Geospatial Agents:

From AI Models to Intelligent Workflows



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Outline

PART 1 · 15 MIN

From AI to Agents

- AI Landscape
- Why AI is everywhere
- Traditional AI
- Integration Challenge
- What is an Agent
- Anatomy of an agent
- Agent Types

PART 2 · 10 MIN

GeoAgents

- What is a GeoAgent
- From silos to one conversation
- Why GeoAgents matter
- A worked example
- GeoAgents in the wild
- Watch-outs

The AI Landscape

ARTIFICIAL INTELLIGENCE

Machine Learning

Deep Learning

Computer Vision
image classification, detection, segmentation

NLP
translation, summarisation, QA

└ Large Language Models (LLMs) — model class

Speech & Audio AI
ASR, TTS, speaker recognition

Forecasting
time-series, climate, demand prediction

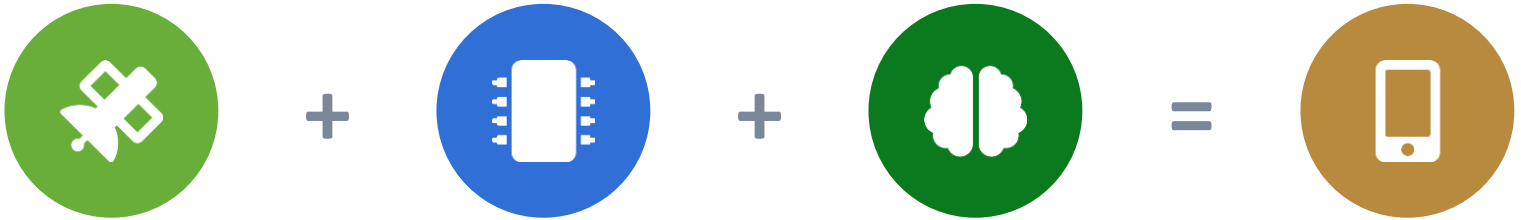
Generative AI

Cross-domain capability built on Deep Learning

Text • Image • Audio • Multimodal

AI also includes: Search & Planning, Knowledge Representation, Constraint Satisfaction, Robotics — not all AI is ML

Why is AI suddenly everywhere?



Data
Satellites, phones, sensors

Compute
Cheap cloud GPUs

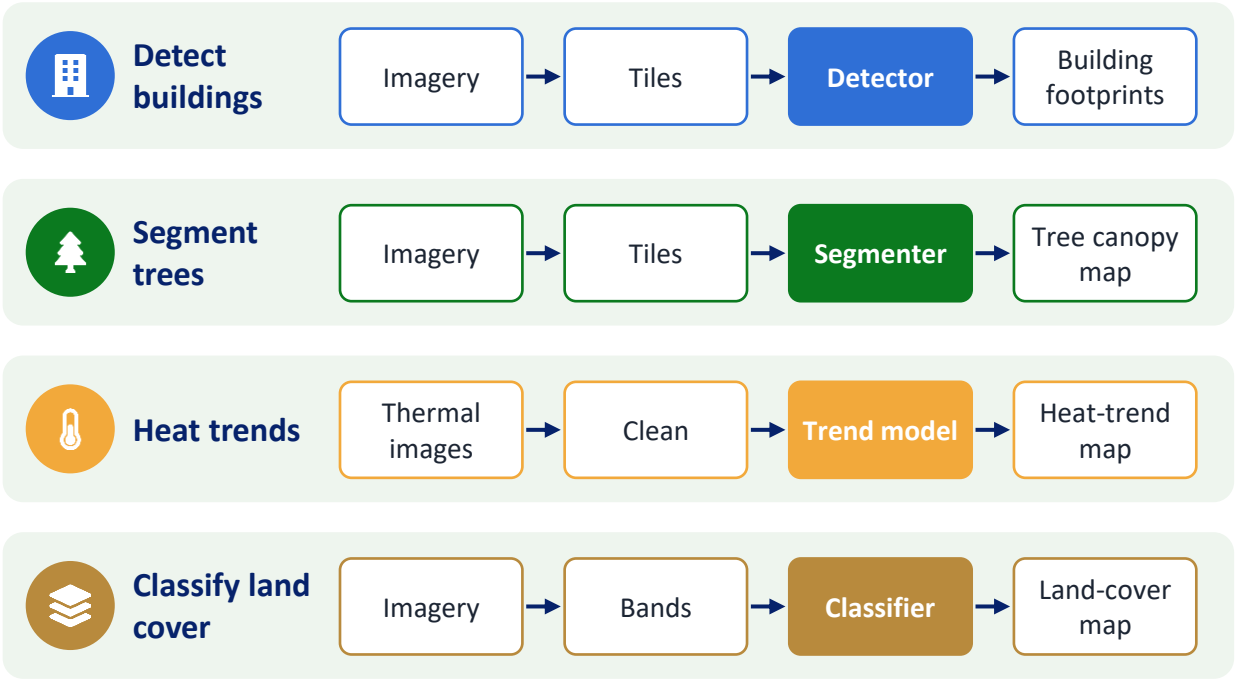
Better models
Transformers & LLMs

AI everywhere
Built into daily apps

You already use AI every day:

- Navigation
- Photo search
- Translation
- Spam filters
- Chat assistants

Traditional AI: one pipeline per task



THE CITY ASKS:

"Where should we plant trees first?"

- Where do people live?
- Where is shade missing?
- Where is it getting hotter?
- Where is there room to plant?

Each answer lives in a different pipeline

The Integration Challenge

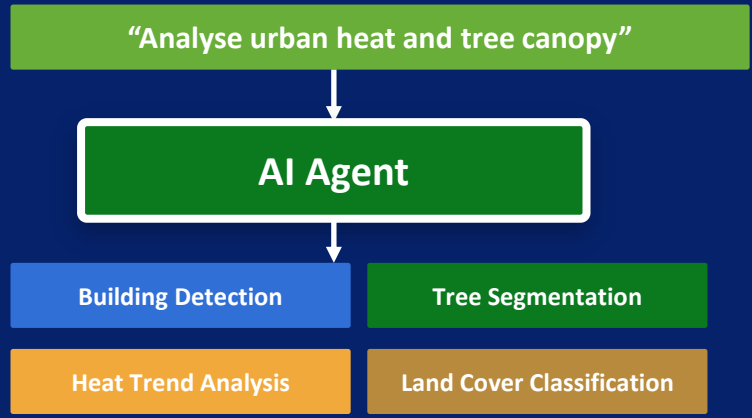
Siloed Architecture

- Building Detection Pipeline
- Tree Segmentation Pipeline
- Heat Trend Analysis Pipeline
- Land Cover Classification Pipeline

- Custom Orchestration Code

Fragile, bespoke, does not generalise

Agent Architecture



Dynamic tool selection
The agent plans, delegates, and composes results — no integration code required

What is an Agent?

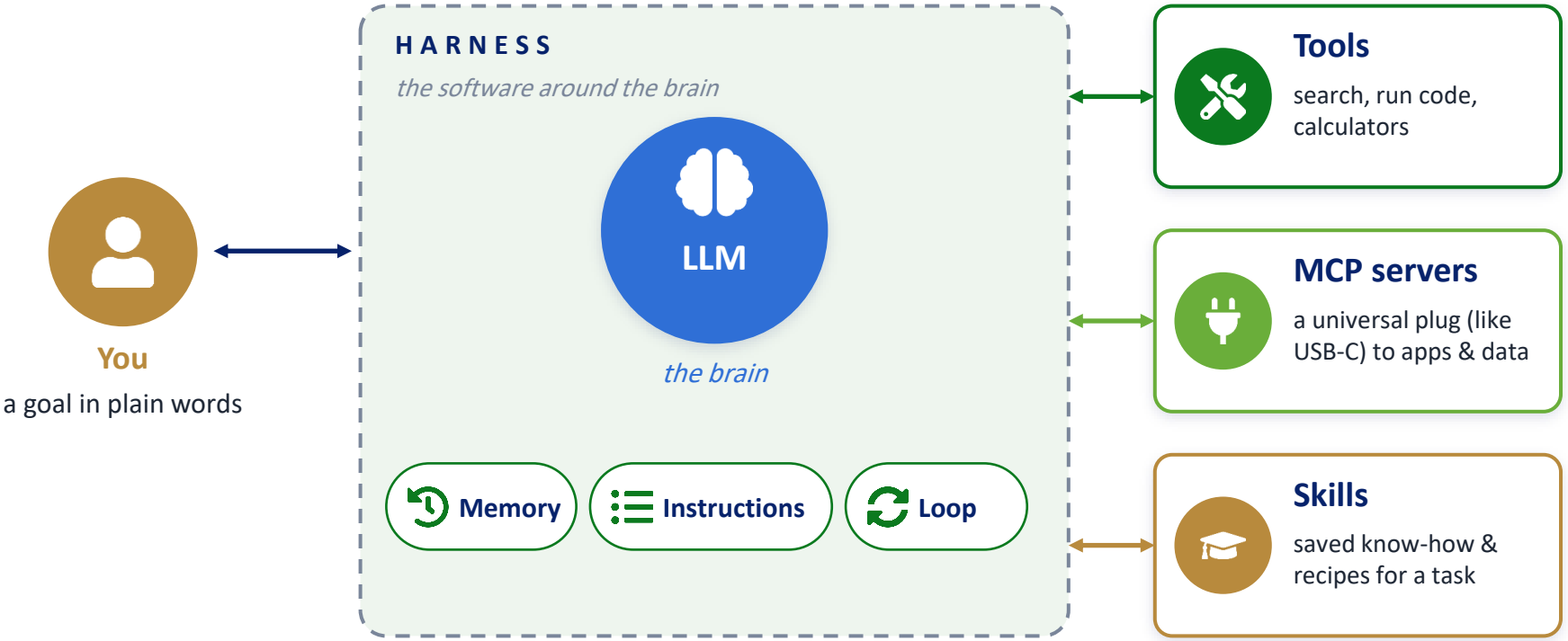


Think, Act, Observe

An agent is an AI given a **goal** that keeps looping until the job is done.

Gets an assignment, plans a route, uses instruments, checks readings, adjusts.

Anatomy of an agent



Agent Architecture: Technical Components

Reasoning Paradigm

Chain-of-Thought (Wei et al., 2022): Explicit intermediate reasoning steps before acting

ReAct (Yao et al., 2022): Interleaved Reasoning + Acting + Observation

Plan-and-Execute: Decompose goal → sequential subplan execution

Memory Taxonomy

Working: Active context window (32K–1M tokens)
Episodic: Conversation and task history
Semantic: External knowledge via RAG / vector stores
Procedural: Tool schemas and workflow templates

Tool Integration

Function calling: Structured JSON schemas declare tool signatures to the LLM

Model Context Protocol: Open standard for agent–service interfaces (Anthropic, 2024)

Observation loop: Tool output fed back as observations in the reasoning loop

Orchestration Frameworks

Open-source: LangGraph, LlamaIndex, AutoGen, CrewAI
Research: HuggingGPT (Shen et al., 2023), BabyAGI
Proprietary: OpenAI Assistants, Claude Agents, Gemini

Before vs after Agentic AI

	Before agents	With Agentic AI
How you ask	Code, configs & scripts	Plain-language description
The pipeline	Fixed, built in advance	Customized on the fly
Tools & models	Siloed, one at a time	Combined automatically
Time to results	Days to weeks	Minutes to hours
Who can use it	Specialists only	Anyone with a question

Agent Types

1. **Simple Reflex Agent**
   Reacts directly to percepts using fixed condition-action rules, no memory or planning

2. **Model-based Agent**
   Tracks an internal world-state model to act sensibly under partial observations

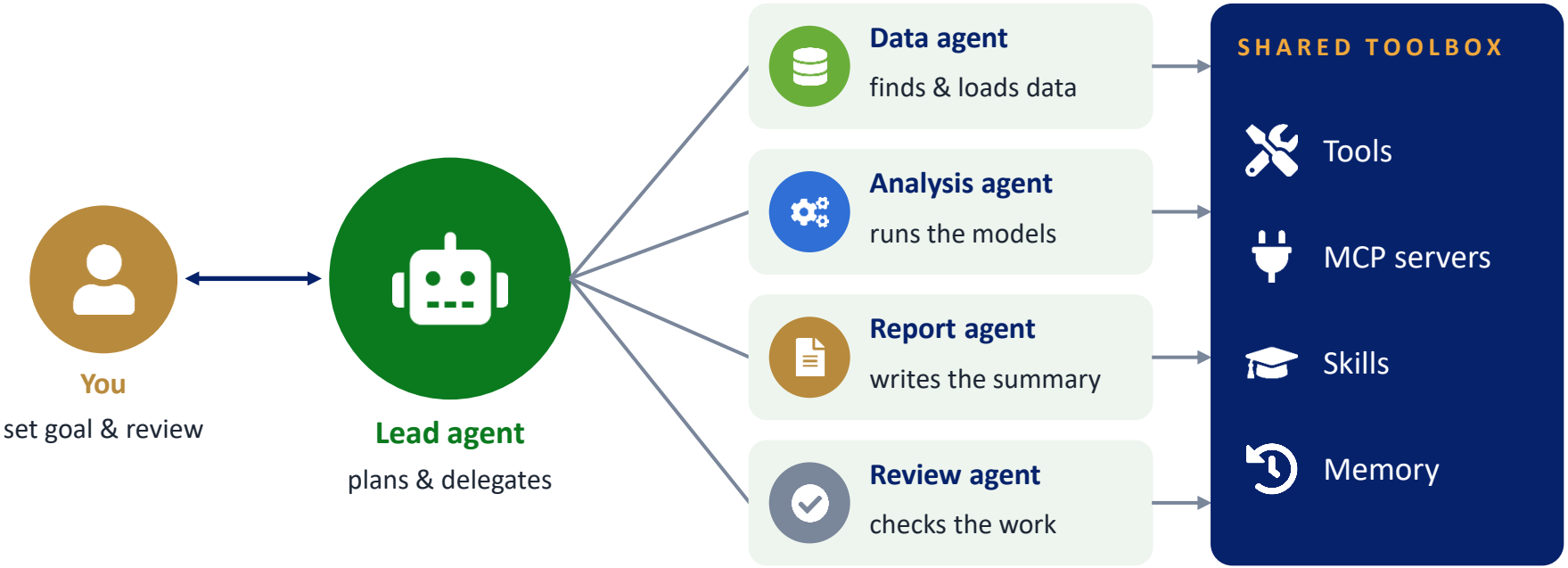
3. **Goal-based Agent**
   Searches and plans sequences of actions to reach an explicit desired goal state

4. **Utility-based Agent**
   Maximises expected utility to pick the best action when multiple goals compete

5. **Learning Agent**
   Improves its own policy from experience and feedback, gets better over time

Agentic AI: Multi=Agents

AI that **pursues a goal**: it plans, delegates, uses tools and checks its own work.



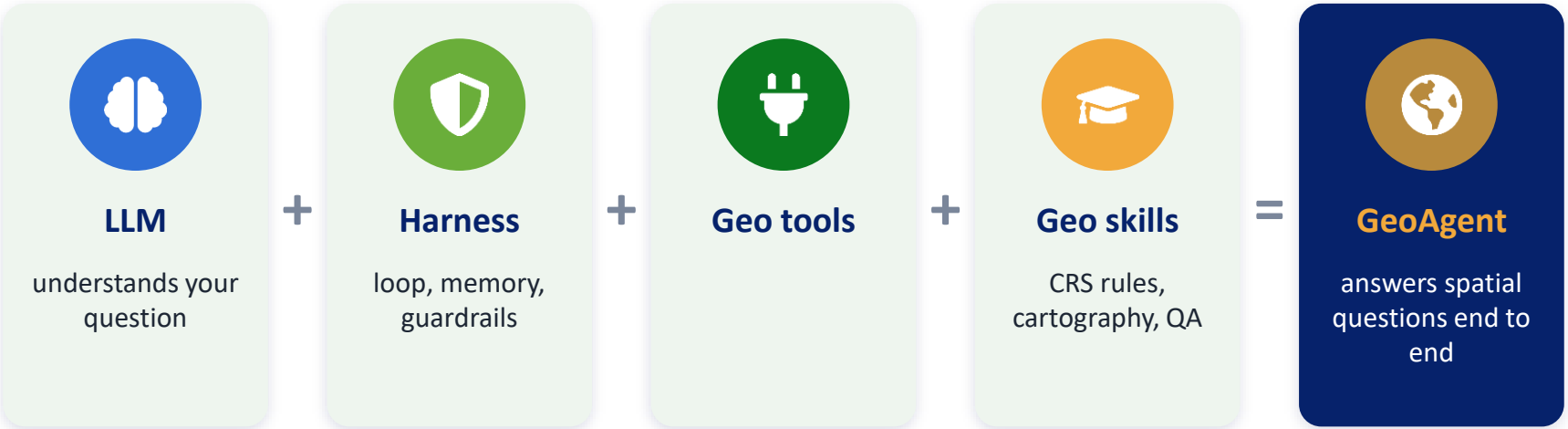
PART 02

GeoAgents

Agents that think in maps · 10 min



What is a GeoAgent?

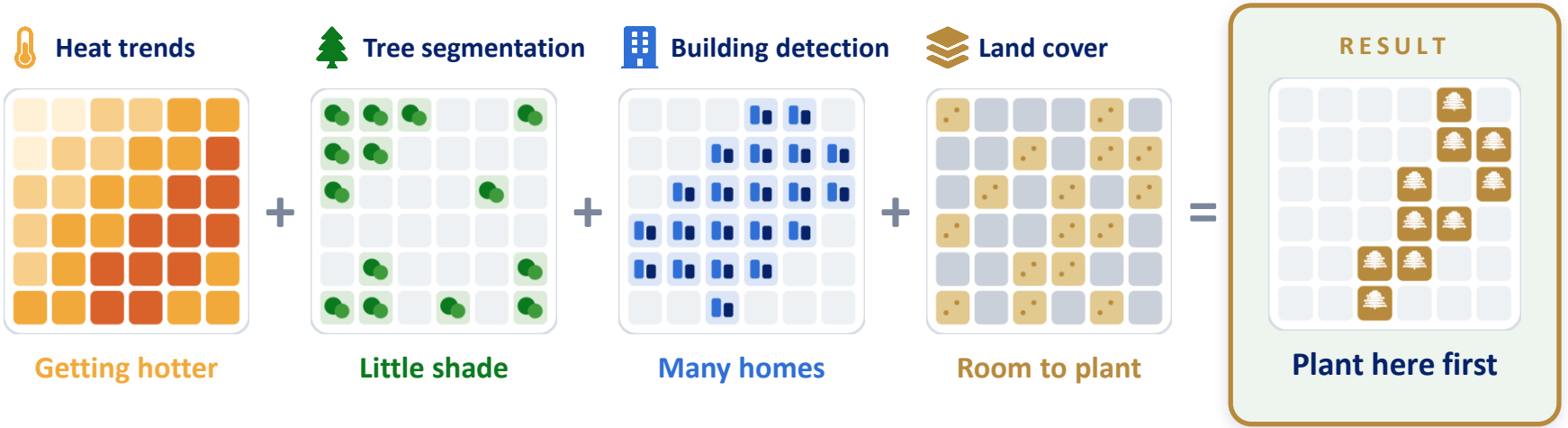


The same recipe ***plugged into GIS.*** It finds, analyzes and maps spatial data on its own.

From silos to one conversation

"Where should we plant trees first?"

GeoAgent calls your 4 pipelines as tools, then overlays their maps



The GeoAgent is the glue layer the engineer was missing.

Why GeoAgents matter

Too much data

More imagery & sensor data every day than analysts could ever look at

Skills gap

Powerful GIS needs coding + domain know-how — few have both

Speed

Floods, fires and quakes need answers in hours, not weeks

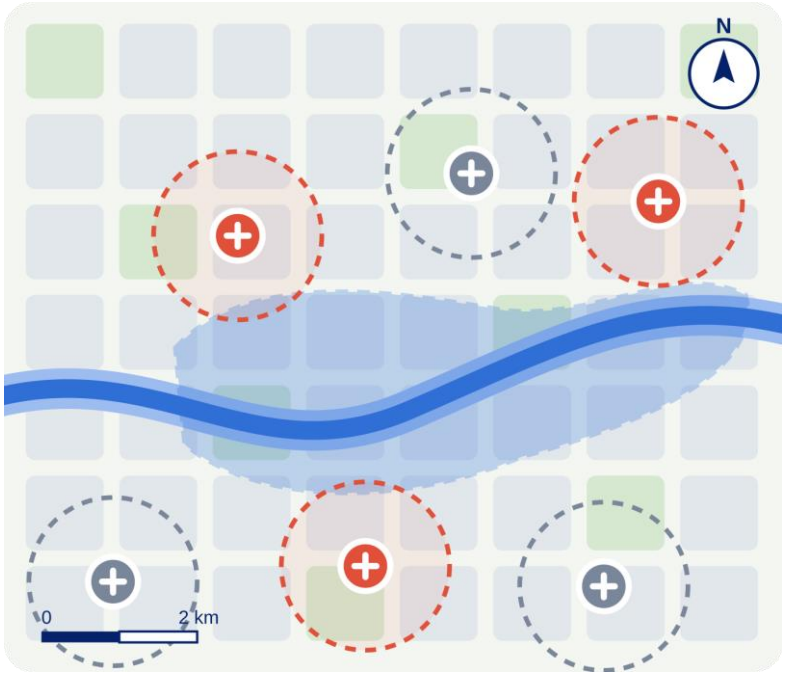
Access for all

Planners, NGOs & citizens ask spatial questions in plain words

A GeoAgent at work

"Which hospitals are within 2 km of this morning flooding?"

1. **Find flood extent** · satellite radar
2. **Load hospitals** · OpenStreetMap
3. **Buffer hospitals** · 2 km
4. **Overlay with flood** · intersect
5. **Map + summary** · 3 at risk



Keep a human in the loop

Made-up facts

Can invent numbers, data or coordinates

Wrong projection

CRS & unit errors look right but aren't

Biased data

Gaps in data = gaps in who gets counted

Location privacy

Where people are is sensitive data



The GeoAgent is the copilot.
You're still the navigator.

WRAP-UP

Key takeaways

01

AI is many specialists — they don't connect on their own

02

Agents connect them: LLM + harness + tools, MCP & skills

03

GeoAgents turn GIS silos into one conversation — you stay in charge

Dr Ali J. GHANDOUR

RASID

African Women in GIS

GoPilot Live Demo:

The #1 GeoAgent



Eng. Hasan Nasrallah

AI Solutions Architect · RASID

Thursday 22 October 2026 · 15:00 Beirut (EEST) · www.gopilot.earth

About RASID

RASID

RASID: Seeing Earth, Smarter

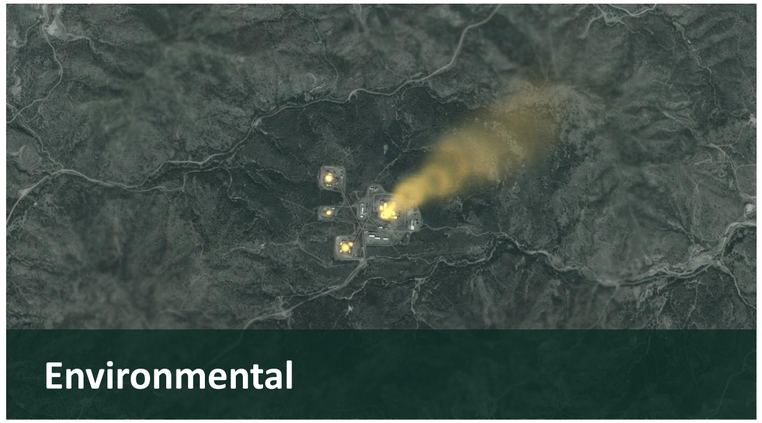
WINNER
AWS Generative AI for Geospatial EMEA

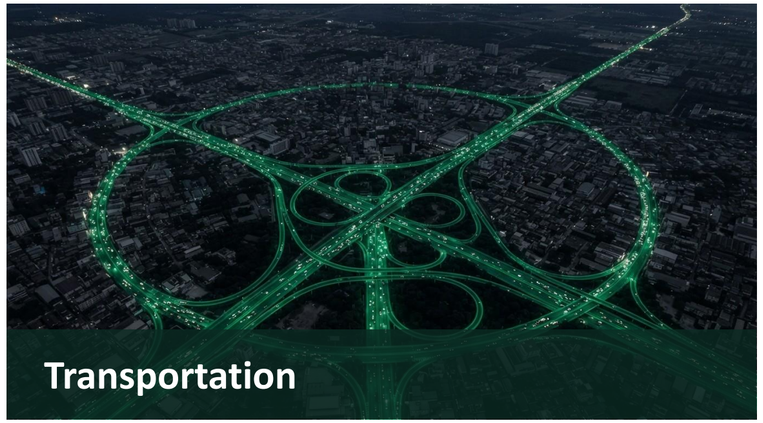
Applied GeoAI for real-world challenges, from Paris and Beirut.









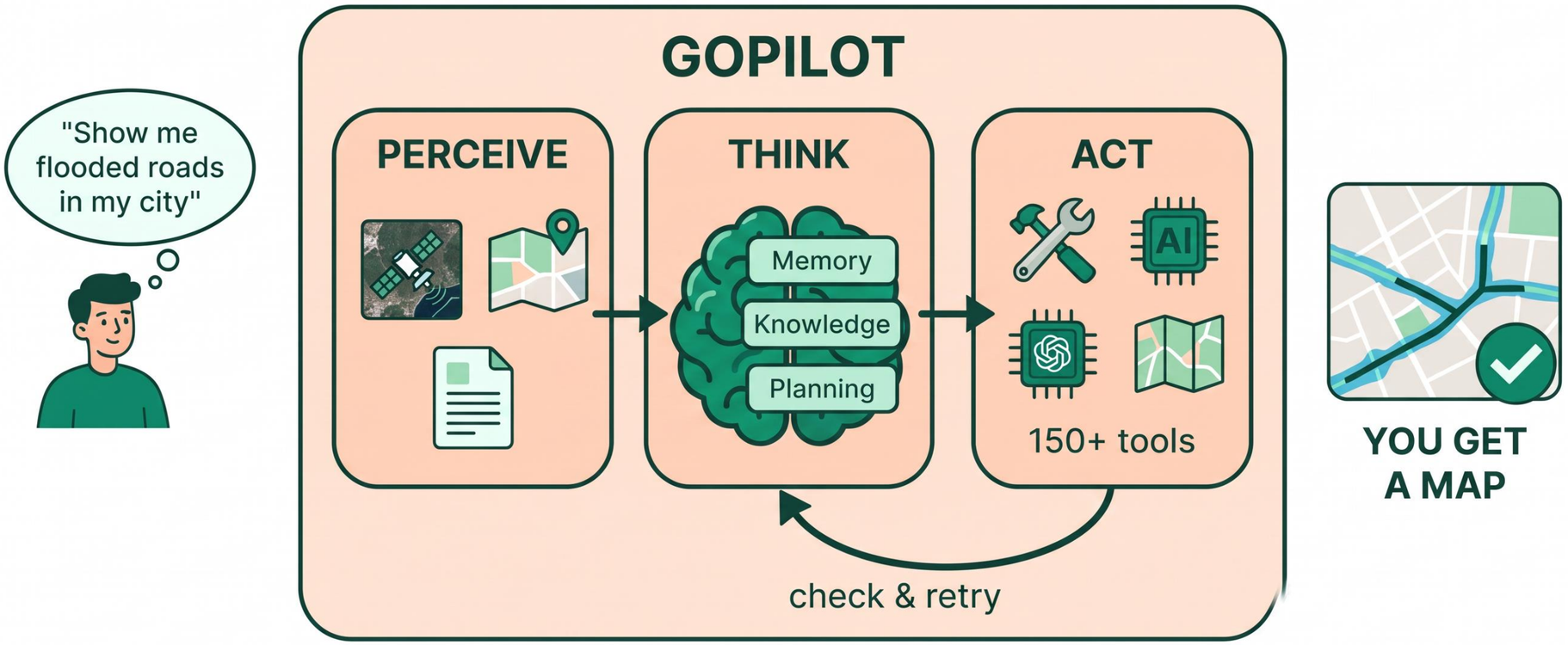




Meet GoPilot

What is GoPilot?

GoPilot is the GeoAgent we built at RASID. You ask about a place in plain words. It finds the data, runs the analysis and hands you the map.



150+

GIS tools ready to use

10,000+

datasets to search

3

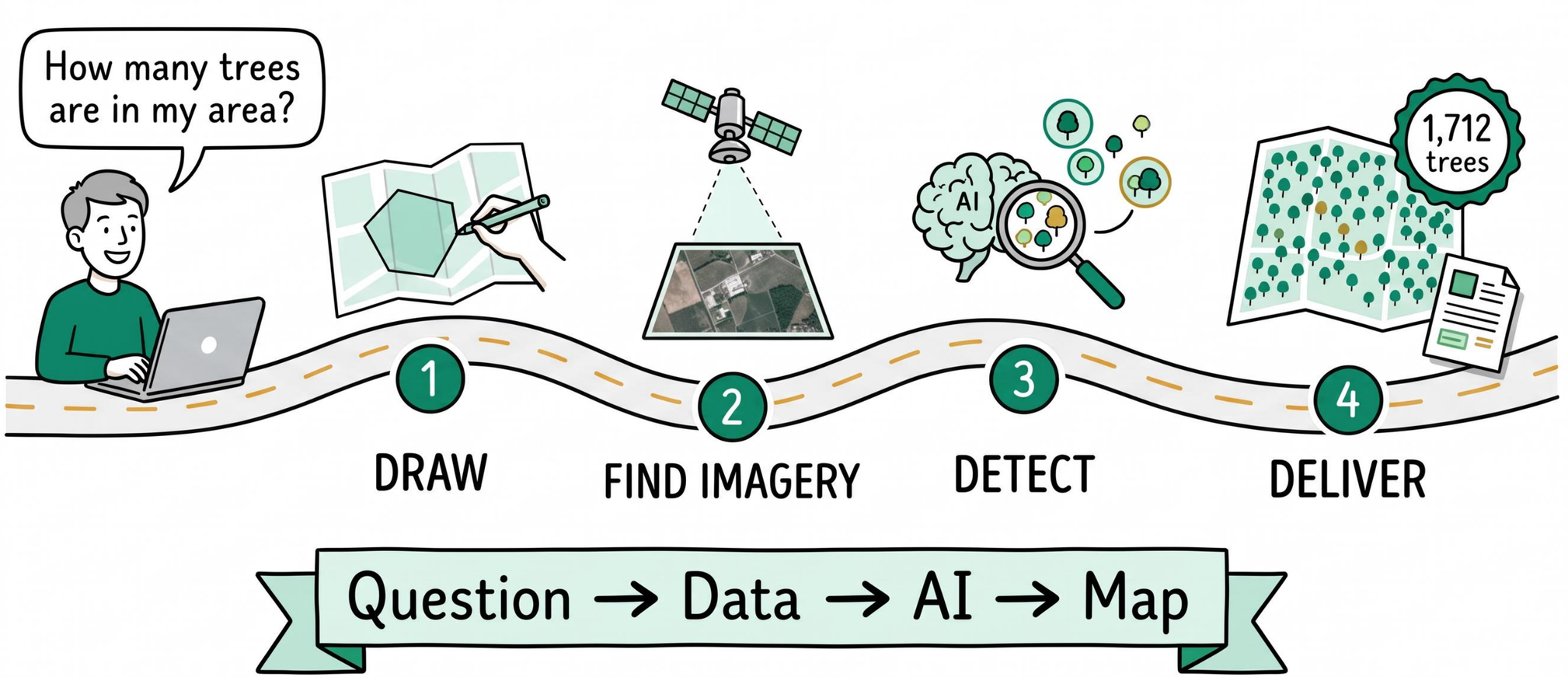
places: web, QGIS, ArcGIS

GoPilot at Work

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One Question, One Finished Map

“How many trees are in my area?” Here is what GoPilot does with that one sentence.



✦ No code, no installs, no waiting. Just a question and a map.

Where You Can Use It

GoPilot Goes Where You Work

Same assistant, same skills, in the tools you already use.

Web App

Chat and map side by side, right in your browser. Nothing to install.

QGIS Plugin

Ask GoPilot from inside the QGIS project you already have open.

ArcGIS Pro

The same assistant for ArcGIS teams and enterprise workflows.

Your Own Data

Drop in your own files, or search thousands of ready datasets.

Shows Its Work

Every step and every layer is visible, so you can check and edit.

Free to Try

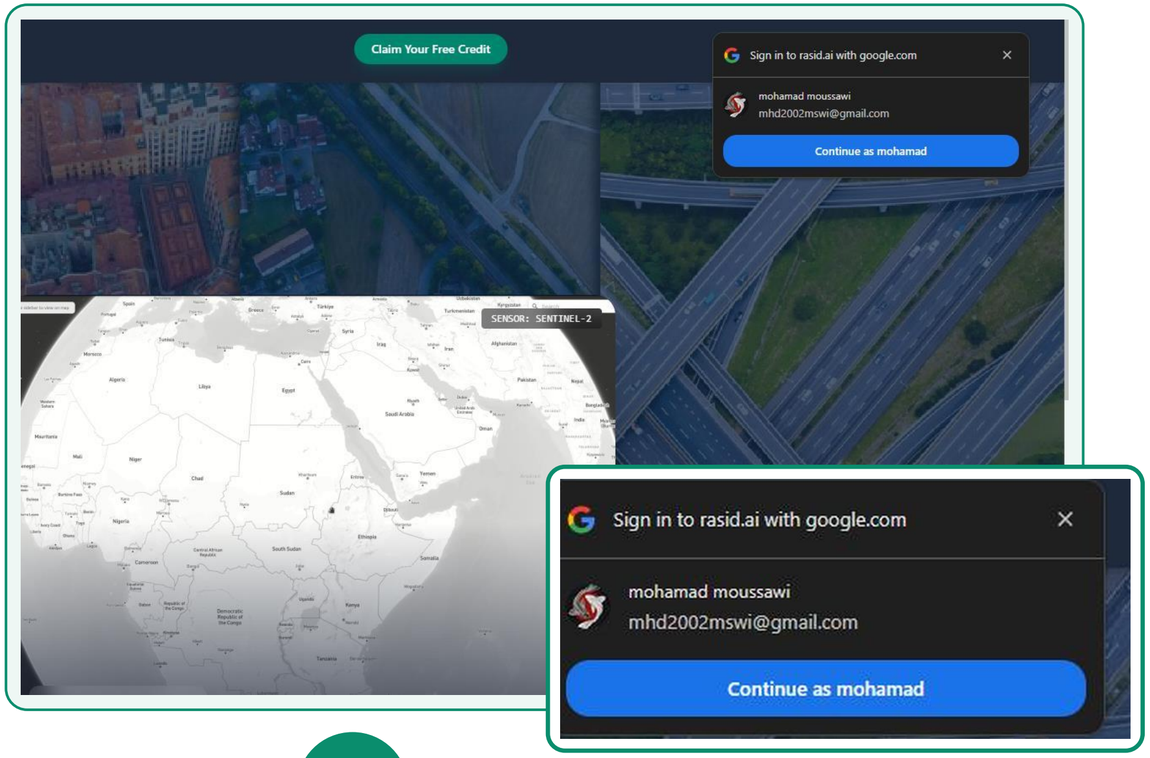
Open app.gopilot.earth, draw an area and ask your first question.

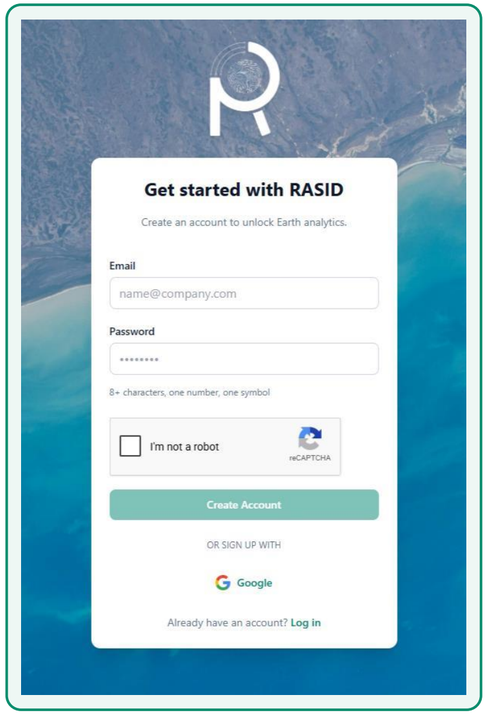
Get Started

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Sign Up in Seconds

Open app.gopilot.earth and pick your way in.





One Tap **Google** **Email**

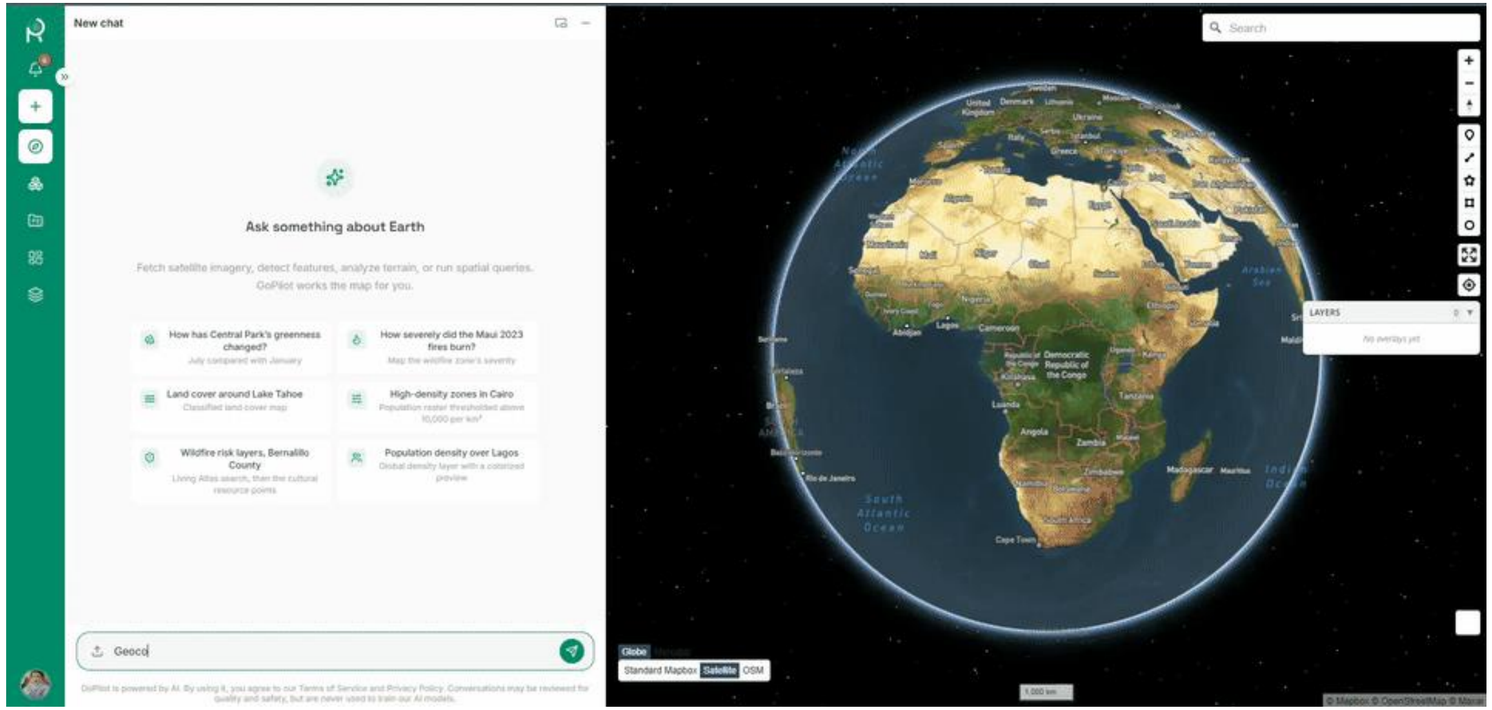
✦ **Pick one and you are in. It takes seconds.**

Quick Tour

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The GoPilot Workspace

Everything you need on one screen: chat on one side, your map on the other.



1 **Chat**

Ask in plain words, follow up like a conversation

2 **Map**

Every result lands here as a live layer

3 **Layers**

Toggle, style and download what GoPilot made

4 **Steps**

See each tool GoPilot ran, and why

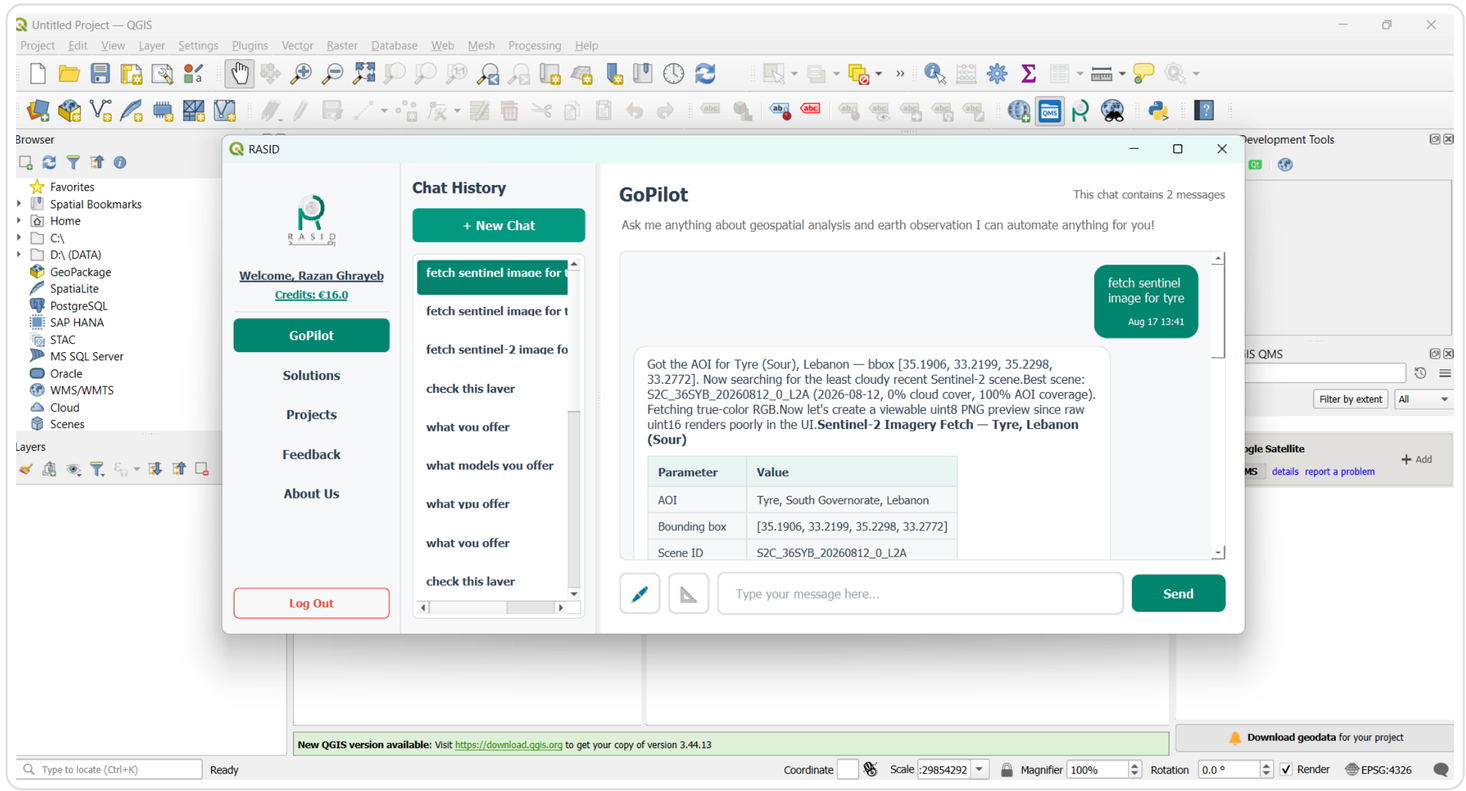
✦ **Placeholder: drop in a screenshot of GoPilot and adjust the labels to match.**

QGIS Plugin

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GoPilot inside QGIS

Ask GoPilot and get imagery, analysis and results directly in your QGIS workspace.



Integrated chat

GoPilot opens in a panel next to your map

Structured results

Layers land in your project, ready to style and edit

OGC-compliant

Standard formats that fit the rest of your stack

Get it: download the RASID plugin for QGIS

✦ One GoPilot. Two GIS platforms. Your data stays in the tools you already use.

ArcGIS Pro Add-in

GoPilot, directly in ArcGIS Pro

Ask in natural language and get analysis, layers and results inside your ArcGIS Pro project.

Unified GoPilot experience

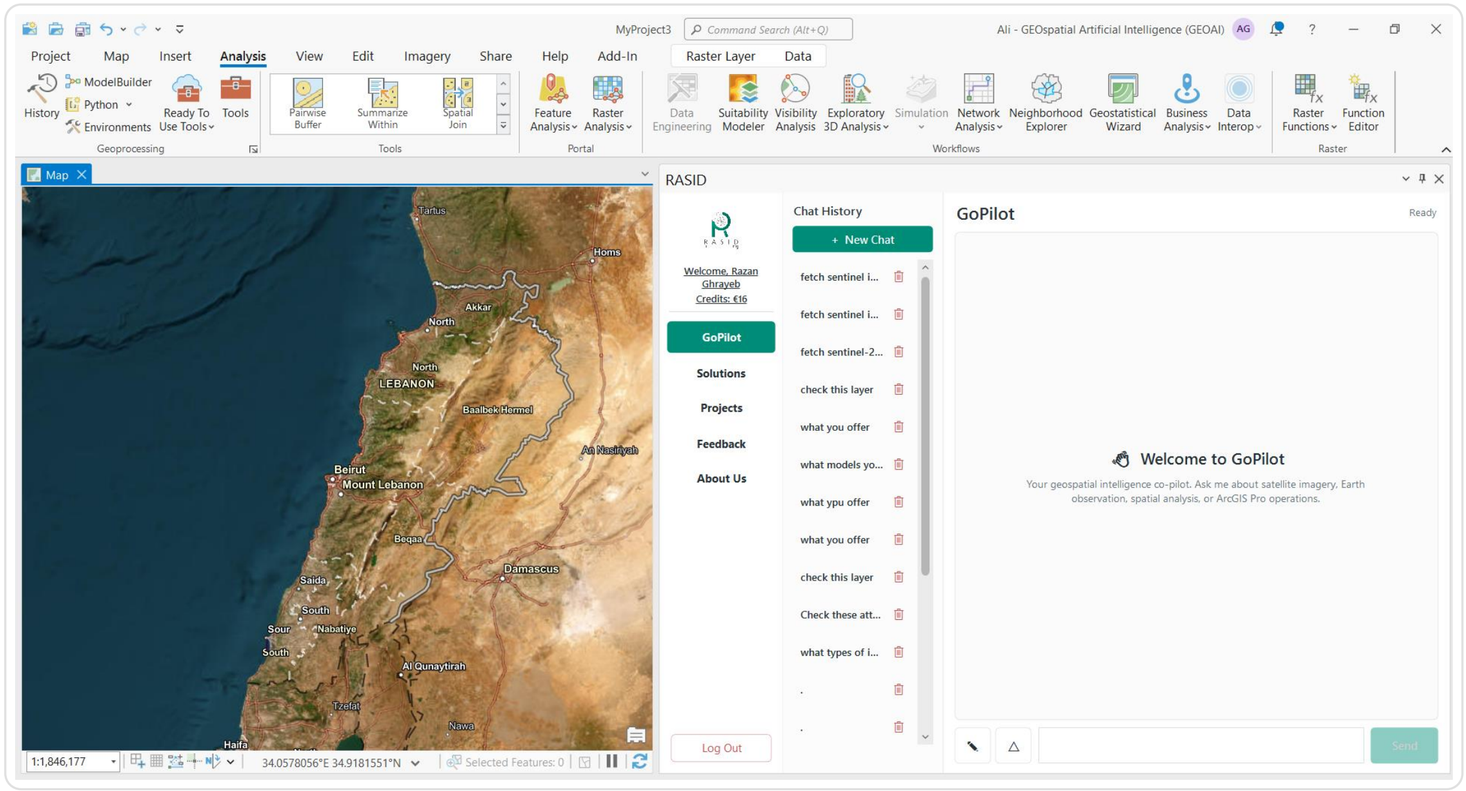
Same chat, history and credits as the web app

Professional GIS context

Works with the maps and layers already open

Reliable workflow

Structured, OGC-compliant results every time



Get it: download the RASID add-in (.esriAddinX)

✦ One GoPilot. Two GIS platforms. Your data stays in the tools you already use.



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رصد

Let's See It Live

- Demo 1 · Count the trees in an area you draw
- Demo 2 · Generate a colorful country-scale relief map
- Demo 3 · Find the best school site in Kigali

Try it free · app.rasid.ai

Live Demo 1

RASID

Count the trees in an area you draw

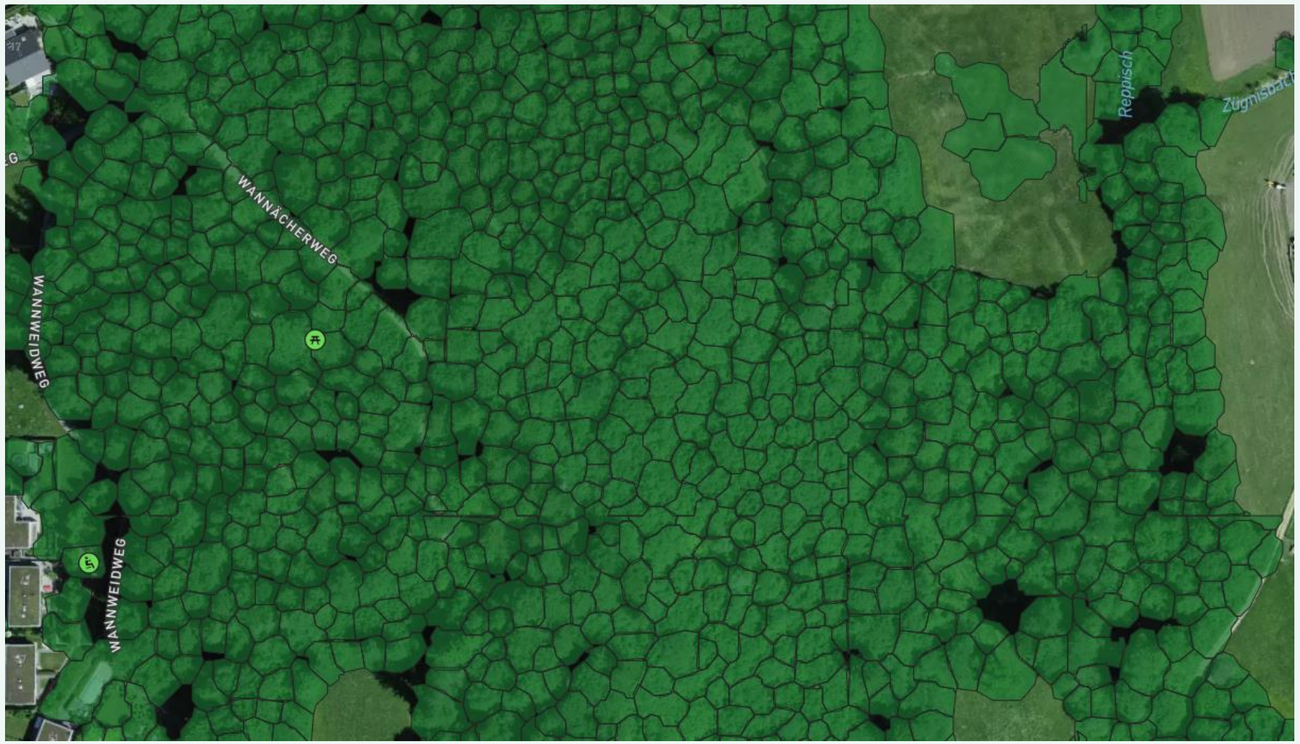
One prompt in. GoPilot plans the steps, runs the tools and hands back the result.

THE PROMPT

“How Many Trees are in my Area of Interest?”

You
in GoPilot chat

THE RESULT



✦ **Watch the steps panel: every tool GoPilot calls is shown as it runs.**

Live Demo 2

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Generate a colorful country-scale relief map

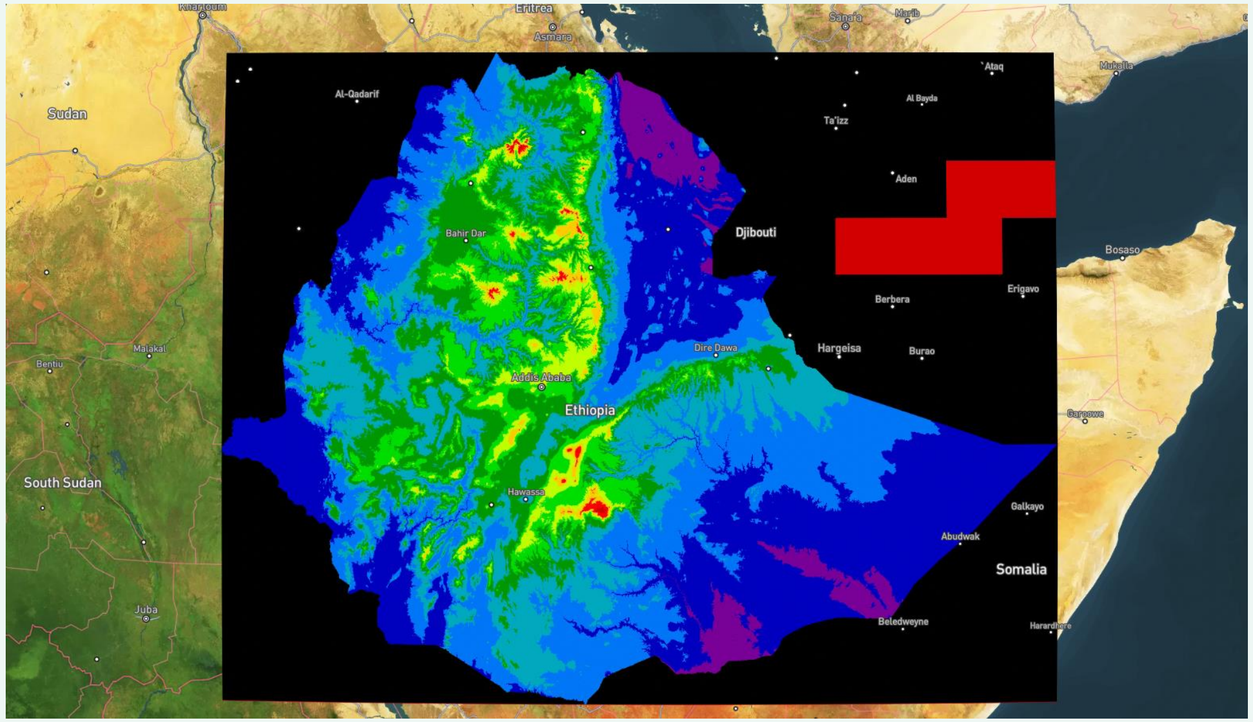
One prompt in. GoPilot plans the steps, runs the tools and hands back the result.

THE PROMPT

“Generate A Country Scale Relief Map for Ethiopia using the nipy_spectral Color-Ramp”

You
in GoPilot chat

THE RESULT



✦ **Watch the steps panel: every tool GoPilot calls is shown as it runs.**

Live Demo 3

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Urban Planning In Kigali, Rwanda

THE PROMPT

*"**As an urban planner, find the best site for a new primary school within a 2 km buffer around Kigali Pelé Stadium, Nyamirambo, Kigali, Rwanda.***

Clip these layers to the buffer:

- Overture roads (by class) and places (by category), including existing schools
- Microsoft building footprints
- Population density
- Rivers and water bodies
- Esri land cover
- Elevation (DEM)
- A cloud-free Sentinel-2 basemap

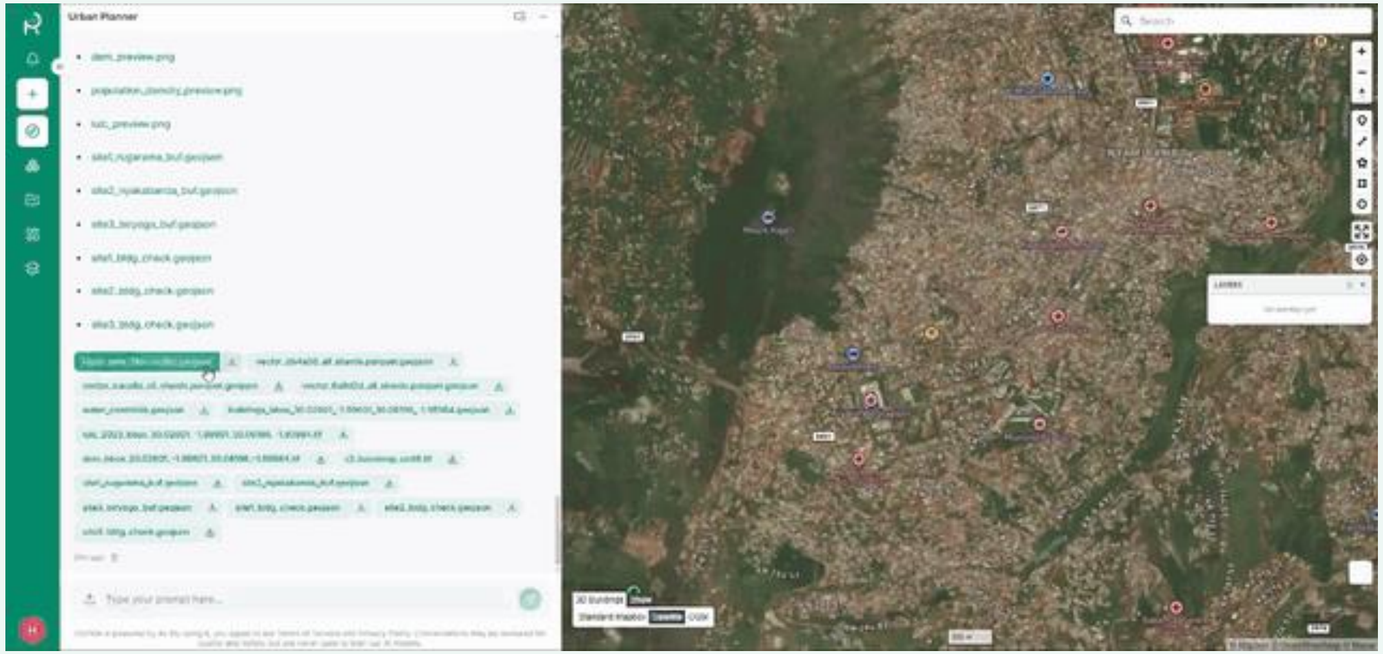
Then score candidate sites on seven criteria:

- high population density
- far from existing schools
- close to a minor road but not a major one on gentle slopes
- outside water, wetlands and low flood-prone valleys
- on open or green land with enough unbuilt space for new construction
- not on public or private establishments, and away from airports, military, industrial zones and stadiums

Return the top 3 sites with their scores and a short reason for each. present all relevant layers that support and show evidence of your reasoning*"*

You
in GoPilot chat

THE RESULT



✦ **Watch the steps panel: every tool GoPilot calls is shown as it runs.**

AWIGS Exclusive

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A Special Offer for African Women in GIS

As part of our partnership with AWIG, everyone who signs up gets:

STEP 1 · START

1 Month FREE

Business Plan trial

2.5M tokens · 1 TB storage · Premium datasets & AI models
QGIS plugin · ArcGIS Pro add-in · Priority support

STEP 2 · KEEP GOING

55% OFF

your monthly fee for 1 full year

After your free month, continue on your plan
at less than half the price for 12 months.

Need more tokens mid-month? Top up anytime

100,000 tokens		**€20**
500,000 tokens	Save 15%	**€85**
2,000,000 tokens	Save 25%	**€300**

✦ **Sign up at app.gopilot.earth to claim your offer.**

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Thank You

Hasan Nasrallah · AI Solutions Architect, RASID

Try GoPilot: www..gopilot.earth