

Project AETHER

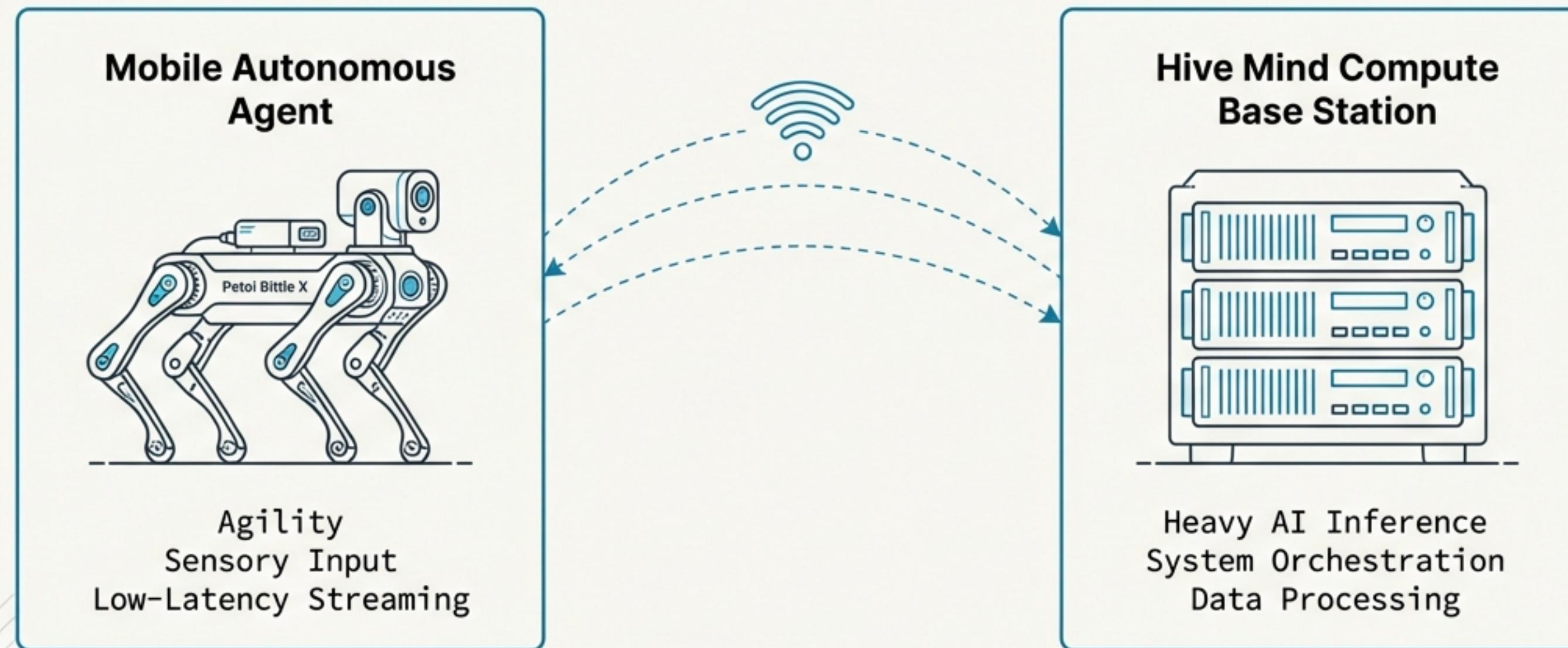
Autonomous Edge-Tracking Hybrid Entity & Reconnaissance

A technical overview of a distributed AI robotics system.



The Core Concept: A Distributed 'Hive Mind' Architecture

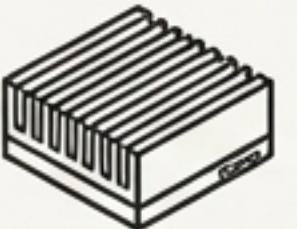
The system decouples the agile mobile agent from the heavy computational load, which is handled by a powerful, stationary base station.



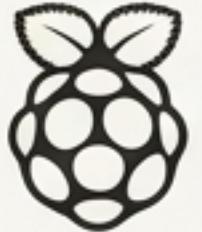
This architecture grants a small, lightweight robot the intelligence and processing power of a much larger system.

The Technology Stack

Hardware Stack



Compute: Jetson Orin Nano (8GB), Raspberry Pi 5, Raspberry Pi 4B+ (x2), Raspberry Pi 3B



Agent: Petoil Bittle X, Raspberry Pi Zero 2W (x2)



Peripherals: Lilygo T-Display, Fox Hunt 2m Radio, 2.4GHz PCB Yagi Antenna, 2.13 in e-Paper Hat, Mini Wireless Keyboard

Software & Frameworks



Orchestration: ROS2 Humble Hawksbill, K3s (Lightweight Kubernetes), Docker



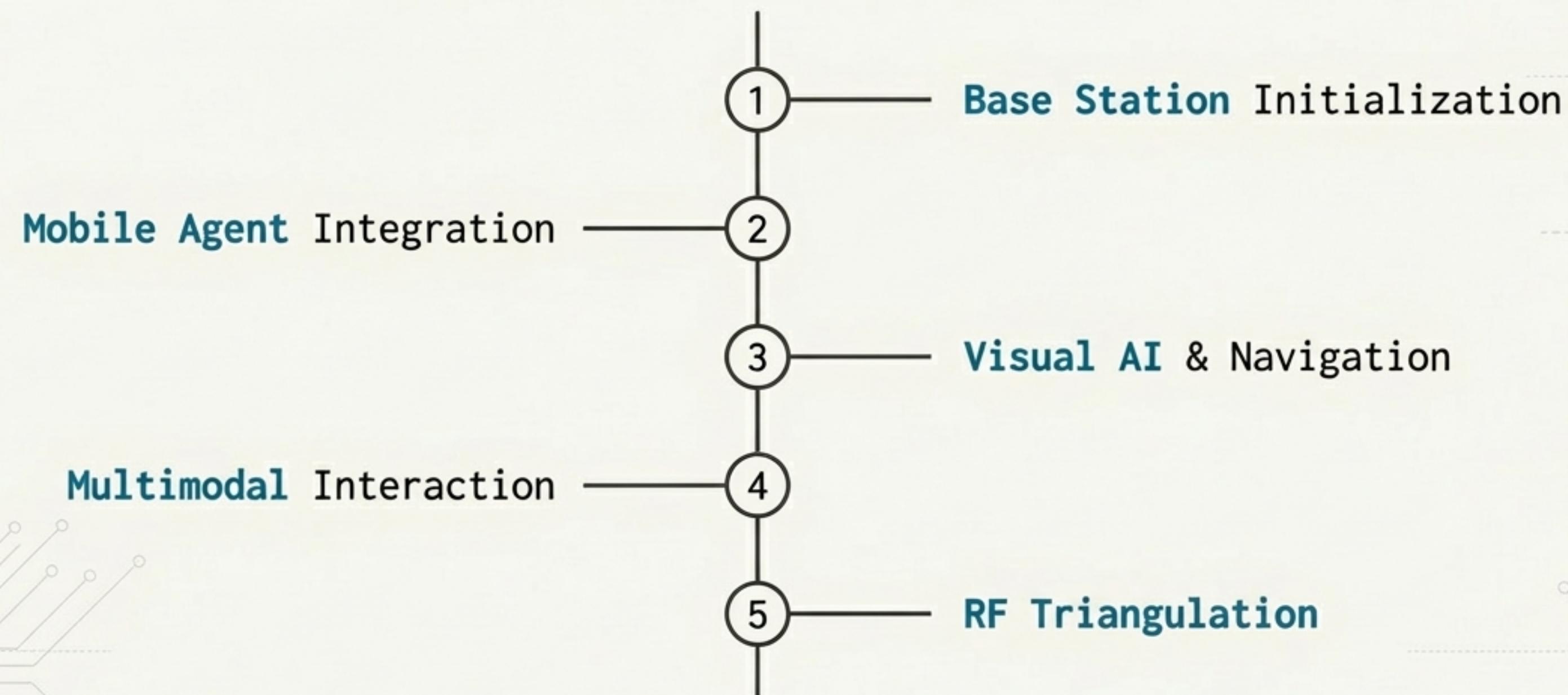
AI/ML: NVIDIA Isaac ROS, YOLOv8, Ollama (Llama 3 / Mistral), OpenAI Whisper (Local), Coqui TTS



Core: FastAPI, Python, C++

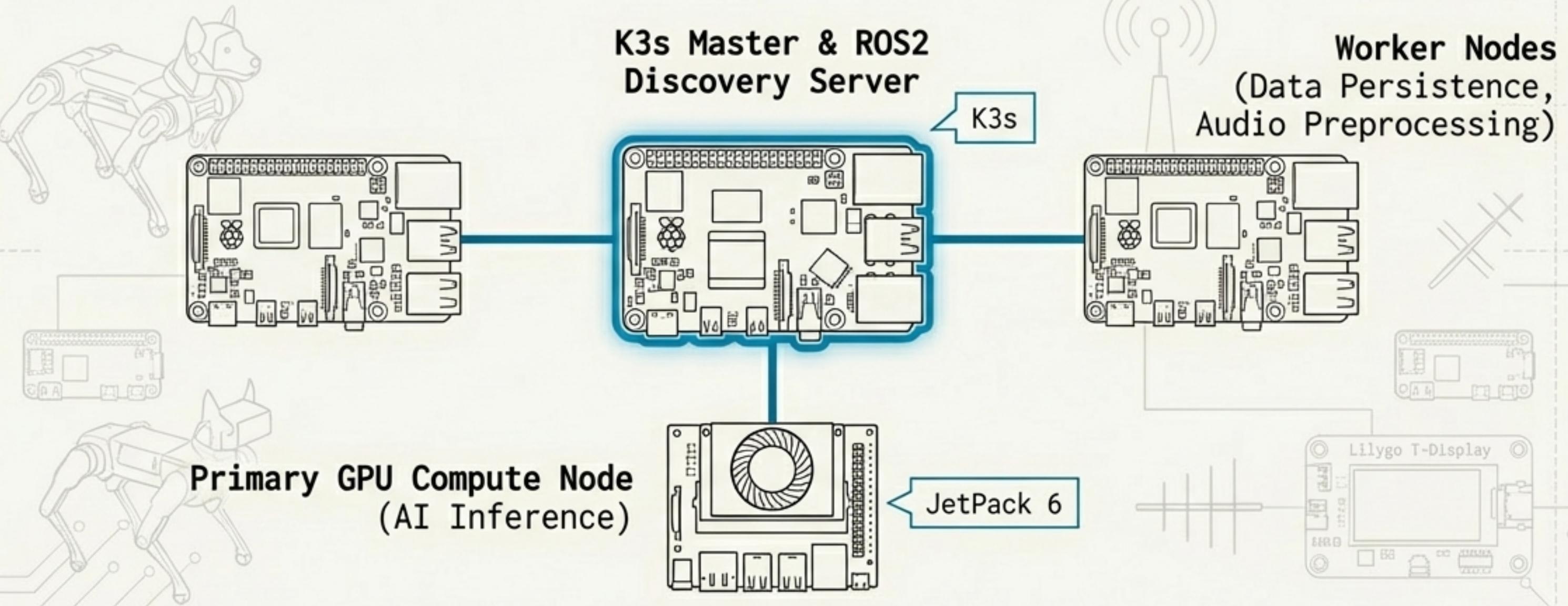
The Build Roadmap: A 5-Phase Genesis

Project AETHER is constructed in five distinct phases. Each phase builds upon the last, progressively unlocking new capabilities and integrating components into a cohesive, intelligent system.



Phase 1: Forging the Hive Mind

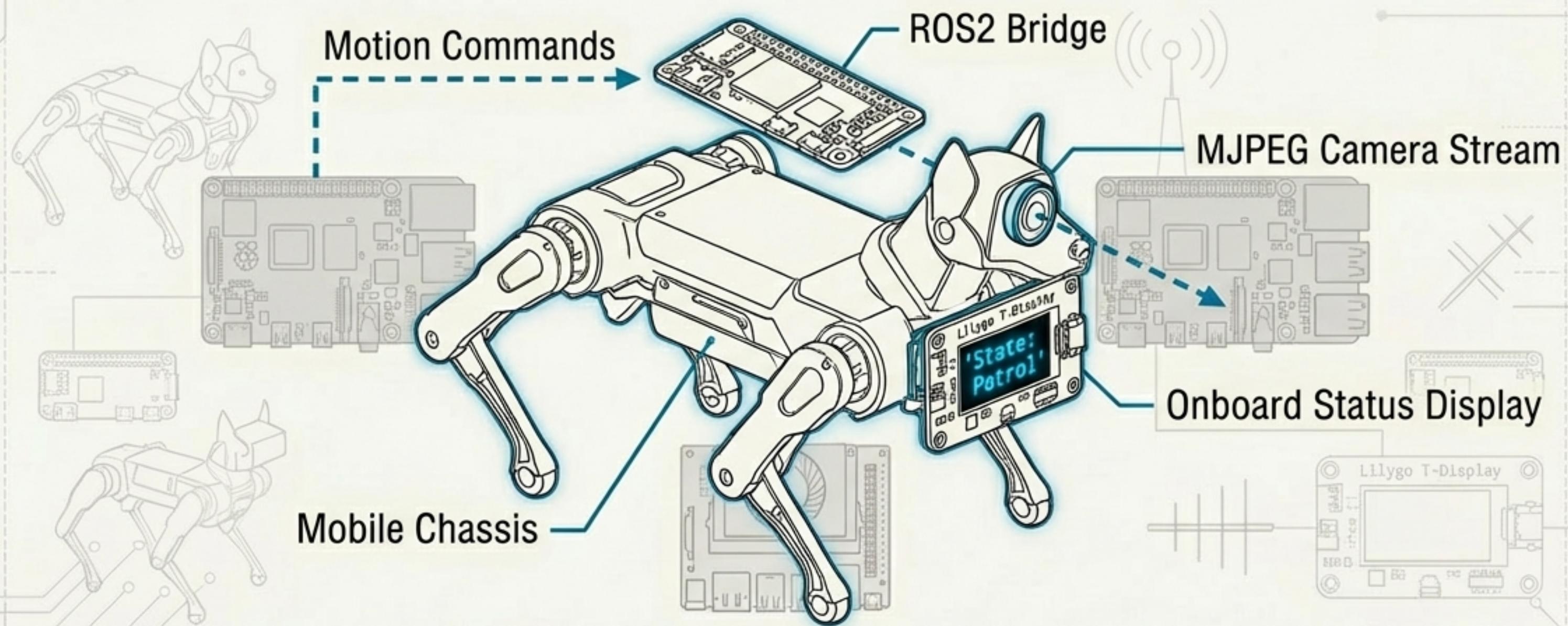
Objective: Establish the centralized compute cluster to handle orchestration, data processing, and AI inference.



Capability Unlocked: A Centralized Compute Brain

Phase 2: Embodying the Agent

Objective: Assemble the mobile agent and establish a data bridge to the Base Station.



Capability Unlocked: **Remote Telepresence and Physical Mobility**

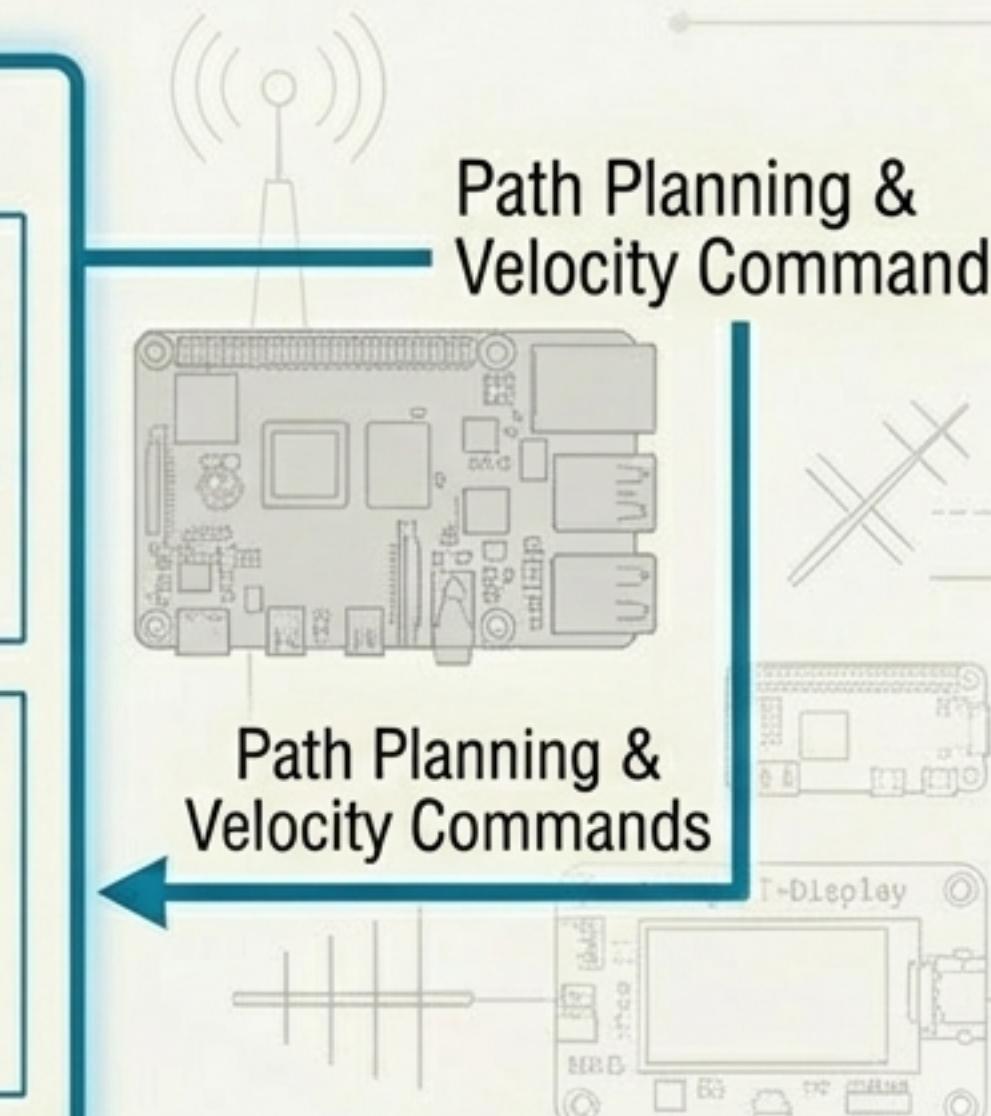
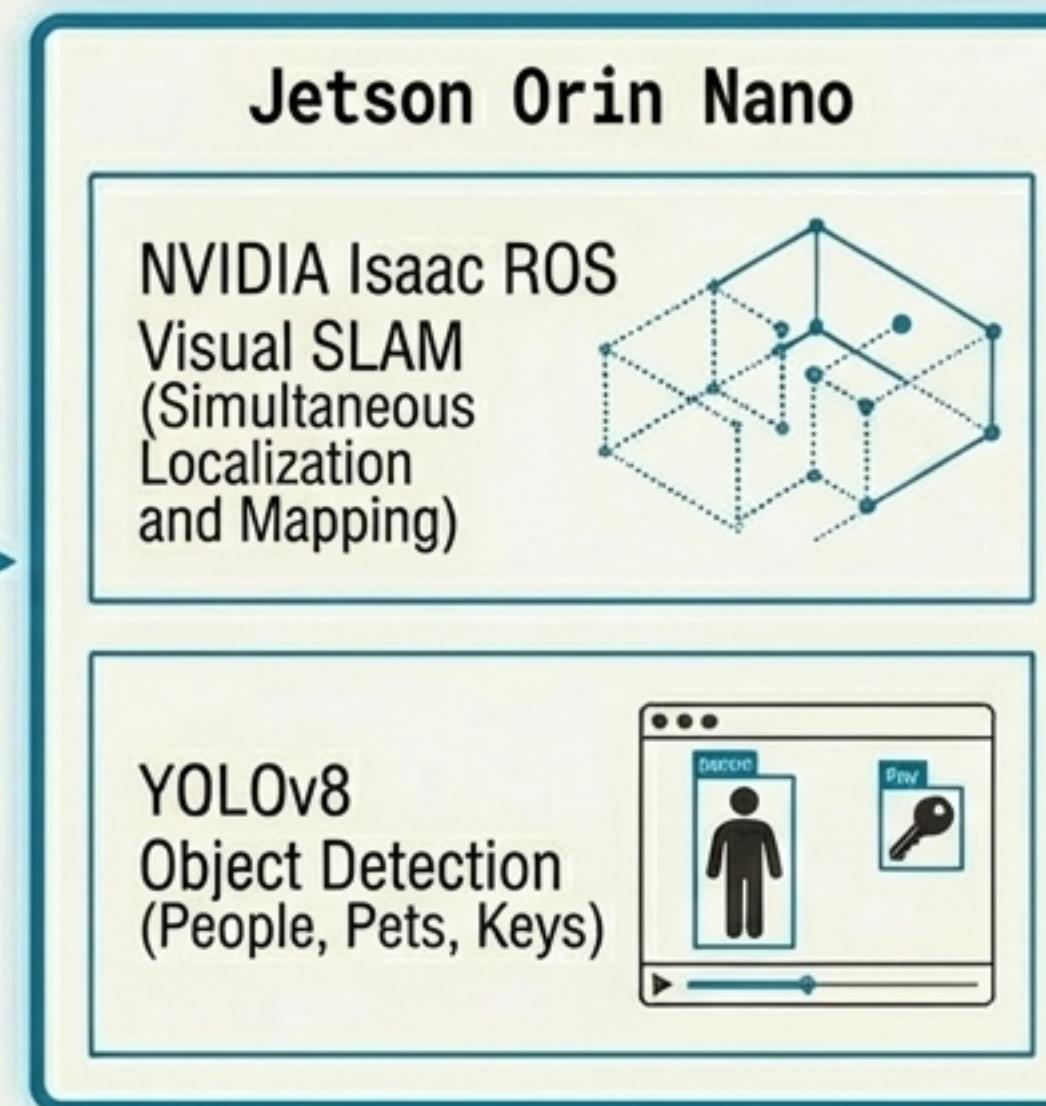
Phase 3: Granting Sight and Autonomy

Objective: Implement the visual intelligence and navigation stack, enabling the agent to map its environment and identify objects.



Video Feed

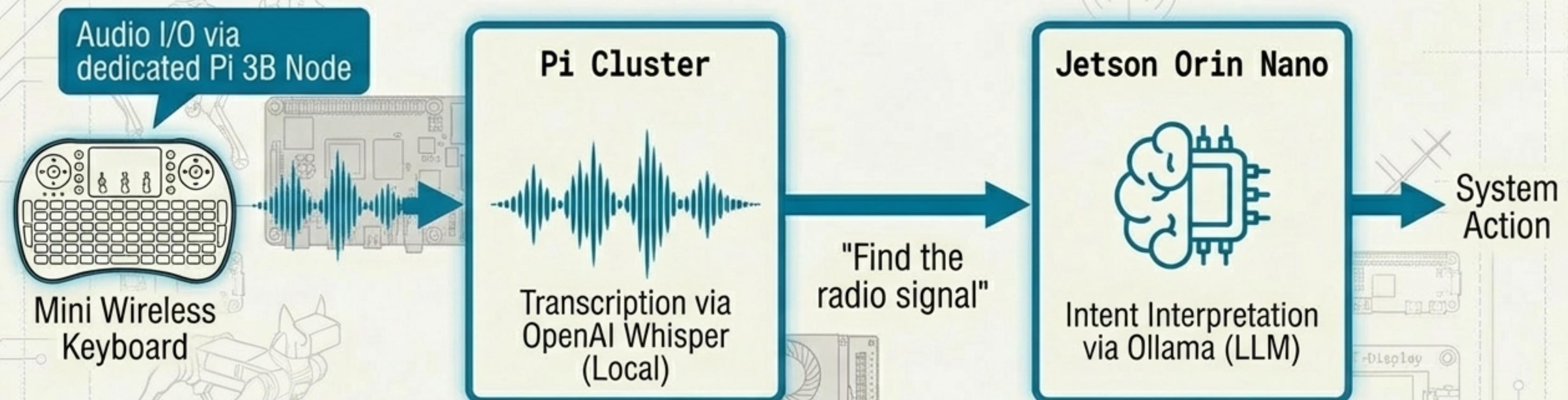
Bittle X



Capability Unlocked: Autonomous Navigation and Environmental Awareness

Phase 4: Enabling Multimodal Interaction

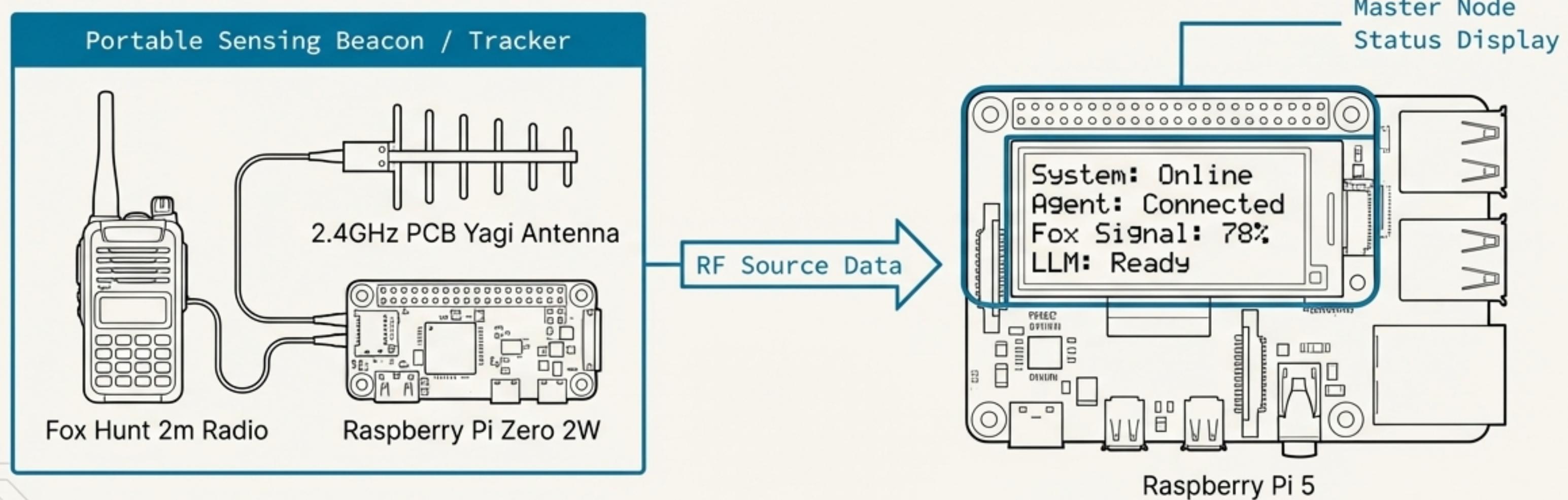
Objective: Integrate a voice and text interface for natural language command and control.



Capability Unlocked: Natural Language Command and Control

Phase 5: A New Sense for Reconnaissance

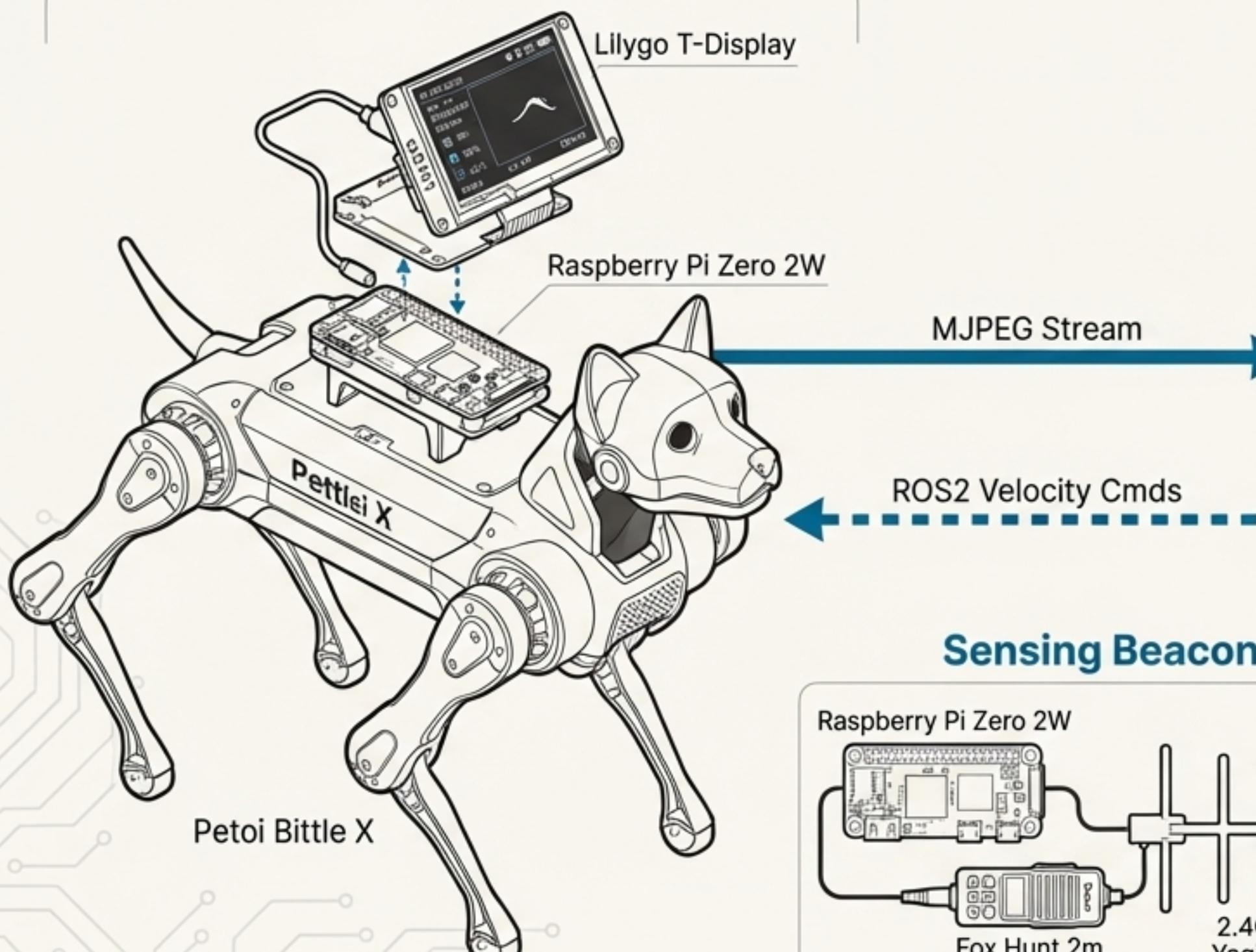
Objective: Integrate an RF sensor to triangulate radio signals and a system-level diagnostic display.



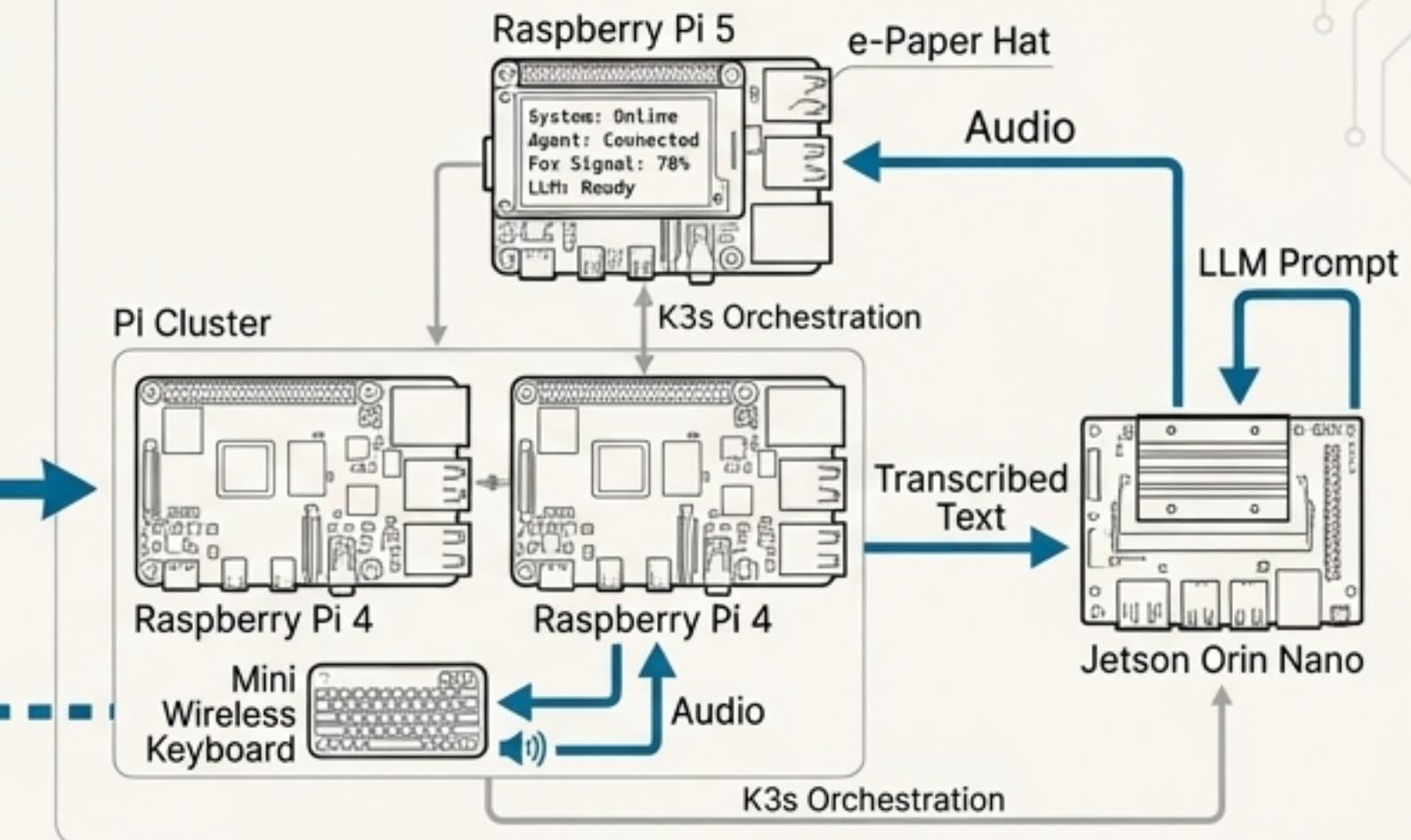
Capability Unlocked: **Radio Frequency Source Triangulation**

AETHER: The Complete System Architecture

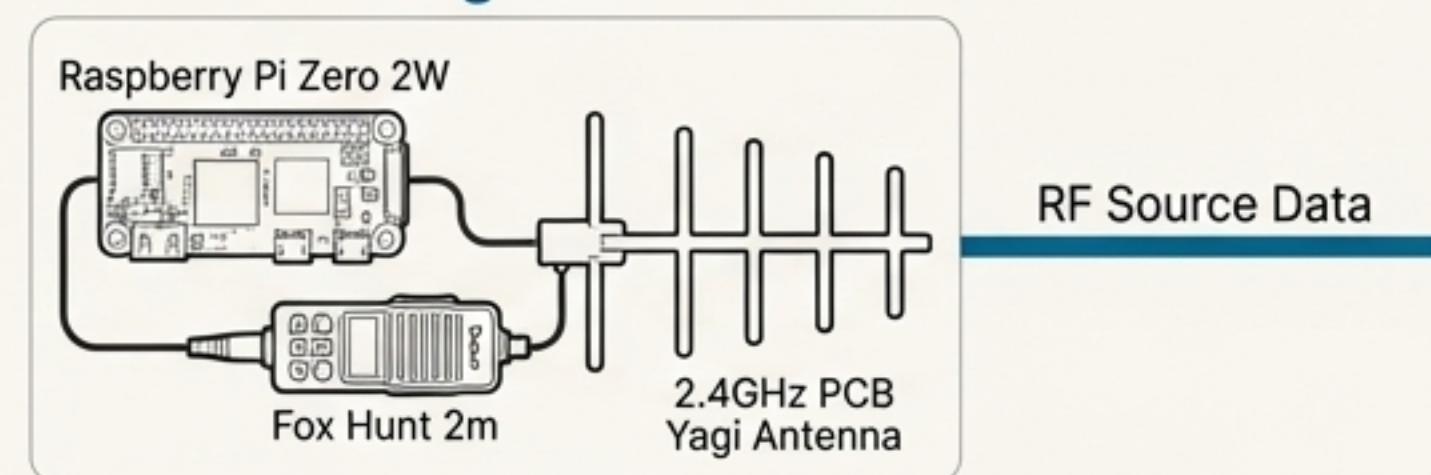
Mobile Agent



Hive Mind Base Station



Sensing Beacon



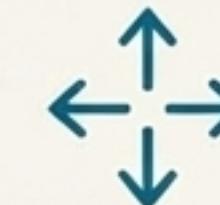
The Synthesis of Capabilities

The five-phase integration results in a single, cohesive entity with a powerful and diverse set of abilities.

I can understand and interpret spoken commands.



I can move with precision to execute tasks.



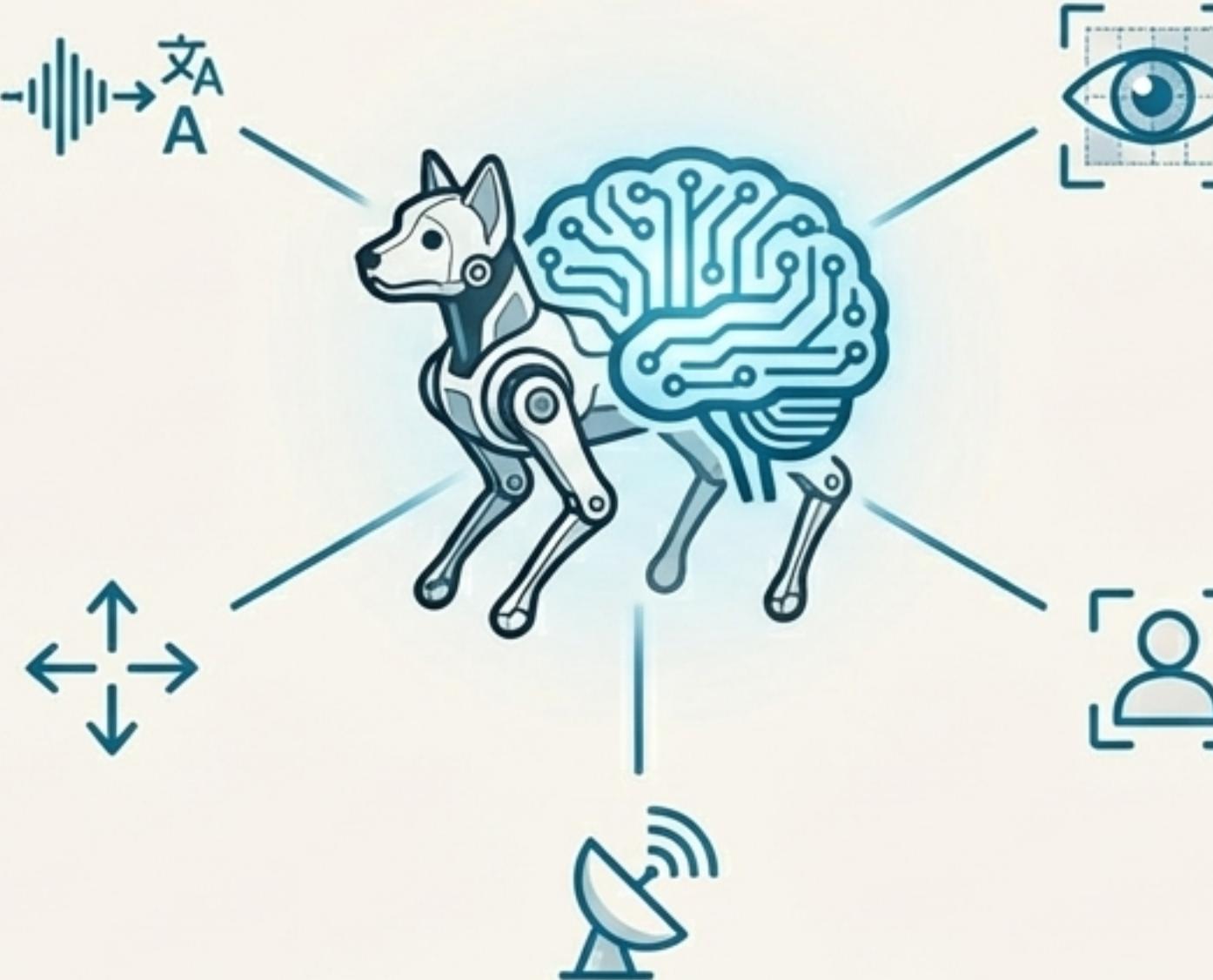
I can locate and track non-visual radio signals.



I can see and autonomously map my environment.

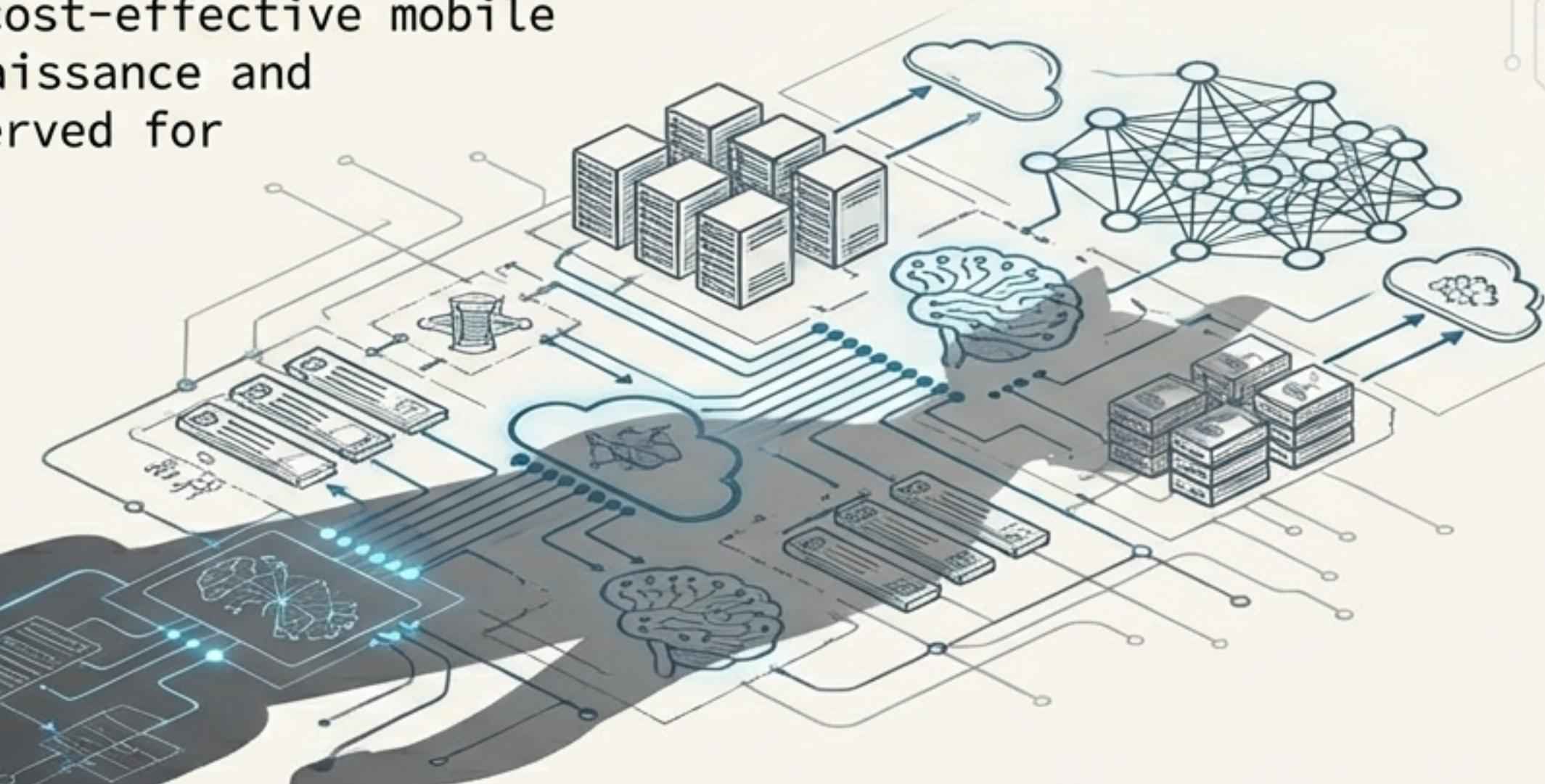


I can identify specific objects and people.



Project AETHER: Redefining Distributed Robotics

By distributing the AI/ML workload to a stationary “Hive Mind,” Project AETHER demonstrates a scalable and powerful architecture. It enables small, cost-effective mobile agents to perform complex reconnaissance and interaction tasks previously reserved for large, monolithic platforms.



The future of advanced robotics is not just bigger machines, but **smarter, distributed systems**.