

# RISE

## Peter Seelman

*Vibe Coding Too Close to the Sun*

# Who Am I?

## @ JHU:

- '27 BS Physics, BA Mathematics
- Hodson Trust Scholar
- Taekwondo Club President

## @ Home:

- Co-Founder of Altera Labs
- Nature enjoyer



# Who Am I?

@ APL:

- RISE Intern for NASA's EZIE Mission ('23 – '25)
- ?





# Who Am I?

## @ APL:

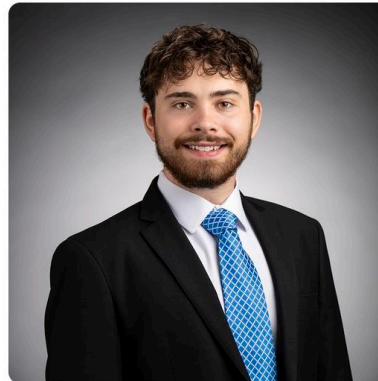
- RISE Intern for NASA's EZIE Mission ('23 – '25)
- RISE Intern: National Security Analyst for Military Tactics and Operations (this summer)



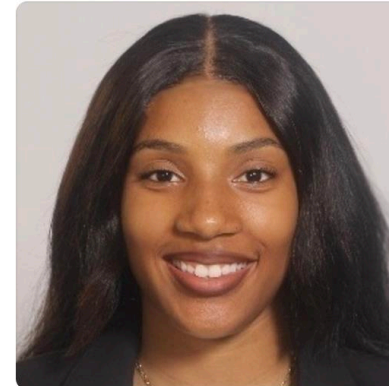
**Ming Nelson**  
APL Mathematics, APS I



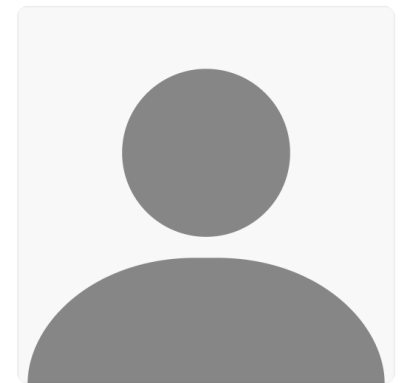
**Edward White**  
APL Operations Research/Analysis PPS



**Peter Seelman**  
APL Technical Aide



**Amari Bullock**  
APL Technical Aide



**Aryan Sharma**  
APL Technical Aide

# CANTATA Overview

- CANTATA was series of FY25 IRADs to examine faster and more accurate analysis techniques for critical technologies
- **Core Functions:**
  - Ingest and continuously update technology-centric data related to all elements of national strategy
  - Enable standardized, well-scoped technology roadmaps
  - Conduct **rapid analysis** of Blue and Red technology development **to support decision makers**
  - Keep pulse of state-of-the-art technologies **and current events that affect those technologies**

| Seed Areas of Emerging Opportunity                                                    |                                                 |                          |
|---------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------|
|    | Biotechnology                                   | <input type="checkbox"/> |
|    | Quantum Science                                 | <input type="checkbox"/> |
|    | Future Generation Wireless Technology (FutureG) | <input type="checkbox"/> |
|    | Advanced Materials                              | <input type="checkbox"/> |
| Effective Adoption Areas                                                              |                                                 |                          |
|    | Trusted AI and Autonomy                         | <input type="checkbox"/> |
|    | Integrated Network Systems-of-Systems           | <input type="checkbox"/> |
|    | Microelectronics                                | <input type="checkbox"/> |
|    | Space Technology                                | <input type="checkbox"/> |
|    | Energy Resilience                               | <input type="checkbox"/> |
|    | Advanced Computing and Software                 | <input type="checkbox"/> |
|   | Human-Machine Interfaces                        | <input type="checkbox"/> |
| Defense-Specific Areas                                                                |                                                 |                          |
|  | Directed Energy                                 | <input type="checkbox"/> |
|  | Hypersonics                                     | <input type="checkbox"/> |
|  | Integrated Sensing and Cyber                    | <input type="checkbox"/> |

# Basic Structure

Three core areas of CANTATA:

## 1. Knowledge Base

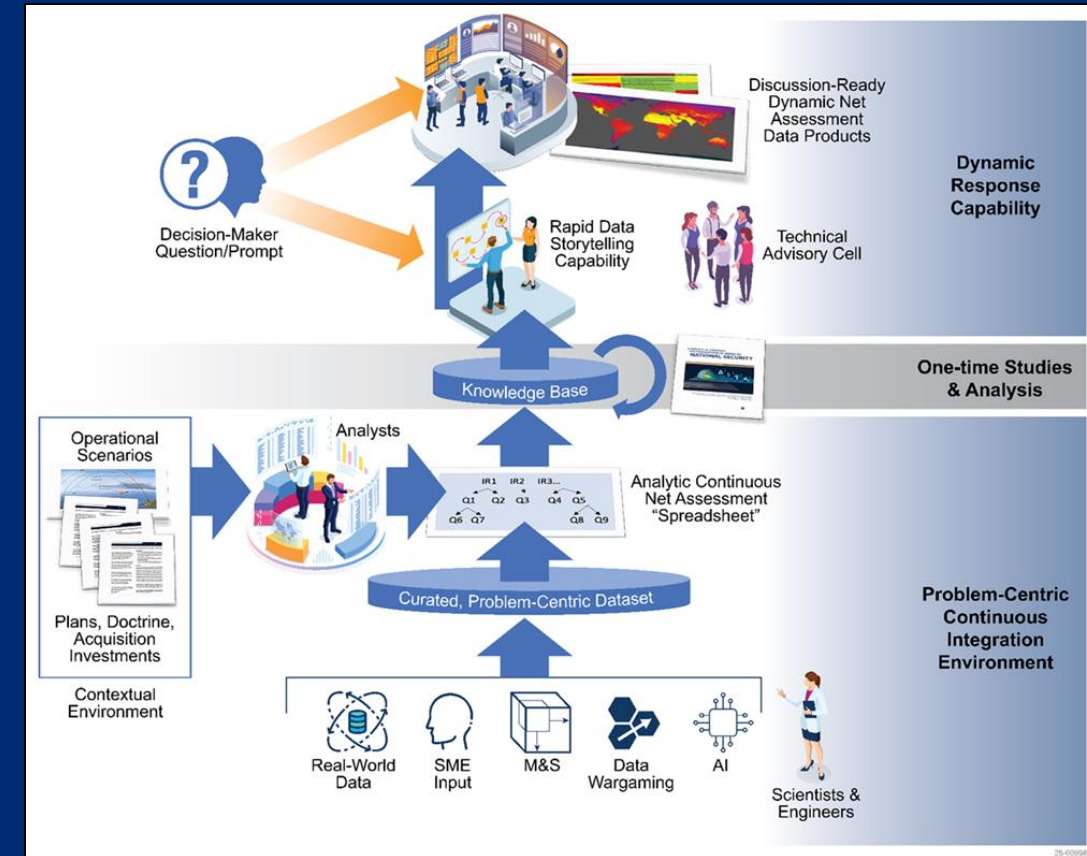
- Collection of all data supporting CANTATA components

## 2. Analysis Environment

- Empowers analysts to rapidly develop and run analytic workflows

## 3. Dashboard

- Displays information relevant to Critical Technology Areas



# Basic Structure

Three core areas of CANTATA:

## 1. Knowledge Base

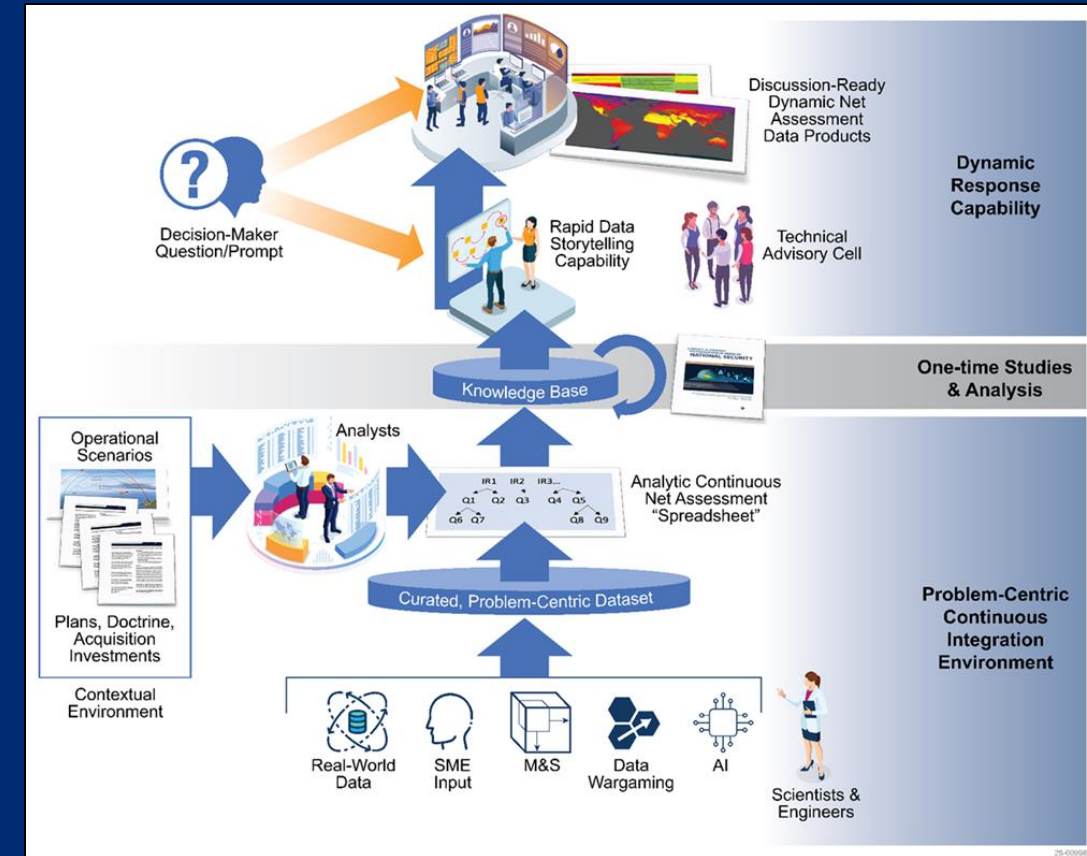
- Collection of all data supporting CANTATA components

## 2. Analysis Environment

- Empowers analysts to rapidly develop and run analytic workflows

## 3. Dashboard

- Displays information relevant to Critical Technology Areas



# Problem Statement

*Where do I fit into all of this?*

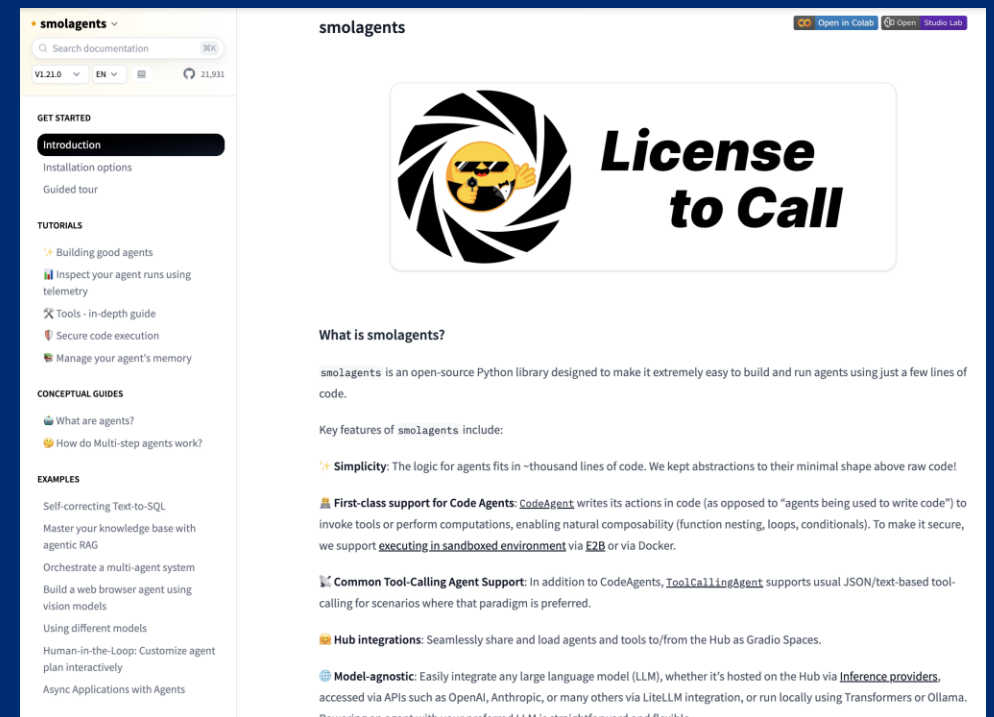
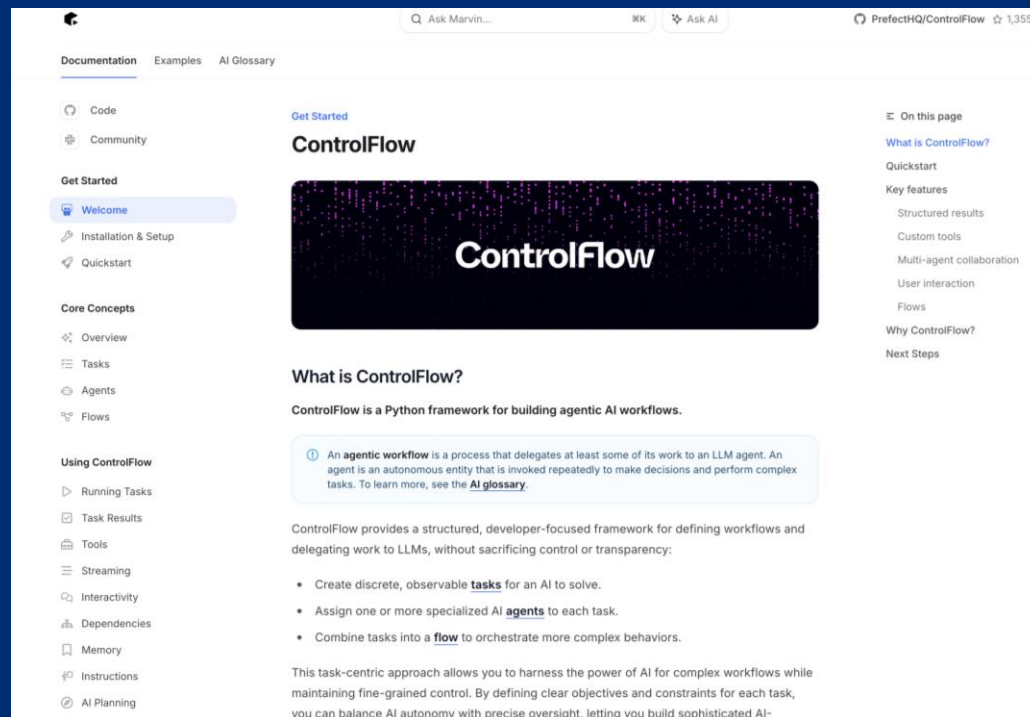
- Need to provide an environment for people to do analysis **quickly, repeatably, and reliably**
- **My role...**
  - Explore agentic AI frameworks
  - Model vignettes of agentic analysis workflows
  - Develop parallel Analysis Environment prototype
  - **BONUS: I built a web app**



# Internship Odyssey 1

*Nearly identical to the Homeric one*

- Initial Tasking:
  - **RQ:** What are the capabilities of AI systems to conduct meaningful analysis given different tools/data/etc.?
  - Tested two frameworks for managing AI agents: **ControlFlow** and **smolagents**



# Internship Odyssey 2

*Nearly identical to the Homeric one*

**Goal:** AI-enhanced Analysis Environment to speed up analytical products grounded in CANTATA tools and datasets

**1. Start small by hooking tools together**

1. Problem: No tools built yet :(
2. Solution: Low fidelity model (LLM hallucinations)

**2. Up complexity of tools because it works**

1. Problem: New untested architecture; want separation of concerns
2. Solution: Tool Agents with dedicated APIs

**3. Putting it all together:**

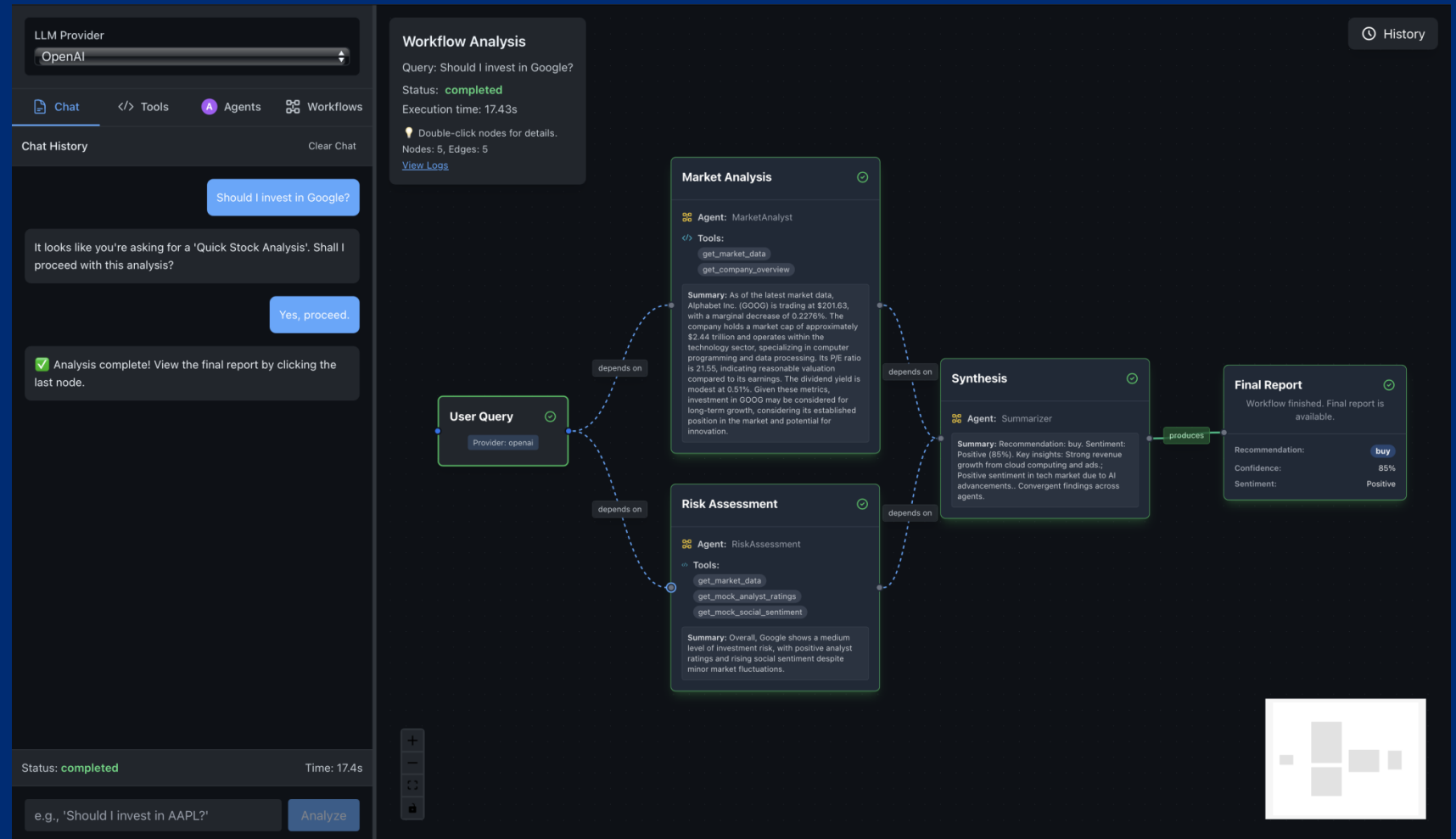
1. Problem: More architecture changes; need to test repeatability and visibility
2. Solution: Run a workflow from a static, modifiable config

**4. I built a web app from scratch to do all this!**

# Introducing FINTEL

*Why did I build a financial analysis system from scratch?*

- I didn't have a license for Enterprise ChatGPT
  - Couldn't share proprietary information about CANTATA, LUMEN, or Toccata with AI
  - OPAL's models weren't powerful enough
- I decided to develop a **parallel prototype** as a proxy for CANTATA:
- FINTEL, A Financial Intelligence Tool



# The Dawn of the AI Workflow Engine

*Modular! Extensible! Flexible!*

## The modular, config-driven model

- **Settings:** env-driven provider configuration and defaults ( `backend/config/settings.py` ).
- **Agents:** declared in `backend/config/agents.yaml` with tools and capabilities.
- **Tools:** declared in `backend/config/tools.yaml` with API key requirements, categories, and examples.
- **Workflows:** declared in `backend/config/workflow_config.yaml` with agent roles, dependencies, and defaults.

Example workflow (excerpt):

```
workflows:
  quick_stock_analysis:
    name: "Quick Stock Analysis"
    description: "Fast, high-level analysis..."
    agents:
      - name: "MarketAnalyst"
        role: "market_analysis"
        required: true
        fallback: "FinancialAnalyst"
        tools: ["get_market_data", "get_company_overview", "get_mock_news"]
      - name: "RiskAssessment"
        role: "risk_assessment"
        required: true
        fallback: "FinancialAnalyst"
        tools: ["get_market_data", "get_mock_analyst_ratings"]
      - name: "Summarizer"
        role: "synthesis"
        required: true
        tools: []
        dependencies: ["market_analysis", "risk_assessment"]

settings:
  default_workflow: "quick_stock_analysis"
  enable_fallback_agents: true
```

## README

## Extending the system

### • Add a tool

- Implement or reuse a function in `backend/tools/` (e.g., `market_data.py`, `economic_data.py`).
- Declare it in `backend/config/tools.yaml` with `function`, optional `class`, `api_key_required`, `examples`.
- If it needs an API key, add the key to `.env`.
- Reference the tool from agents in `agents.yaml` and workflows in `workflow_config.yaml`.

### • Add an agent

- Add a new agent under `agents:` in `backend/config/agents.yaml` with `tools`, `capabilities`, and `enabled`.
- Optionally add templates/logic in `backend/agents/` if needed.
- Reference the agent in a workflow via `workflow_config.yaml` with `role`, `required`, and `fallback`.

### • Add a workflow

- Add a new entry in `backend/config/workflow_config.yaml` under `workflows:`.
- List agent roles, required flags, fallbacks, dependencies.
- Optionally update `settings.default_workflow`.

### • Switch providers (OpenAI, Google, Local)

- Configure keys or `LOCAL_BASE_URL` in `.env`.
- The selected provider can be passed by the client or defaults to `DEFAULT_PROVIDER`.
- Provider settings live in `backend/config/settings.py`.



LLM Provider

OpenAI

History

Chat

Tools

Agents

Workflows



### No Workflow Data

Waiting for workflow execution...

Debug: 0 nodes, 0 edges



e.g., 'Should I invest in AAPL?'

Analyze



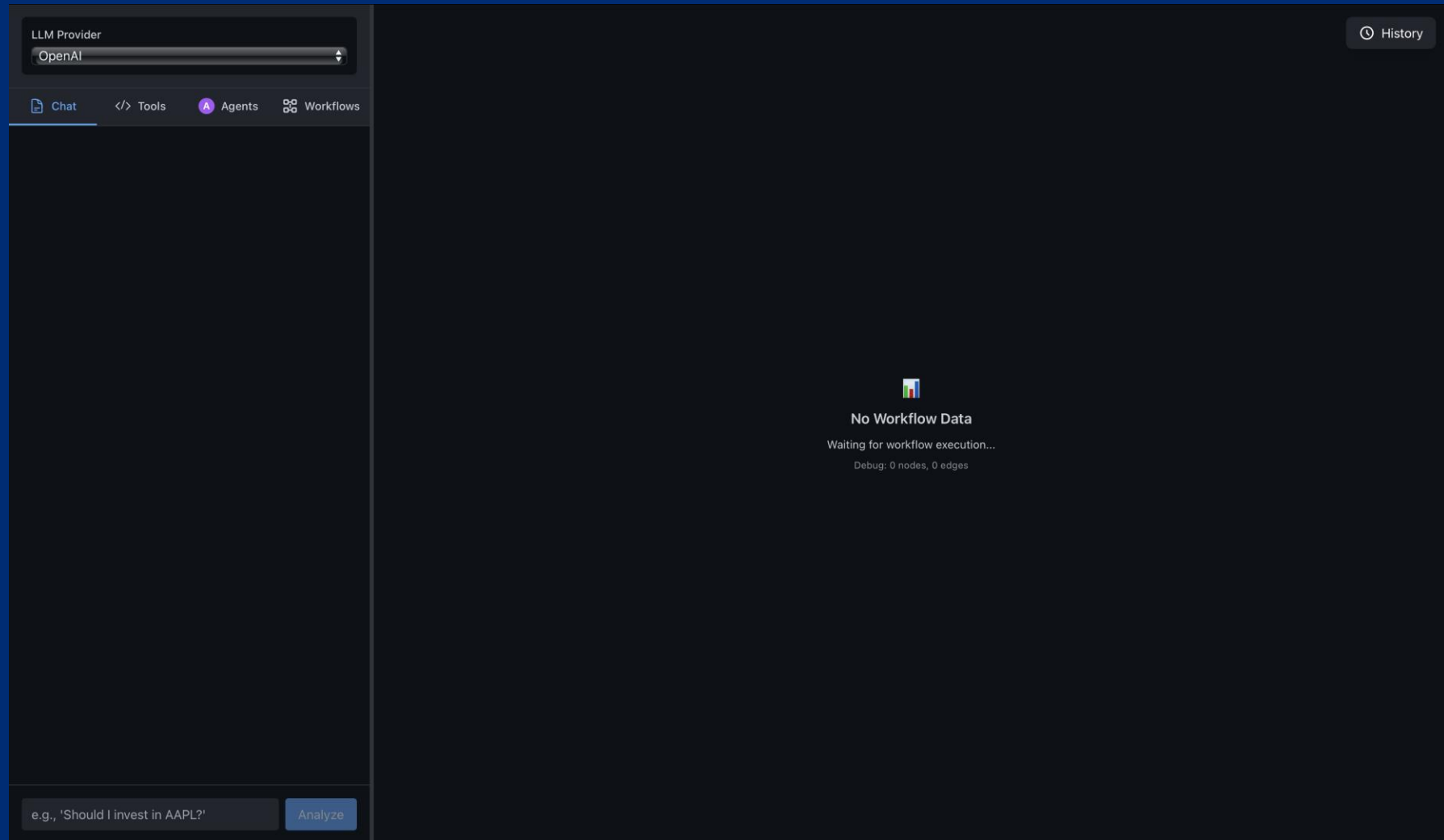
Demo Time!

8 February 2026

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# FINTEL Base Page

## *Bootup Screen*



# FINTEL Quick Stock Analysis

LLM Provider  
OpenAI

ChatToolsAgentsWorkflows

Chat HistoryClear Chat

Should I invest in Google?

It looks like you're asking for a 'Quick Stock Analysis'. Shall I proceed with this analysis?

Yes, proceed.

Analysis complete! View the final report by clicking the last node.

Status: completedTime: 17.4s

e.g., 'Should I invest in AAPL?'Analyze

Workflow Analysis

Query: Should I invest in Google?

Status: completed

Execution time: 17.43s

Double-click nodes for details.

Nodes: 5, Edges: 5

View Logs

Market Analysis

Agent: MarketAnalyst

Tools: get\_market\_data, get\_company\_overview

Summary: As of the latest market data, Alphabet Inc. (GOOG) is trading at \$201.63, with a marginal decrease of 0.2276%. The company holds a market cap of approximately \$2.44 trillion and operates within the technology sector, specializing in computer programming and data processing. Its P/E ratio is 21.55, indicating reasonable valuation compared to its earnings. The dividend yield is modest at 0.51%. Given these metrics, investment in GOOG may be considered for long-term growth, considering its established position in the market and potential for innovation.

Risk Assessment

Agent: RiskAssessment

Tools: get\_market\_data, get\_mock\_analyst\_ratings, get\_mock\_social\_sentiment

Summary: Overall, Google shows a medium level of investment risk, with positive analyst ratings and rising social sentiment despite minor market fluctuations.

Synthesis

Agent: Summarizer

Summary: Recommendation: buy. Sentiment: Positive (85%). Key insights: Strong revenue growth from cloud computing and ads.; Positive sentiment in tech market due to AI advancements.; Convergent findings across agents.

Final Report

Workflow finished. Final report is available.

Recommendation: buy

Confidence: 85%

Sentiment: Positive

# FINTEL Side-by-Side

Chat, Tools, Agents, Workflows

LLM Provider

OpenAI

Chat

Tools

Agents

Workflows

Chat History

Clear Chat

Should I invest in Google?

It looks like you're asking for a 'Quick Stock Analysis'. Shall I proceed with this analysis?

Yes, proceed.

Analysis complete! View the final report by clicking the last node.

Status: completed

Time: 14.6s

e.g., 'Should I invest in AAPL?'

Analyze

LLM Provider

OpenAI

Chat

Tools

Agents

Workflows

Available Tools

System Status

HEALTHY

Tools: 20/20

Agents: 5/5

Errors: 0

Warnings: 0

get\_market\_data

market\_data

API Key Required

Get real-time market data for a stock ticker

Capable Agents

FinancialAnalyst

MarketAnalyst

RiskAssessment

API Key Required

This tool requires a `alpha_vantage` API key to function.

Examples

get\_market\_data(ticker='AAPL')

get\_market\_data(ticker='GOOG')

get\_company\_overview

market\_data

API Key Required

Get comprehensive company overview and fundamental data

Capable Agents

FinancialAnalyst

MarketAnalyst

RiskAssessment

get\_economic\_data\_from\_fred

economic\_data

API Key Required

LLM Provider

OpenAI

Chat

Tools

Agents

Workflows

Available Agents

Agent System Status

HEALTHY

Total Agents: 5

Enabled: 5

Required: 1

Capabilities: 11

EconomicAnalyst

macroeconomic\_indicators

Available

economic\_analysis

Tools (2)

get\_economic\_data\_from\_fred

available

misleading\_data\_validator

available

Capabilities (2)

macroeconomic\_indicators

economic\_analysis

Instructions Preview

You are an expert economic analyst specializing in macroeconomic analysis. CRITICAL INSTRUCTIONS FOR TOOL USAGE: 1. For EVERY economic analysis, you MUST call get\_economic\_data\_from\_fred 2. ALWAYS us...

FinancialAnalyst

risk\_assessment

market\_analysis

Required

economic\_analysis

+1 more

MarketAnalyst

market\_analysis

ticker\_detection

Available

LLM Provider

OpenAI

Chat

Tools

Agents

Workflows

Workflow Selection

Choose Analysis Type

Quick Stock Analysis

Fast, high-level analysis of a specific stock for a go/no-go investment decision.

Sector & Competitor Deep Dive

Analyzes a company's position within its sector by comparing it against key competitors.

Macroeconomic Outlook

Assesses the overall economic climate using key indicators like GDP, inflation, and unemployment.

Custom

Build your own (coming soon)

Selected Workflow Details

Agent Team

market\_analysis

Required

5 tools

risk\_assessment

Required

3 tools

synthesis

Required

0 tools

Configuration Management

Agents and tools can be customized by editing `backend/config/workflow_config.yaml`. Changes take effect after restarting the backend server.

# FINTEL Features

Workflow Analysis

Agent Trace: Market Analysis

Agent Overview

Agent Name: Market Analysis

Status: Completed

Task Description: Analyze market data, financial metrics, and trading patterns

Summary: With a current price of \$201.63, and a P/E ratio of 21.55, Alphabet Inc offers a blend of technology services with a stable market cap of over \$2.44 trillion. The minor decrease in current price may represent a slight dip in investor sentiment, but the overall fundamentals suggest it's a strong candidate for investment.

Inputs Received

Agent Message

Tool Input: get\_market\_data

Tool Input: get\_company\_overview

Agent Message

Tool Input: mark\_task\_aabb502d\_successful

Agent Trace: Risk Assessment

Execution Timeline

Agent Message

Reasoning: No textual reasoning (tool-only step)

Agent Tool\_call

Tool: get\_market\_data LIVE

Input: { "ticker": "GOOG" }

Output: { "symbol": "GOOG", "price": "201.6300", "change": "-0.4600", "change\_percent": "-0.2276%", "volume": "11117-27-52.336086" }

Agent Tool\_call

Tool: get\_mock\_analyst\_ratings MOCK

Input: { "ticker": "GOOG" }

Output: { "ticker": "GOOG", "buy": "18", "hold": "6", "sell": "1", "consensus": "buy", "price\_target": { "median": "200.0", "high": "240.0", "low": "165.0", "status": "success", "mock": true, "timestamp": "2025-08-11T17:27:52.336086" } }

Agent Tool\_call

Tool: get\_mock\_social\_sentiment MOCK

Input: { "ticker": "GOOG" }

Output: { "ticker": "GOOG", "sentiment\_score": "0.62", "volume": "12450", "trend": "rising", "mentions": { "AI": "earnings", "guidance": "1", "status": "success", "mock": true, "timestamp": "2025-08-11T17:27:52.425937" } }

Agent Message

Reasoning: { "ticker": "GOOG", "risk\_level": "Medium", "risk\_factors": [ "Market volatility", "Analyst rating consensus is 'buy' with a median price target of \$200", "Social sentiment is relatively positive with a score of 0.62" ], "risk\_summary": "Despite a slight decrease in price, analysts are bullish on GOOG, and social sentiment is rising. Potential risks include market volatility and macroeconomic conditions." }

Agent Message

Reasoning: No textual reasoning (tool-only step)

Agent Tool\_call

Tool: mark\_task\_bcaf7a43\_successful Controlflow Internal Tool LIVE

Input: { "risk\_factors": [ "Market volatility", "Analyst rating consensus is 'buy' with a median price target of \$200", "Social sentiment is relatively positive with a score of 0.62" ], "risk\_level": "Medium", "risk\_summary": "Despite a slight decrease in price, analysts are bullish on GOOG, and social sentiment is rising. Potential risks include market volatility and macroeconomic conditions.", "ticker": "GOOG" }

Output: Task #bcaf7a43 (task\_risk\_assessment) marked successful.

Task Success

Result: tickers="GOOG" risk\_level="Medium" risk\_factors=[ "Market volatility", "Analyst rating consensus is 'buy' with a median price target of \$200", "Social sentiment is relatively positive with a score of 0.62" ] risk\_summary="Despite a slight decrease in pr..."

Executive Summary

Buy

Ticker: GOOG

Positive, 80%

Strong growth in cloud services

Resilient advertising revenue

Portfolio diversification enhancing stability

Enhanced Analysis Results

Ticker

GOOG

Sentiment

Positive

Recommendation

Buy

Key Insights

Strong growth in cloud services

Resilient advertising revenue

Portfolio diversification enhancing stability

Market leadership remains intact

Positive forward-looking guidance

Agent Analysis

Market Analyst

Market Analysis

More

With a current price of \$201.63, and a P/E ratio of 21.55, Alphabet Inc offers a blend of technology services with a stable market cap of over \$2.44 trillion. The minor decrease in...

Risk Assessor

Risk Assessment

More

Despite a slight decrease in price, analysts are bullish on GOOG, and social sentiment is rising. Potential risks include market volatility and macroeconomic conditions.

Synthesis

Synthesis

More

Buy

Cross-Agent Insights

Analysis completed using Market Analyst and Risk Assessor and Synthesis. Agents provided mixed perspectives, suggesting balanced analysis.

APL

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