happen.

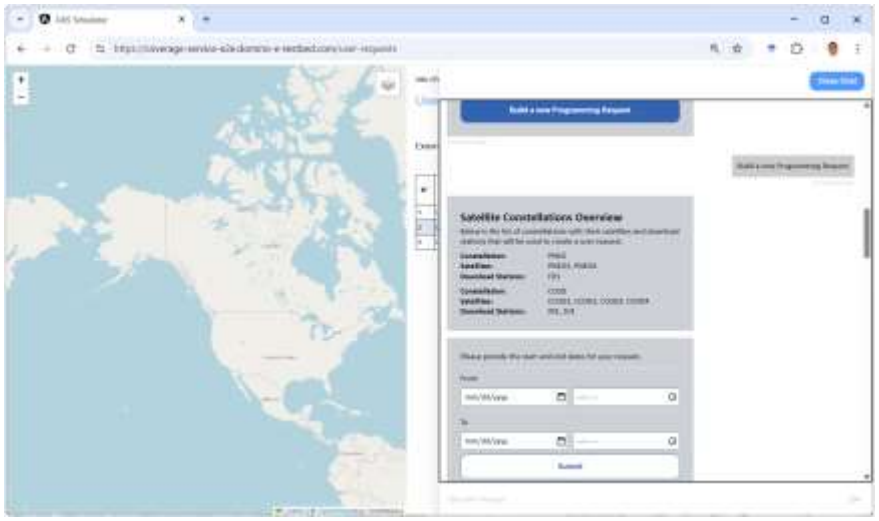


Figure 9. Virtual Assistant Service – Satellite Constellations Overview.

If you're happy with defaults, the assistant can proceed and prepare the request (Figure 9). But usually, you'll want images that meet specific needs (e.g., low cloud cover, specific viewing angles, or a particular acquisition mode), so the VAS helps you refine those technical parameters.

Let's start with satellite constellations. Each constellation has different goals, and the instruments they carry and the types of images they can capture vary widely. The VAS is here to help you understand which constellation is best suited for your needs.

The VAS can quickly summarize the differences and help you pick the right one for your objective, or you can ask the VAS questions like: "Which constellations are available?", "What are their primary purposes?", "Which has higher resolution?", "Which satellite should I use to monitor my forest?", "What are the main differences between CO3D and PNEO?", "Which is better for forest monitoring or for capturing elevation?" or "Can I use CO3D to measure tree heights?" The assistant guides you through all the details, helping you compare constellations and understand their capabilities. (Figures 10 and 11)

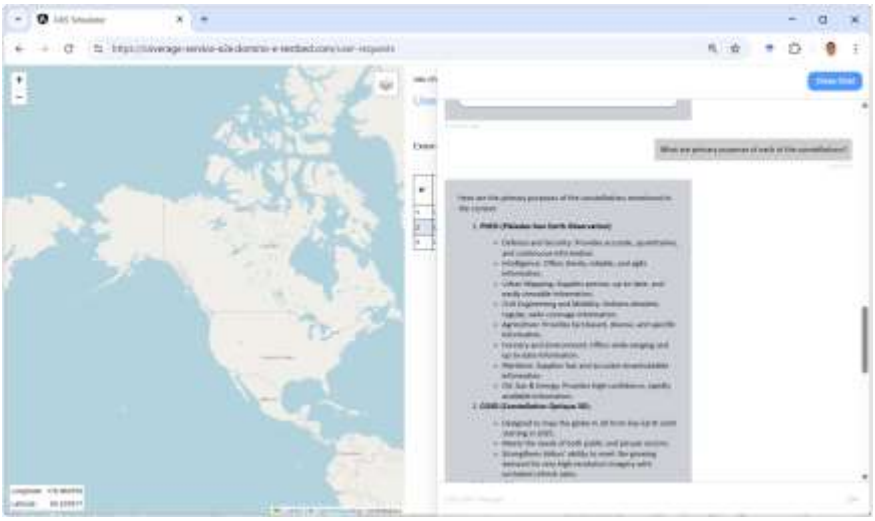

Figure 10. Virtual Assistant Service – Questions about Satellite Constellations (1/2).

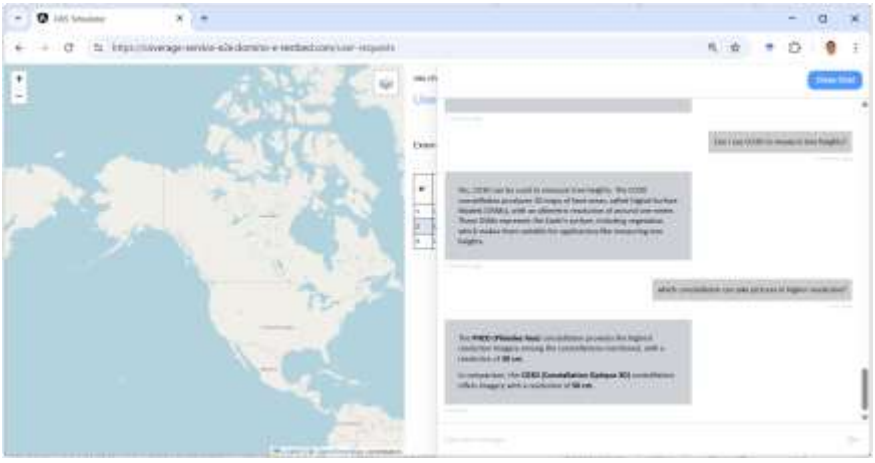

Figure 11. Virtual Assistant Service – Questions about Satellite Constellations (2/2).

Once you feel confident about which constellation fits your goals, you can simply instruct the bot to select it. For example, you might say: “Let’s go with CO3D.” The assistant then proceeds with the next steps of building your request based on that choice (Figure 12).

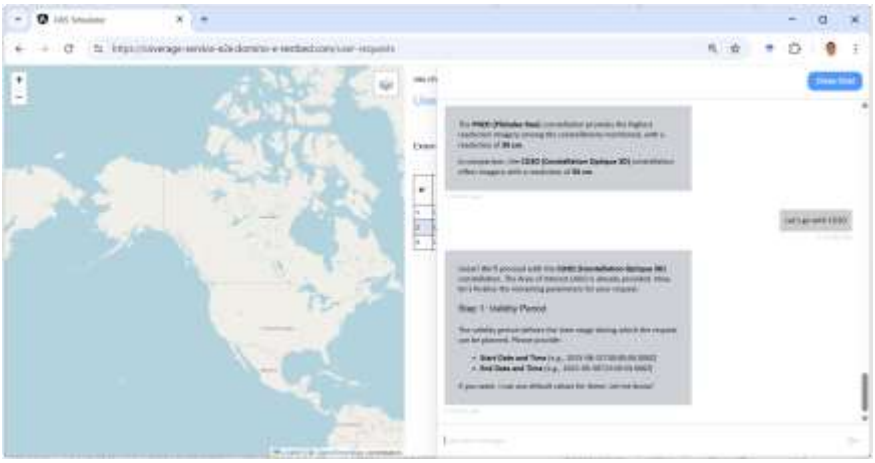

Figure 12. Virtual Assistant Service – Selection of the Constellation.

Now that you've chosen a constellation (or several), the VAS naturally moves on to the next step — the time window for your request. The assistant asks when you want the acquisition to be planned, but you don't need to type rigid date strings. You have full freedom: specify exact dates (e.g., 2025-11-01 to 2025-11-14), or use natural language like "November 2025" or "the first two weeks of November." The VAS understands these expressions, interprets them, and converts your answer into the precise format the system requires (Figure 13).

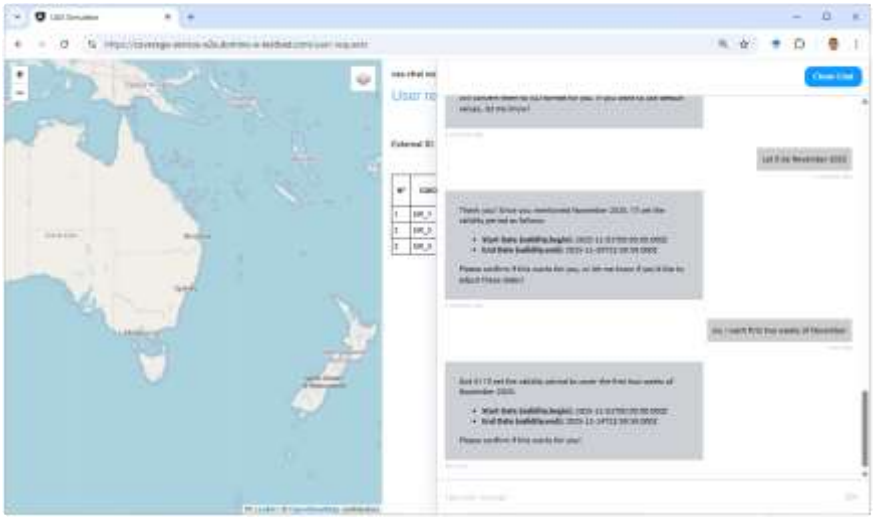

Figure 13. Virtual Assistant Service – Specifying the Validity Period.

Once the time range is set, the VAS offers to walk you through the rest of the acquisition parameters. It explains each parameter's meaning, its default value, and the allowed value

range — for example, cloud-cover thresholds, viewing angles, pitch limits, acquisition mode, and priority. You can follow the assistant step by step and accept defaults where appropriate, or you can dive in and customise values one by one.

This is an interactive conversation: ask the assistant to clarify anything ("what does off-nadir mean?", "why does this constellation limit psiXY to 27°?"), request examples, or say "leave default" for some fields and change others. The VAS validates inputs as you go, flags conflicting or out-of-range values, and suggests alternatives if a choice is likely to fail operational checks.

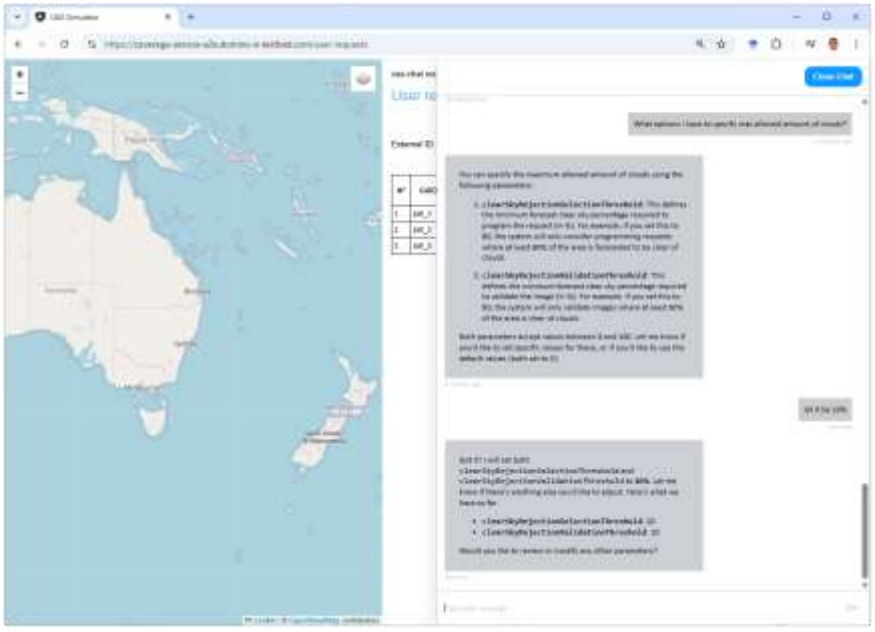

Figure 14. Virtual Assistant Service – Working with Parameters (1/3).

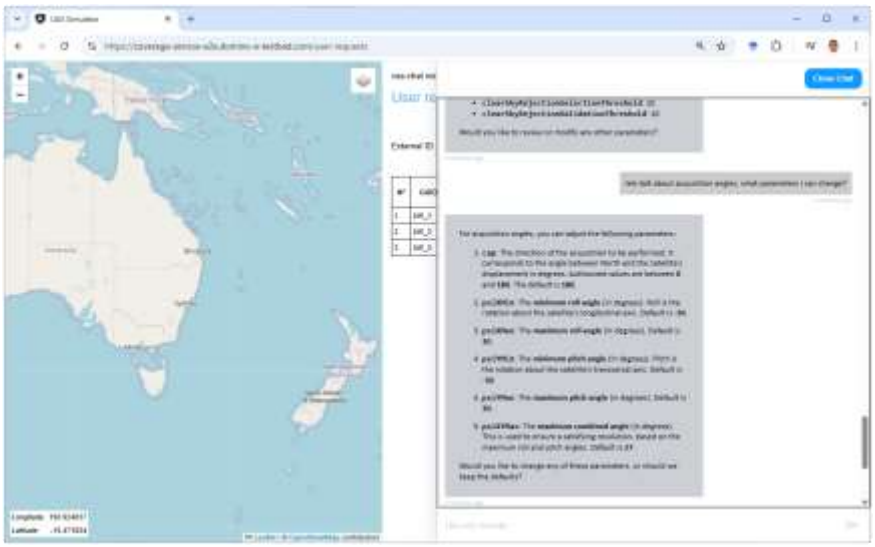

Figure 15. Virtual Assistant Service – Working with Parameters (2/3).

Figure 16. Virtual Assistant Service – Working with Parameters (3/3).

Take your time — you can revisit and revise any parameter during the dialogue. When everything looks correct, the assistant summarizes the full programming request in plain language and shows the exact structured request that will be sent to the system (Figure 17). In the integrated DOMINO-E Testbed the request is then deposited to the Coverage Service and triggers downstream actions in both in CS and SCRMS.

Figure 17. Virtual Assistant Service – Depositing the Request.

Behind the scenes the assistant uses generative AI-driven dialogue management to make this easy. Instead of forcing you to fill long forms, the VAS asks natural follow-up questions, validates your answers, converts your replies into standard formats, and warns you if a combination of parameters is invalid or likely to fail. You can also interrupt, revise, or revisit previously set parameters at any time.

**To summarize this demonstration**: the VAS turns the complex, technical process of ordering satellite imagery into a simple, guided conversation — helping you obtain exactly the data you need without having to "speak satellite." This intelligent, dialogue-driven interaction demonstrates how advanced language models can make complex EO operations accessible to a much broader user community.

## 4.4 Behind the Scenes: The VAS Management System

Now, let's take a look behind the scenes of the Virtual Assistant.

While the chatbot is the part that interacts with you directly, there's a whole management environment supporting it — the VAS Management System (Figure 18).

Here, VAS trainers can log in to maintain and continuously improve the assistant. They can explore and edit its logic, design and refine conversation flows, and enrich the knowledge base (KB) that the VAS relies on when serving users (Figure 19). Unlike general-purpose chatbots that operate on open internet data, the DOMINO-E VAS works strictly with carefully curated, domain-specific knowledge — ensuring that its responses are precise, relevant, and trustworthy.

Figure 18. Virtual Assistant Management System - Scenario.

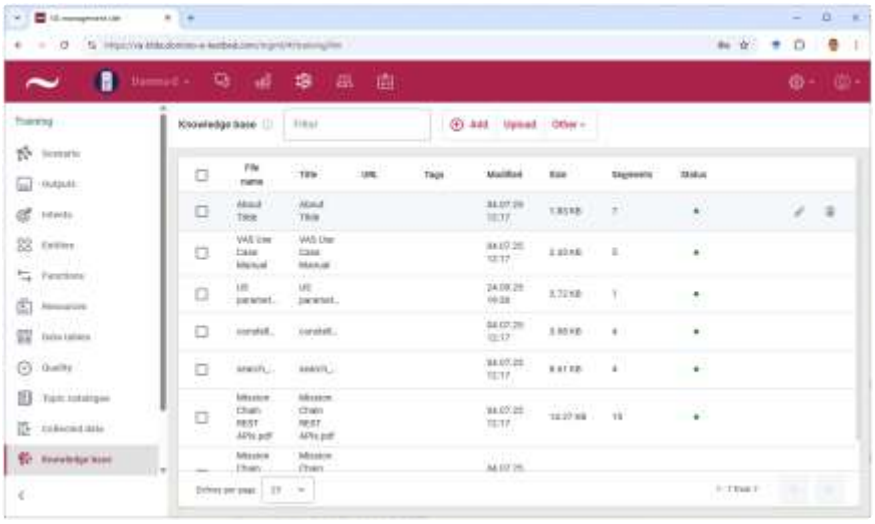

Figure 19. Virtual Assistant Management System – Knowledge Base.

In the same environment, service operators can monitor user interactions (Figure 20), identify issues or recurring questions, and plan updates to improve future performance.

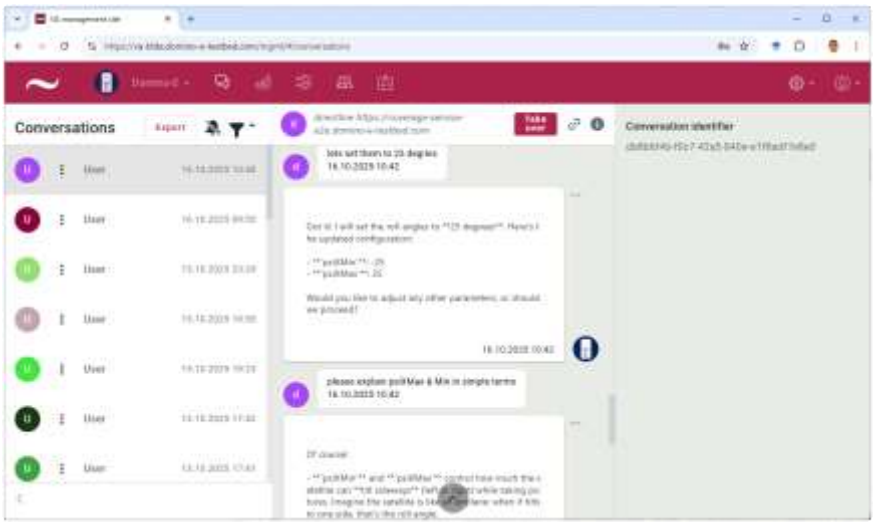


Figure 20. Virtual Assistant Management System - Conversations.

This management layer ensures that the VAS is not a static system, but a living, evolving assistant — one that grows smarter and more capable over time thanks to expert guidance and real-world feedback.

# 5. CONCLUSION

The demonstration successfully showcased the capabilities of the Virtual Assistant Service as an intelligent interface for interacting with satellite acquisition systems. It illustrated how natural-language communication can simplify the process of defining complex acquisition parameters — from selecting satellite constellations to specifying time ranges and technical settings. By guiding users through each step, explaining parameter meanings, and converting conversational inputs into formal tasking requests, the VAS effectively lowers the entry barrier for non-expert users.

This demonstration proves that the VAS can simplify and humanize access to Earth observation data, translating user goals into actionable satellite acquisition requests.

# ANNEX – DEMONSTRATION VIDEO.

A demonstration video showcasing the VAS in action is provided as a separate file and serves as an annex to this document. It visually illustrates the interaction flow and key functionalities described in the text.