

An aerial photograph of a river delta, likely the Mississippi River Delta, showing a complex network of waterways. The land is colored in shades of red and white, while the water is a deep blue. The image is used as a background for a presentation slide.

Meet Your New Partners in Science: ENVI[®] Agent and IDL[®] Agent

April 2026

N|V|5

Before we Begin...



The webinar is being recorded

- Slides & on-demand version of the webinar will be available within a few business days



Questions?

- Please post any questions in the Questions box

Today's Speakers



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Agenda

- Introduction: IDL Agent and ENVI Agent
- What is an Agent?
- IDL Agent: Background and Demo
- ENVI Agent: Background and Demo
- Questions and Discussion



IDL Agent

A programming partner that empowers you to autonomously write, run, and troubleshoot IDL code, simplifying developer workflows and accelerating discovery



ENVI Agent

A geospatial partner for planning and executing workflows that keeps you in the driver's seat, allowing you to direct the analysis while it handles the technical heavy lifting

What is an Agent?

Components

Context

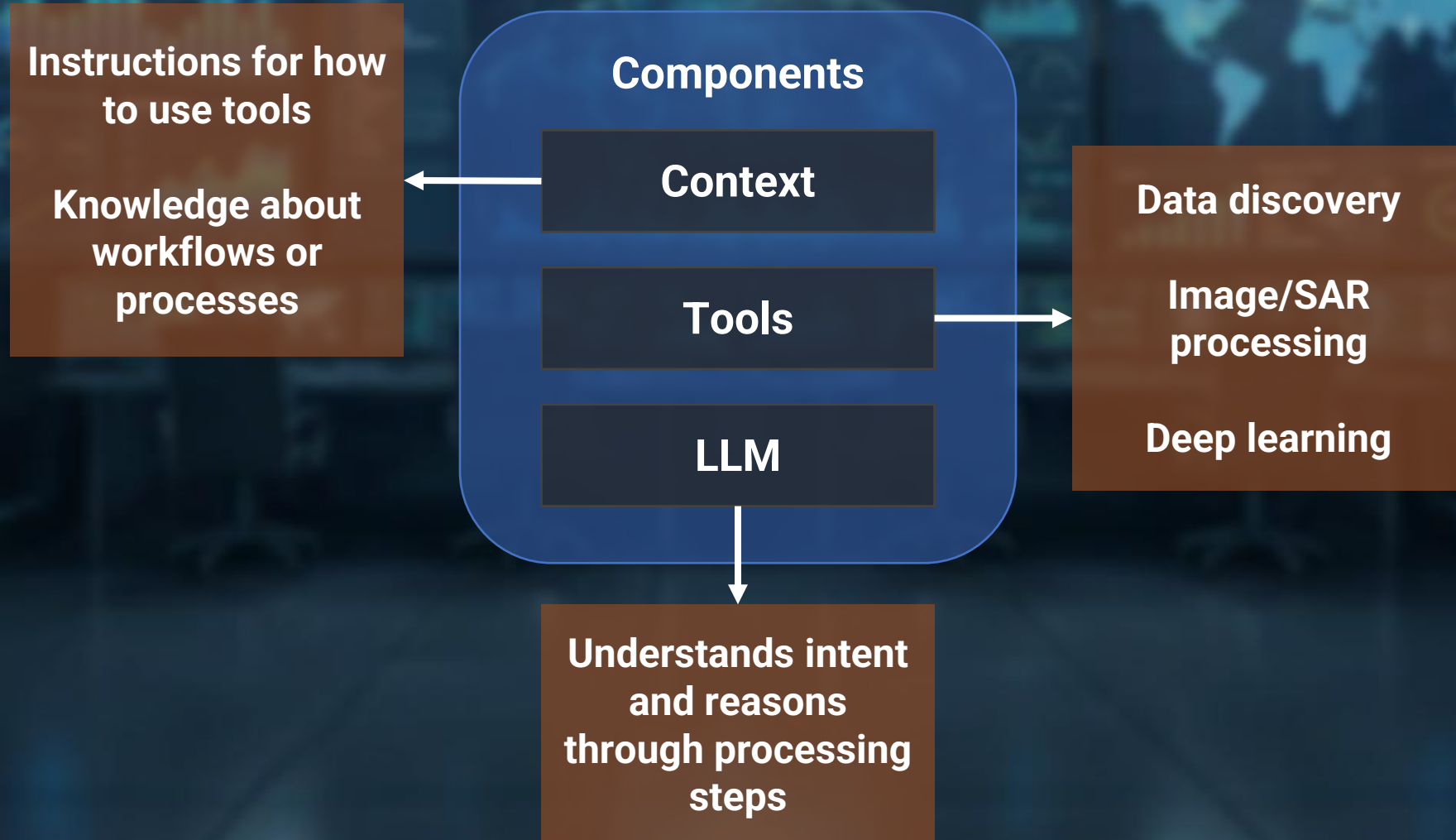
Tools

LLM

An Agent is an autonomous, AI-driven system that interprets natural language and executes tools to solve user requests



What is an Agent?



Why are LLMs Helpful?

Reasoning vs Processing

LLMs from simple pattern matching to active problem-solving, allowing them to "reason" through spatial complexities

End of Rigid Workflows

We are moving past "fit-for-purpose" scripts; modern AI adapts to diverse datasets without manual reconfiguration

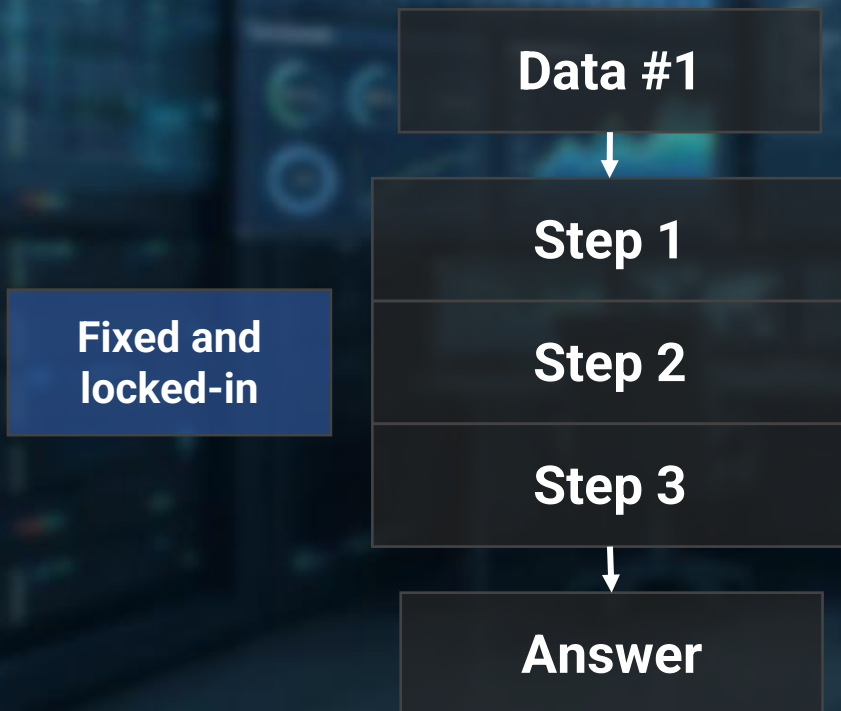
Human-Centric Logic

By pairing natural language instructions with specialized tools, LLMs can execute multi-step workflows with human-like intuition

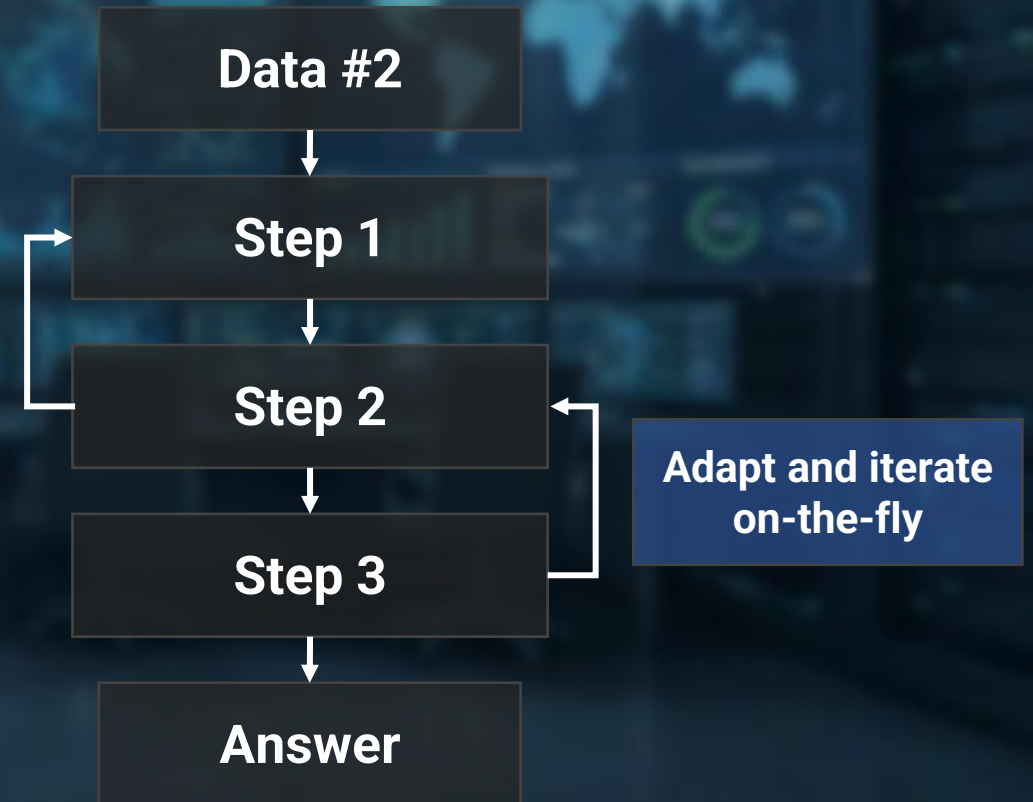


An Example Workflow

Traditional Problem Solving

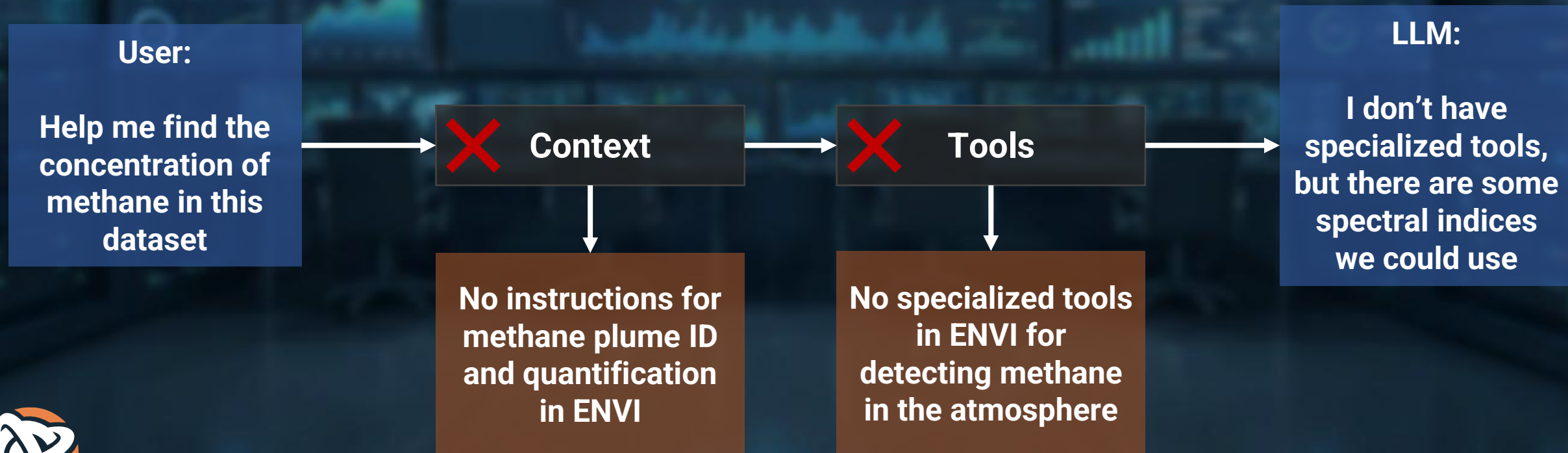


AI Problem Solving



...But it's Not Magic

LLMs are powered by the context and tools they have available





- **Summary**

- **Ideal For:** Scientists, data analysts, and programmers who use IDL as a core part of their daily work.
- **The Value:** It makes IDL more approachable, lowering the barrier for new team members and helping them come up to speed faster on large or outdated codebases.

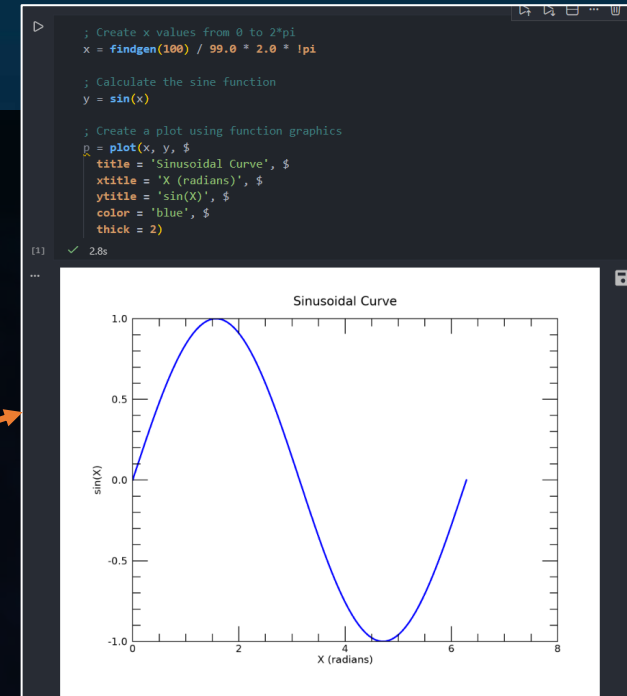
- **Key Capabilities:**

- **Write and Run Code:** Generate everything from "Hello World" scripts to complex vectorized algorithms
- **Explain and Troubleshoot:** Ask the agent to explain sections of code or propose a fix for errors
- **Intelligent Recommendations:** Understands your code base make sure new code fits existing patterns and styles



• Example Questions

- Create a hello-world IDL Notebook that plots a sinusoidal curve
- Can you tell me more about IDL's HTTPRequest class?
- What does this section of code do?
- Is there a better way to accomplish this task?
- Write a vectorized, non-maximum suppression algorithm for cleaning up object detection results



```
function NMSBoxer, boxes, scores, $
  apply_ios_threshold = apply_ios_threshold, $
  iou_threshold = iou_threshold, $
  ios_threshold = ios_threshold, $
  count_remove = count_remove, $
  compile_opt idl2, hidden

;+ Init result
count_remove = 0

; set default value
if -isa(iou_threshold, /number) then iou_threshold = 0.30
if -isa(ios_threshold, /number) then ios_threshold = 0.80

; Handle empty input
n_boxes = n_elements(scores)
if (n_boxes eq 1) then return, -1

; Sort boxes by scores in descending order
sorted_indices = reverse(sort(scores))

; Mask for boxes to keep or discard
mask = bytarr(n_boxes) + 1b

; Calculate areas for all boxes
areas = (boxes[2, *] - boxes[0, *]) * (boxes[3, *] - boxes[1, *])

; process each box
for i = 0, n_boxes - 2 do begin
  ; get our index
  current_idx = sorted_indices[i]

  ; skip if a box we should exclude
  if -mask[current_idx] then continue

  ; Get remaining boxes
  remaining_indices = sorted_indices[i + 1 : *]

  ; check the mask
  idxkeep = where(mask[remaining_indices], countkeep)
```



Demo: IDL Agent



IDL Agent: Tips and Tricks

- Be specific with your requests
 - If you know exactly what you want, communicate it to get it right the first time
- Attach files to requests
 - You can manually add files for context, or anything you highlight will automatically be included
- Start a new chat for each topic
 - Separate out conversations or requests
 - If the LLM ever gets off-track, a new chat will help
 - Sometimes LLMs can get “stuck” on some concepts



- **Summary**

- **Ideal For:** Remote sensing professionals and image processors who are familiar with the ENVI ecosystem.
- **The Value:** Reduces the amount of manual effort when processing data with ENVI. The agent summarizes workflows before processing to ensure the analysis matches your intent.

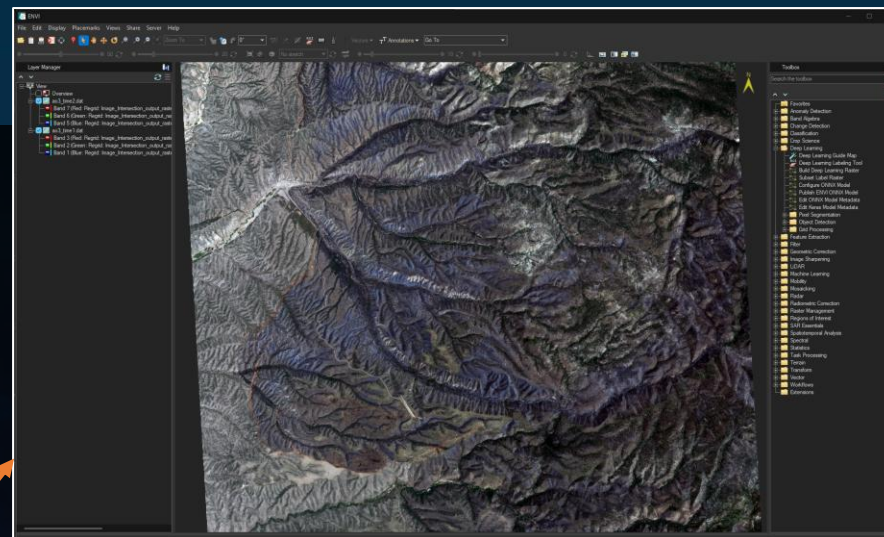
- **Key Capabilities:**

- **Conversational:** Describe the problem you want to solve, like change detection, and the agent handles the planning and execution
- **Transparent Logic:** Review every proposed step and easily ask for changes or inject your own expertise before data processing begins
- **An ENVI Expert:** Access all ENVI's image processing tools and bring your own using the ENVI Task API



• Example Questions

- Can you help me plan a change detection workflow using the data “here”?
- What ENVI tools do you have available?
- Can you open the data in “here” for me in ENVI?
- Using ENVI, how can I do supervised classification to map features from a spectral library?
- [After running processing] Can you summarize that workflow in an IDL Notebook for me?



Step 1: Load Input Raster

First, specify the path to your input raster. This can be any multispectral or hyperspectral image in a format ENVI supports (GeoTIFF, ENVI format, etc).

```
; Specify input file
; Replace this path with your own data file
inputFile = filepath('qb_boulder_msi', subdir=['data'], root_dir=e.root)

; Open the raster
raster = e.openRaster(inputFile)
print, 'Opened raster: ' + file_basename(inputFile)
print, 'Dimensions: ', raster.ncolumns, ' x ', raster.nrows
print, 'Bands: ', raster.nbands
```

IDL

Step 2: ISODATA Classification

The ISODATA algorithm starts with evenly distributed class means and iteratively clusters pixels. It continues until either:

- The percentage of pixels changing classes drops below the threshold, OR
- The maximum number of iterations is reached

Parameters:

- **input_raster:** The raster to classify



Demo: ENVI Agent



ENVI Agent: Tips and Tricks

- Add “ENVI” to your requests
 - Ex: Help me plan a change detection workflow using ENVI
 - Ex: With ENVI, process the datasets in “this” location using steps 1, 2, and 3 for me.
- How should I phrase my questions for ENVI Agent?
 - Rather than a request like “Extract water bodies in this image more than 1 km sq” it helps if you can be a little more descriptive like:
 - Map water in the image
 - Convert to vector
 - Filter vector to remove small water bodies
 - When requests are open ended, it can take a while to get to the right answer. If you are more direct you can save time.



IDL Agent



ENVI Agent

Framework	Powered GitHub Copilot
Connectivity	<u>Requires internet access</u>
LLMs	~20 for GitHub Copilot Offline or local LLMs not currently supported
Setup	IDL 9.2 or ENVI 6.2 Visual Studio Code and IDL for VSCode Paid GitHub Copilot subscription
Licensing	IDL Agent included with IDL 9.2 ENVI Agent requires additional module

Quick Links

- IDL Agent Resources
 - [IDL Agent Web Page](#)
 - [IDL Agent Setup Video](#)
 - [IDL Agent Demo Video](#)
- ENVI Agent Resources
 - [ENVI Agent Web Page](#)
 - [ENVI Agent Setup Video](#)
 - [ENVI Agent Demo Video](#)

[IDL Agent and ENVI Agent FAQ](#)

An aerial photograph of a mountain range with a circular inset showing a topographic map overlay. The inset highlights a specific mountain peak with a radial pattern of contour lines and a central peak. The surrounding landscape is a patchwork of green fields and forests.

Questions and Discussion

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