



JACKDAW

Just-in-time AI Coordinator for Knowledge
Discovery and Analytics on a World-scale



Funded by
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Hello, my name is (Stein) Runar (Bergheim)

- I have been working with “data” for about 27 years, first with tables, then with maps, now with IoT and AI
- Have worked under the banner of my beloved Norwegian employer ASPLAN VIAK for most of that time on 300+ projects in 25+ countries
- Exiled for more than 20 years
- Presently living in Brussels
- Will eventually return to Nordfjord, Norway dead or alive





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NEXT
STEPS

DATA, TOOLS &
CATALOGUES

THE TOOL &
HOW IT WORKS

INTRODUCTION
& CONTEXT



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POLIRURAL
plus



Thank You

for your attention (if this does not apply to
you, please disregard 😊)



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INTRODUCTION & CONTEXT

PoliRuralPlus in brief

- We are a Horizon Europe project working to make rural development more evidence-based, data-driven, and inclusive.
- We build on decades of EU investment in spatial data, open science, and digital infrastructures — from INSPIRE, Copernicus, Eurostat, PSI Directive to national geoportals and data hubs.
- Our mission: to connect these assets with the new generation of AI-driven reasoning tools

Introducing Jackdaw

- Jackdaw is our conversational AI assistant — a “GeoAI Chatbot” that helps people talk to maps.
- The name comes from the inquisitive and clever bird that collects shiny things — a metaphor for how our agent gathers and connects pieces of spatial knowledge.
- It also comes from friend and colleague Karels inexplicable and increasingly disturbing desire to name all things after birds



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The problem we aim to solve

- Today, the people who know what questions to ask about rural development are often not the ones who know how to ask the questions in expert systems.
- Jackdaw aims to close that gap — enabling rural development actors, planners, consultants and agricultural practitioners to perform lead meaningful conversations about spaces in natural language, without relying on the intermediary (and obfuscation) of an “expert”.



Building on what exists

Jackdaw does not seek to replace, replicate or rename existing infrastructures and concepts.

It takes as a starting point the data, catalogues, and services already available across Europe — trying to make them more accessible for practical decision support.

Trying to counteracting two popular but unproductive approaches:

Starting over: “throwing out the baby out with the bathwater.”

Reinventing (renaming) existing concepts for the benefit of people who live in the PowerPoint universe as opposed to the real world



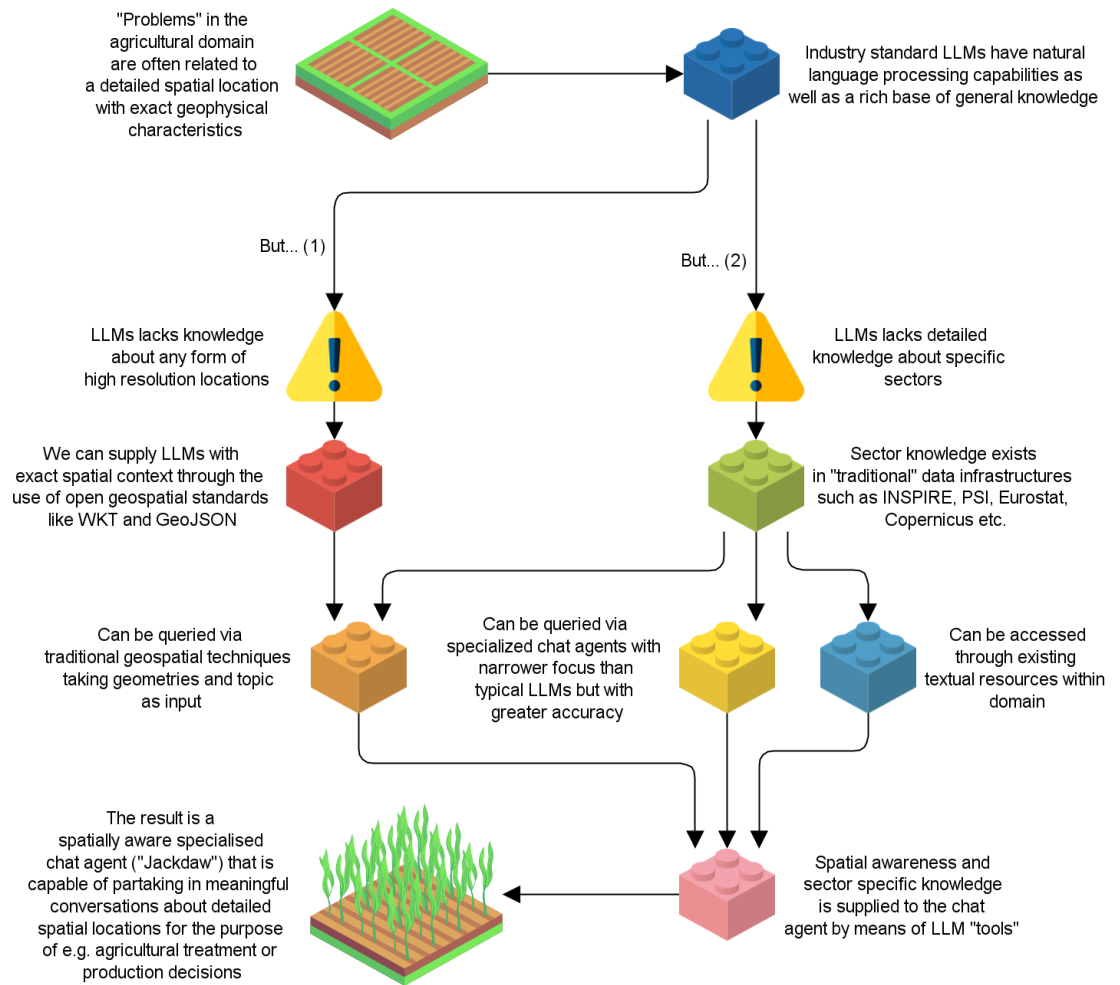
THE TOOL & HOW IT WORKS

What Jackdaw is

A chat-based interface that combines:

- Natural-language conversation
- Spatial data inputs (maps, geometries, regions)
- Mixed outputs: text, diagrams, and map visualisations

Its goal: to support rural and agricultural planning, identify urban-rural linkages, and inform policy and investment decisions.





What Jackdaw needs to know

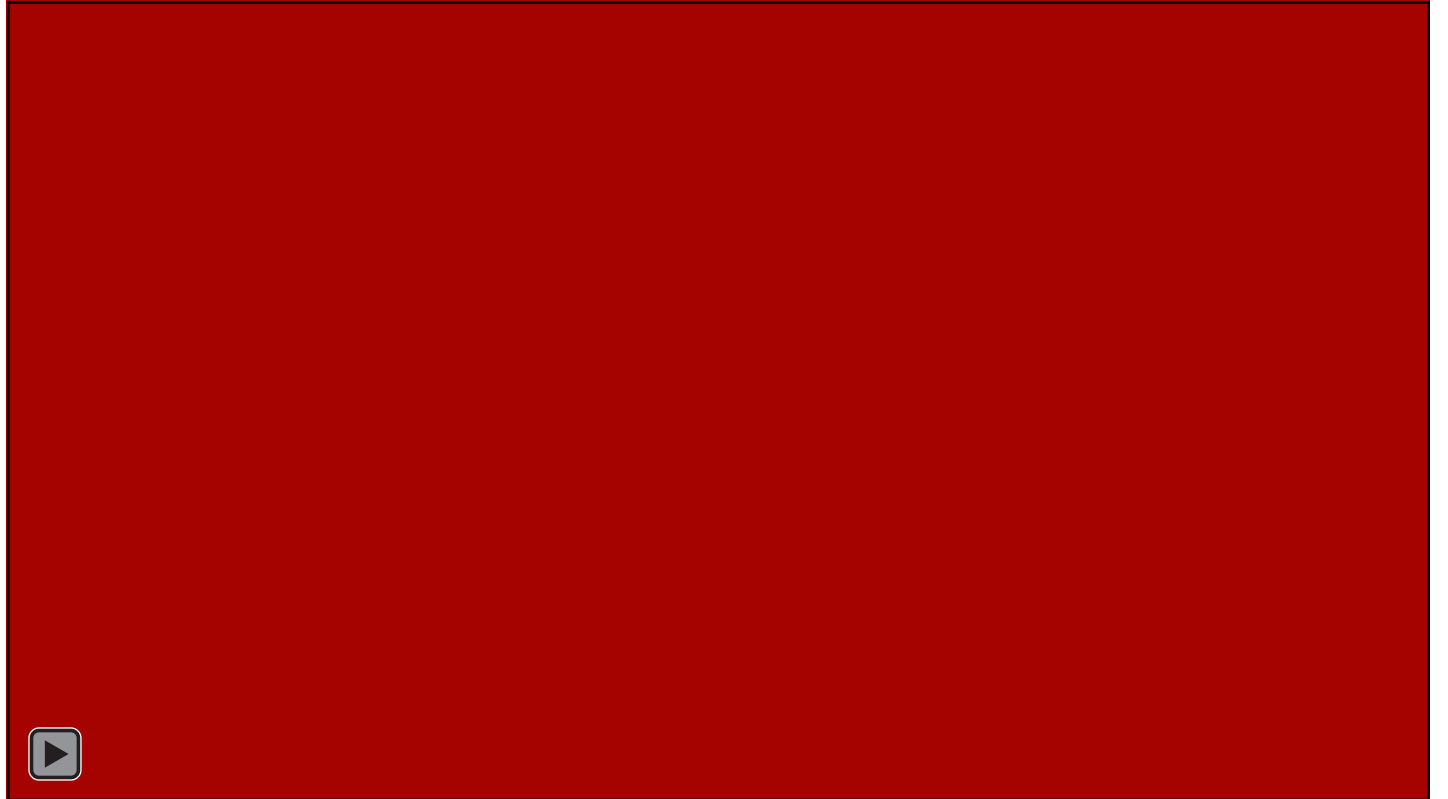
To answer spatial questions about rural areas intelligently, Jackdaw integrates:

A Large Language Model for reasoning and orchestration

A broad base of spatial datasets — infrastructure, demographics, terrain, land use, environment, services, etc.

Textual knowledge sources — legislation, policy guidelines, industry news, funding, opportunities — connected through retrieval-augmented generation (RAG)

Near-real-time information services to sense current conditions



How it works (interaction)

The user asks a question.

The user specifies a location in a map.

- Draw a geometry directly on a map, or
- Search for known administrative areas (LAU, NUTS)

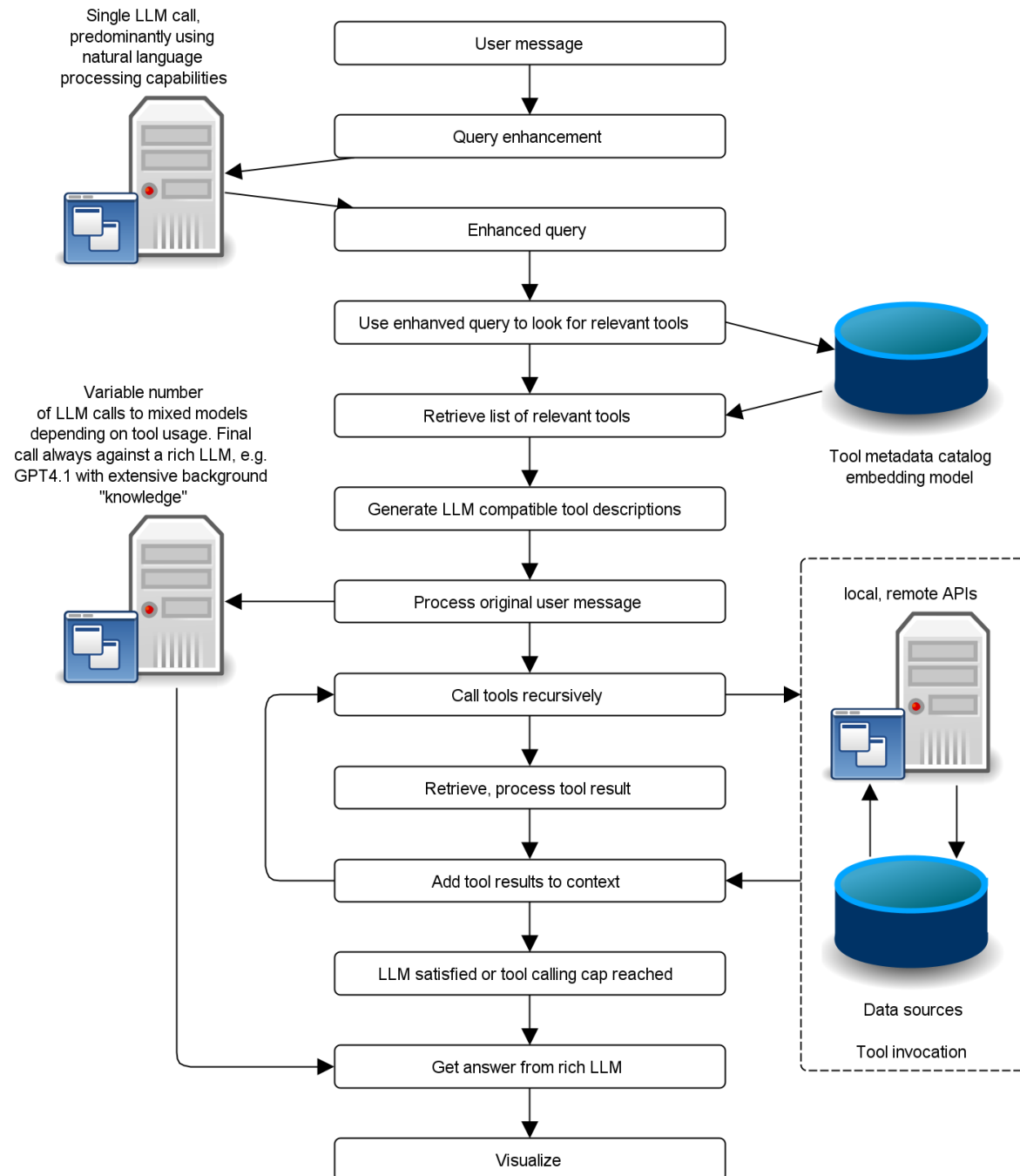
Jackdaw analyses topic, timeframe, and required spatial resolution.

Determines what tools may be useful

Jackdaw then queries relevant tools, datasets, and services for information

Then the original question is asked again on the backdrop of authoritative information

Output is presented in the form of text, maps, and charts.



DATA, TOOLS & CATALOGUES

We've bet on grid data

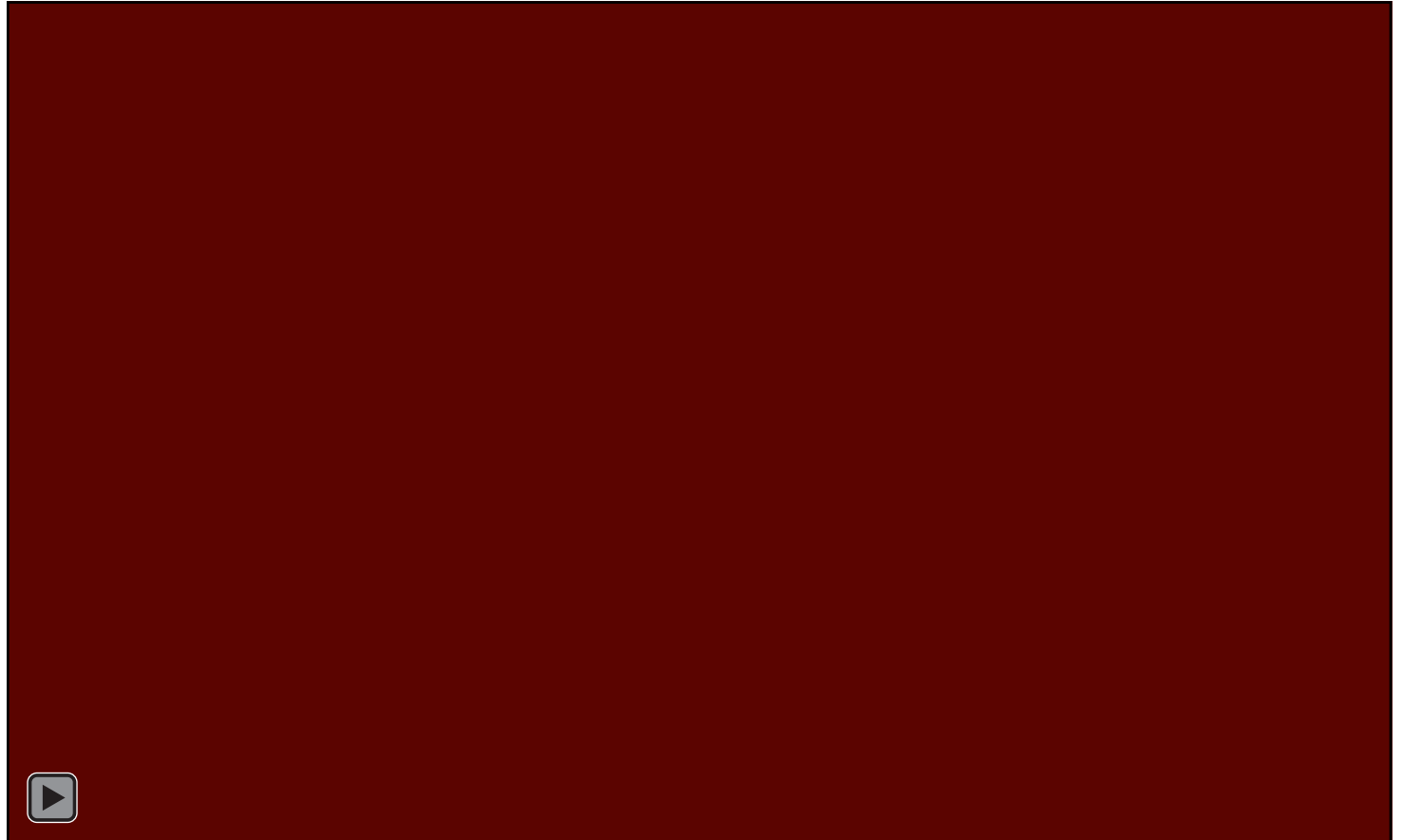
Going back to the cradle of GIS in the 1980s and 90s

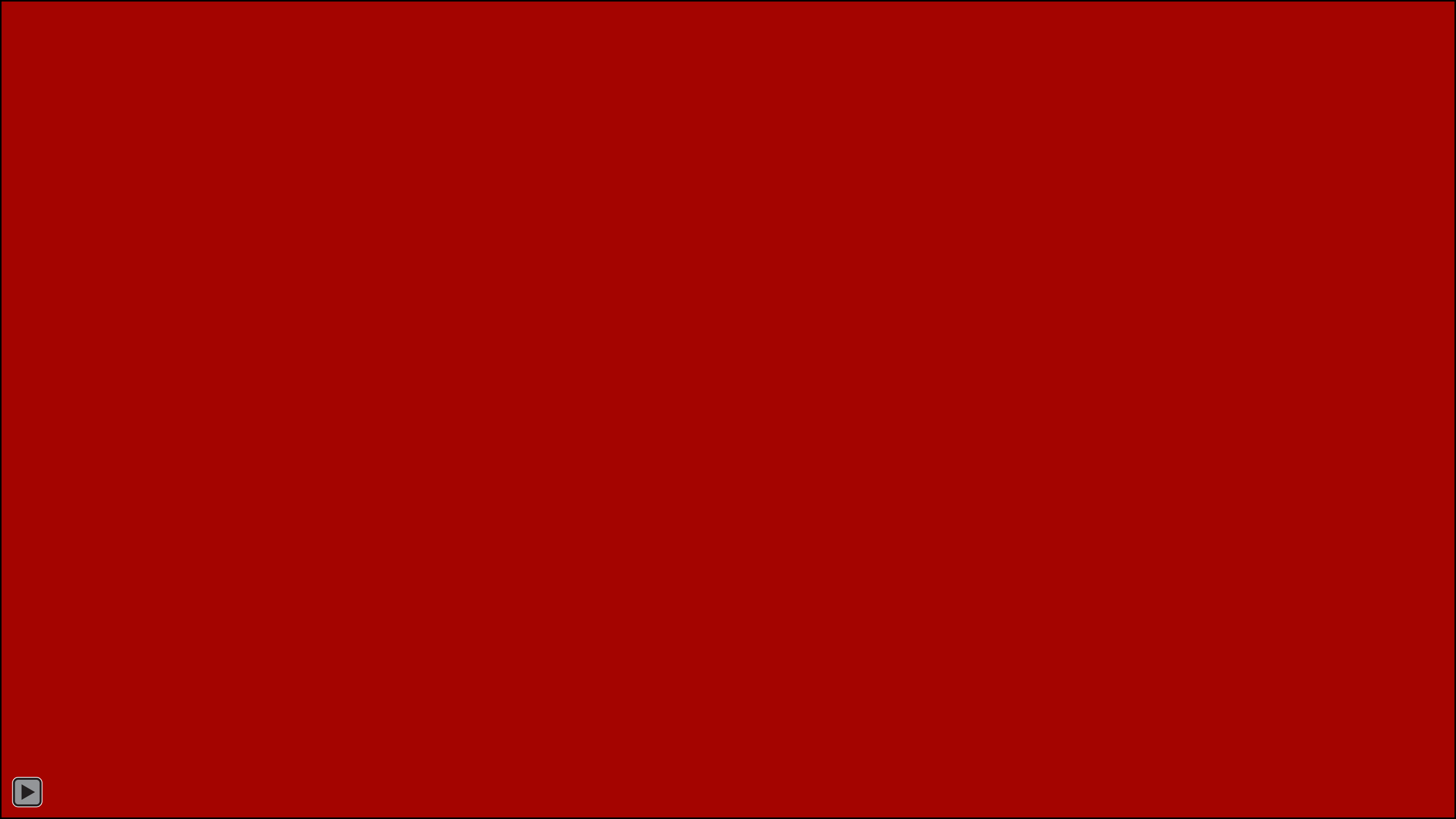
Pan-European, gridded datasets provide scalability and comparability.

They allow consistent cross-dataset analyses and easy aggregation at multiple spatial levels.

They also allow large scale contextual analysis

They form the backbone of our dynamic data cubes, where users can perform on-the-fly "raster calculations" through a friendly conversational interface.





Connecting LLMs with external data

- The bridge between the LLM and spatial data are Tools — external functions that can fetch, filter, or compute data.
- Jackdaw uses these tools dynamically, but too many options confuse current models.
- Our solution:
 - Prefilter tools based on topic, time, and area
 - Build a next-generation data catalogue that not only supports search and browsing but also describes datasets richly enough to be exposed as callable tools via the emerging Model Context Protocol (MCP)

NEXT
STEPS

Large Language Models in Jackdaw

We experiment with multiple LLMs.

Their main role is orchestration and natural-language understanding, and to a lesser extent the raw, unrefined and sometimes dubious knowledge they contain.

Cost predictability and sovereignty are also of importance :

- For sustainability, we explore fixed-price self-hosted models in private clouds. Marek Splichal is our man on the case
- For resilience and scalability, we test self-hosted models and EU AI infrastructures such as the initiatives led by PSNC in Poland. Raul Palma is the one to talk to about this



The baseline for further work

- Jackdaw already operates on a pan-European scale using existing datasets.
- Users can start conversations and get meaningful responses — but real value comes from dialogue, not one-off queries.
- Jackdaw behaves like a well-intentioned but inexperienced assistant: it needs guidance, correction, and feedback to improve.
- Not by accumulating information like our “big data friends” – but through each single conversation not Q&A but a dialogue of multiple steps
- Necessary to gain understanding of possibilities and limitations among user community. Chat agents are unapologetic liars

Next steps

- Extend the tools to work better at local and regional scale
- Support spatial data user uploads and GeoRAG indexing of vector data
- Enable self-publishing and context enrichment via our catalogue service
- Support cross-agent integration through MCP
- Invite partners and collaborators with relevant business cases to test and co-develop the platform