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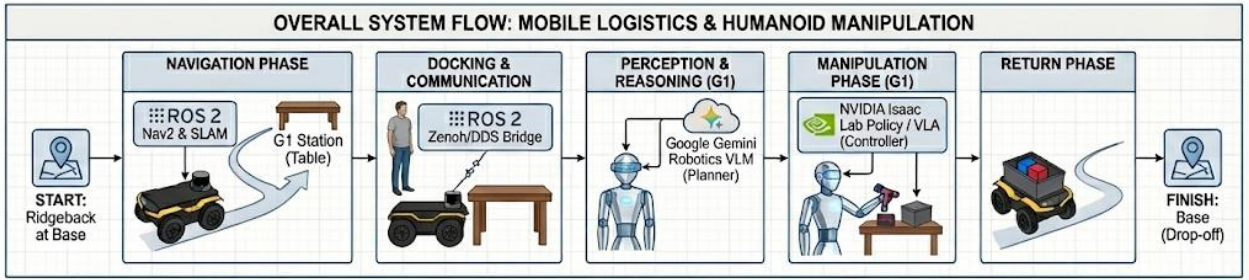
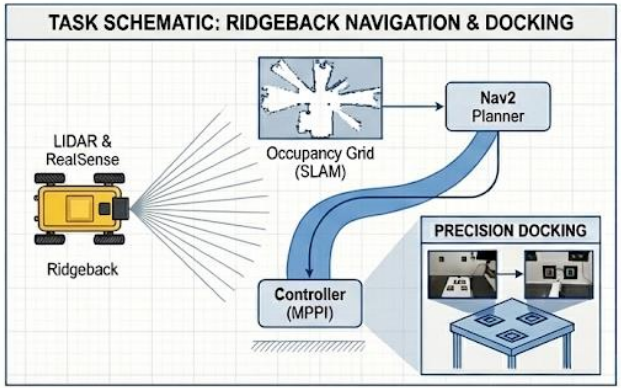
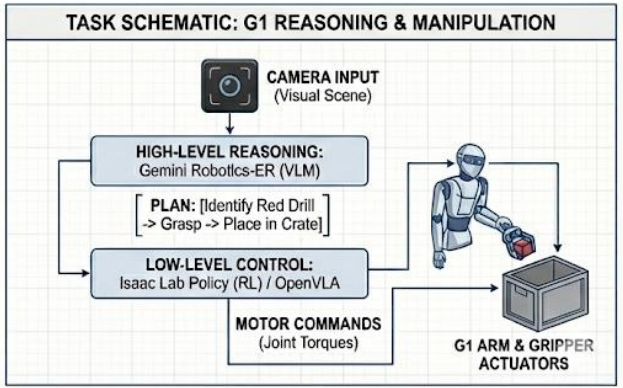
DyNAMO: Dynamic Navigation & Autonomous Manipulation Operations







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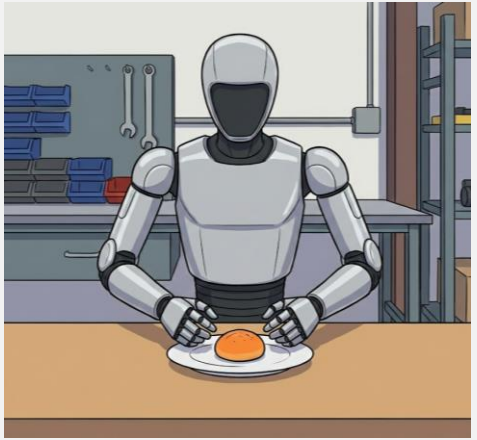
Clearpath Ridgeback Transporter

- ROS 2 Jazzy + Nav2 Stack
- SLAM & Obstacle Avoidance
- Autonomous Docking
- Onboard RTX 3050 & NVIDIA Jetson AGX Thor

Cognitive Collaboration Loop

Project DyNAMO creates an autonomous logistics loop by integrating a Clearpath Ridgeback for mobile transport and a Unitree G1 humanoid for dexterous manipulation, enabling the two robots to collaborate on finding, sorting, and transporting objects using advanced AI reasoning.

Unitree G1 Humanoid Manipulator



- Google DeepMind Gemini (Reasoning Planning)
- NVIDIA Isaac Lab (RL Policy)
- Dexterous Grasping & Placing

Technical Stack and Project Roadmap

The 2025 AI & Robotics Stack

- Middleware: **ROS 2 Jazzy** (Humble compatible)
- Reasoning "Brain": **Google DeepMind Gemini Robotics** (VLM API)
- Simulation & Control "Body": **NVIDIA Isaac Lab** (Omniverse & PhysX)

DyNAMO scenario illustration

Project Roadmap: Simulation to Real

Phase 1: Simulation (Initial Focus)

Complete use-case development & validation in **NVIDIA Isaac Sim**.

Develop & refine AI policies safely.

Phase 2: Real Hardware Deployment (Opportunity)

Successful simulation implementation unlocks access to real **G1 & Ridgeback** robots.

Deploy and test on physical hardware.