

HIWONDER JetRover Developer Kit & Jetson Nano 4GB

HIWONDER JetRover Developer Kit & Jetson Nano 4GB Robot Car Instruction Manual

Brand: HIWONDER | Model: JetRover Developer Kit & Jetson Nano 4GB

1. INTRODUCTION

The HIWONDER JetRover is a professional robotic platform designed for learning and development in ROS1 & ROS2 environments. Powered by a Jetson controller, it integrates advanced AI capabilities including large AI models, Lidar SLAM mapping, AI vision, a 6DOF robotic arm, voice control, and smart sorting functionalities. This manual provides essential information for setting up, operating, and exploring the full potential of your JetRover.

Key Features:

- **Smart ROS Robots Driven by AI:** Professional platform for ROS1 & ROS2 learning, leveraging deep learning frameworks and MediaPipe development.
- **SLAM Development and Diverse Configuration:** Equipped with 3D depth camera, Lidar, and microphone array for precise multi-point navigation, TEB path planning, and dynamic obstacle avoidance.
- **High-performance Vision Robot Arm:** Features a 6DOF vision robotic arm with intelligent serial bus servos and an HD camera for object-grabbing tasks.
- **Empowered by Large AI Model:** Integrates multimodal models with ChatGPT for enhanced perception, reasoning, and human-robot interaction.
- **Robot Control Across Platforms:** Multiple control methods including WonderAi app (iOS/Android), wireless handle, ROS, and keyboard.

2. PRODUCT OVERVIEW

The JetRover Developer Kit is a comprehensive package designed for advanced robotics education and development. Below is an overview of its main components and capabilities.



Figure 2.1: HIWONDER JetRover Robot Car with 6DOF Robotic Arm and various sensors.

2.1. Main Components and Features

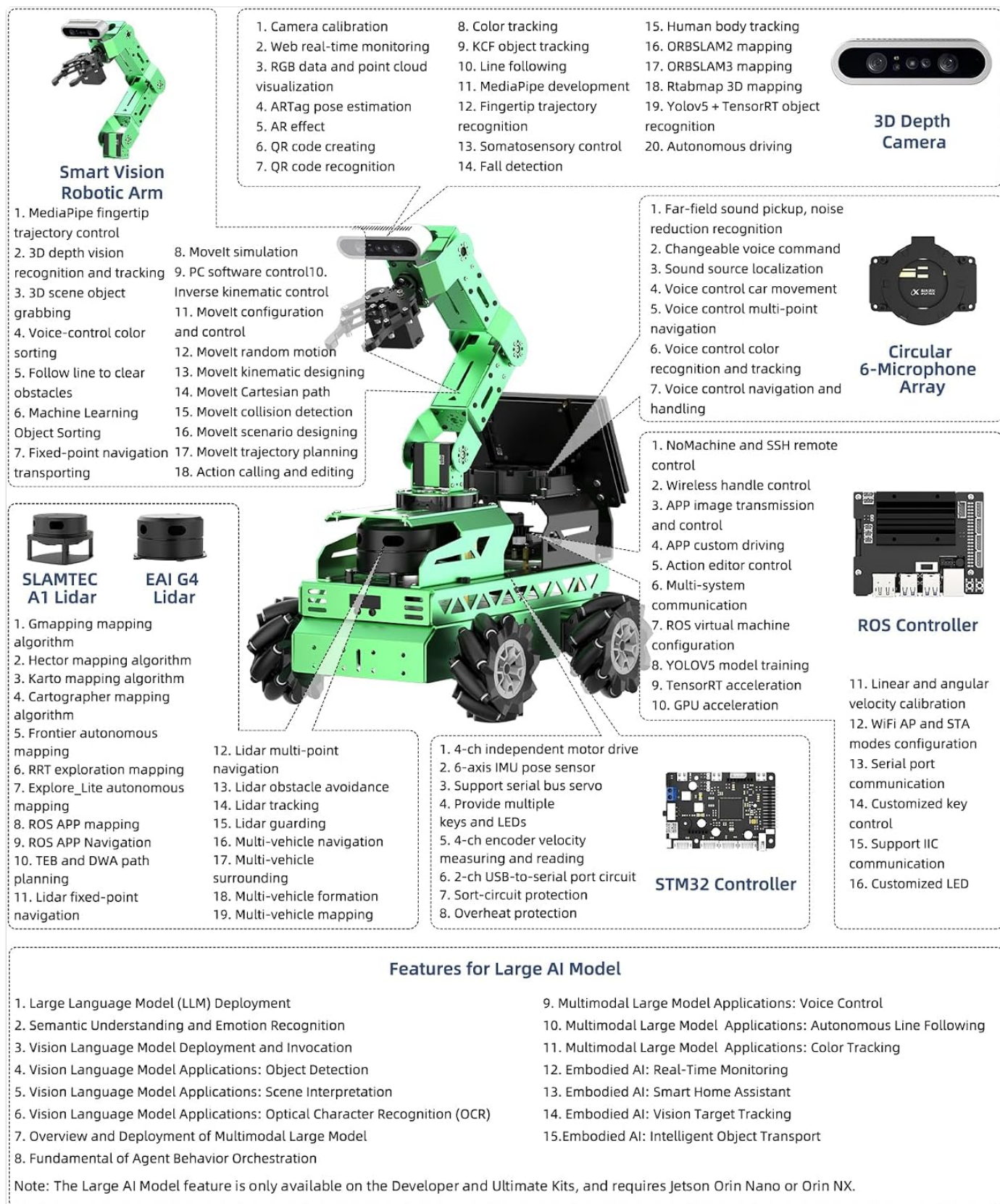


Figure 2.2: Detailed breakdown of JetRover's smart arm, SLAMTEC A1 Lidar, EAI G4 Lidar, 3D Depth Camera, Circular 6-Microphone Array, STM32 Controller, and features for Large AI Models.

2.2. Kit Comparison

The JetRover Developer and Ultimate Kits, paired with Jetson Orin Nano and Orin NX, are recommended for full Large AI model applications due to their comprehensive feature sets and high performance.



Figure 2.3: Comparison of JetRover Standard, Advanced, Developer, and Ultimate Kits, highlighting differences in Lidar, 3D Depth Camera, LCD screen, and Microphone Array availability.

3. SETUP

The JetRover Developer Kit comes pre-assembled. This section outlines the initial steps to power on and connect your robot.

3.1. Initial Power-up and Connection

1. Ensure the battery is fully charged. The kit includes a Lithium Ion battery.
2. Connect the power adapter to the robot.
3. Power on the Jetson Nano 4GB developer kit.
4. Connect to the robot's Wi-Fi network or via Ethernet.
5. Access the robot's interface via a web browser or the WonderAi app.

For detailed assembly instructions, please refer to the comprehensive tutorials provided with the kit.

4. OPERATING MODES AND CAPABILITIES

4.1. SLAM Mapping and Navigation

The JetRover utilizes Lidar and 3D depth camera data for Simultaneous Localization and Mapping (SLAM), enabling it to build maps of its environment and navigate autonomously.

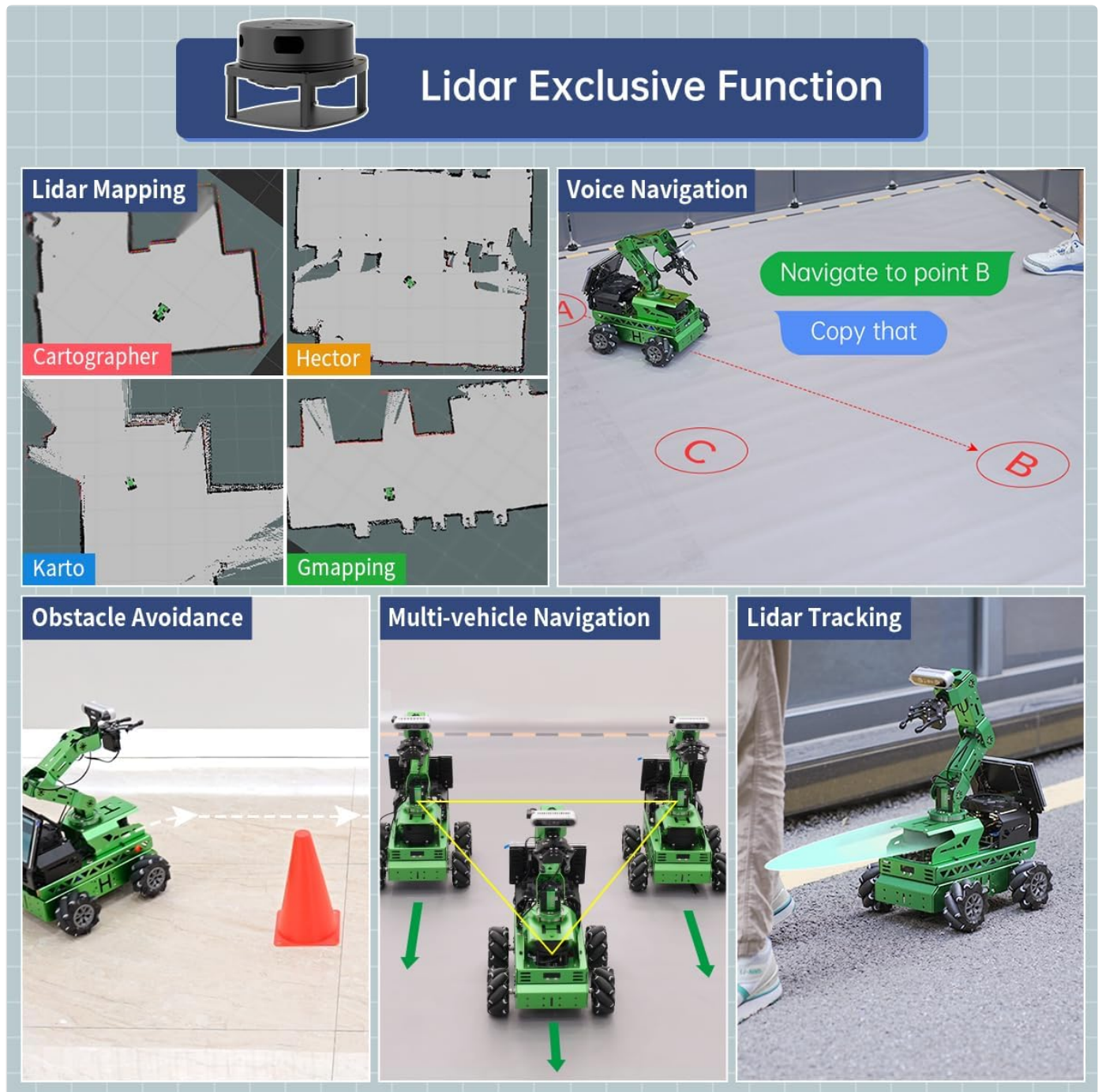


Figure 4.1: JetRover demonstrating Lidar mapping using Cartographer, Hector, Karto, and Gmapping algorithms, alongside voice navigation and obstacle avoidance.

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Video 4.1: Demonstration of ROS2 & ROS1 AI robot car with Lidar, autonomous driving, SLAM mapping & navigation.

4.2. AI Vision and Object Manipulation

The integrated 3D depth camera and 6DOF robotic arm allow for advanced AI vision tasks, including object detection, tracking, and manipulation.

Upgrades in the 2025 Edition

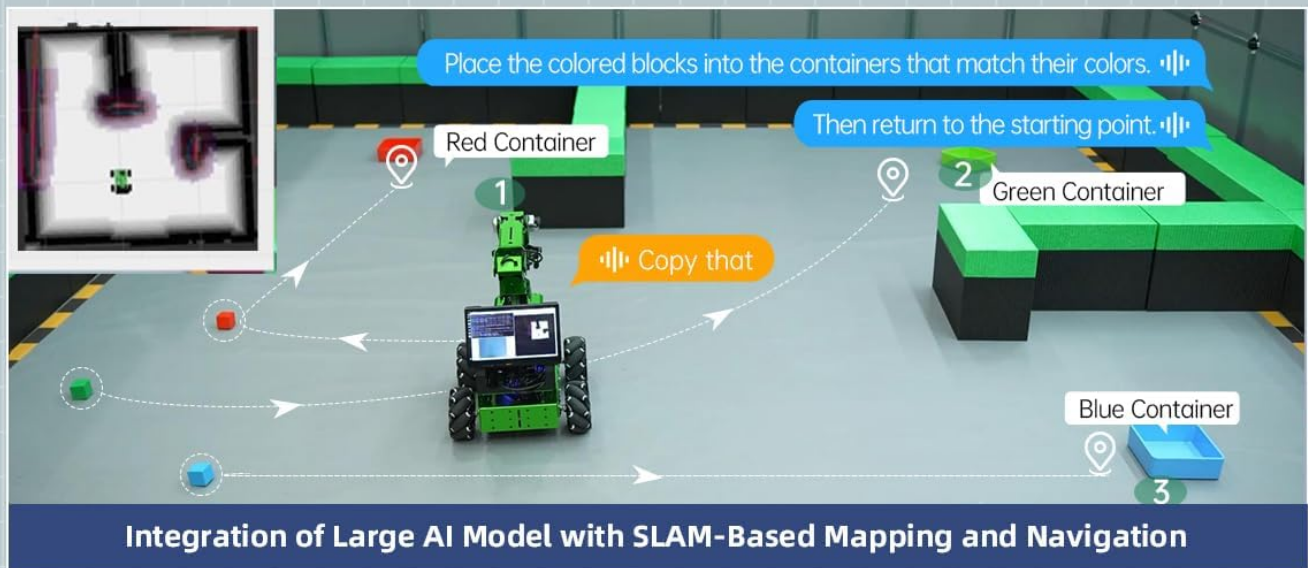


Figure 4.2: JetRover performing intelligent sorting of colored blocks into corresponding containers using its robotic arm and AI vision.

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Video 4.2: Demonstration of 3D SLAM + Grasping, showing the Jetson & ROS robot car with 6Dof robot arm navigating, locating, and picking objects.

4.3. Voice Control and Human-Robot Interaction

With its 6-microphone array and ChatGPT integration, the JetRover supports natural language processing for voice commands and interactive experiences.

AI Autonomous Navigation and Transportation

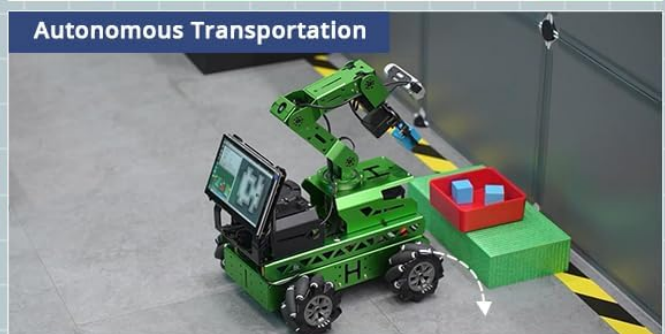
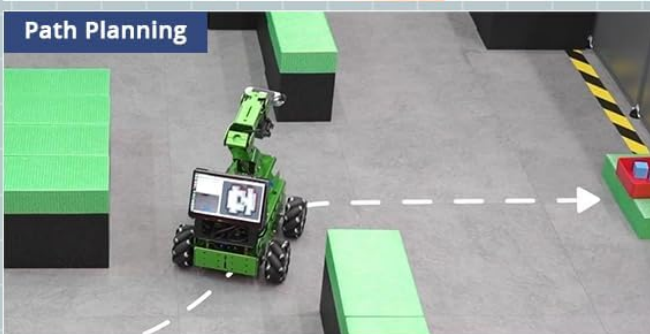
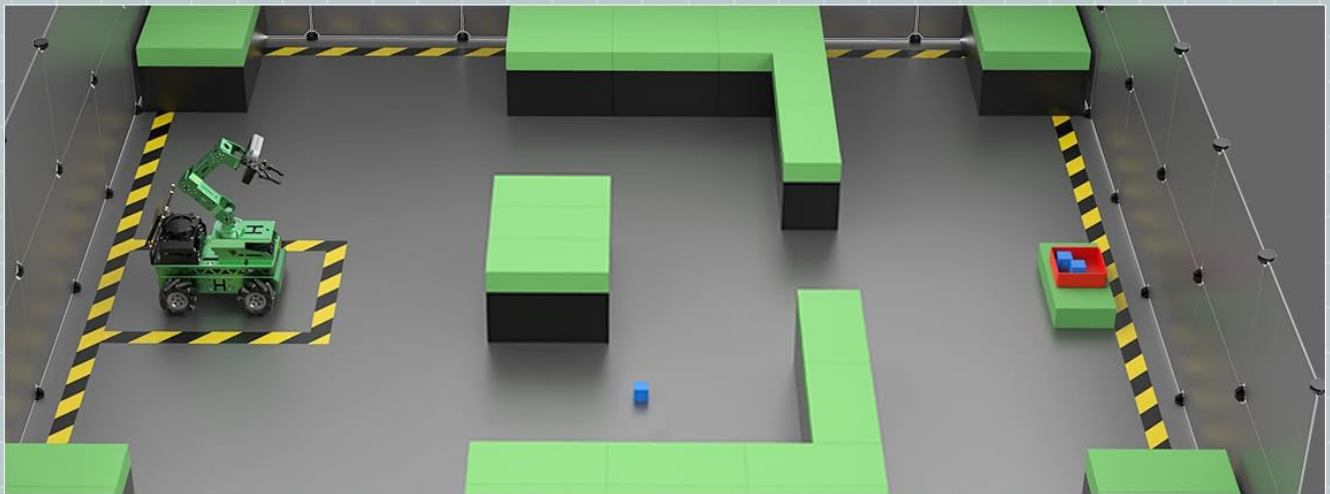


Figure 4.3: JetRover responding to voice commands for waste sorting and object picking, demonstrating sound source localization.

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Video 4.3: Demonstration of AI voice control smart robot car with 6DOF robot arm, showcasing interaction and learning capabilities.

5. ADVANCED FEATURES

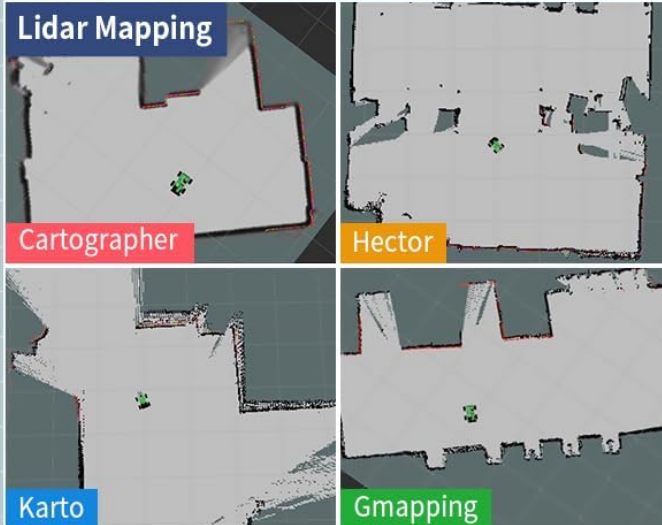
5.1. Lidar Exclusive Functions

The SLAMTEC A1 Lidar provides 360-degree omnidirectional laser scanning for accurate mapping, multi-point navigation, obstacle avoidance, and multi-vehicle coordination.

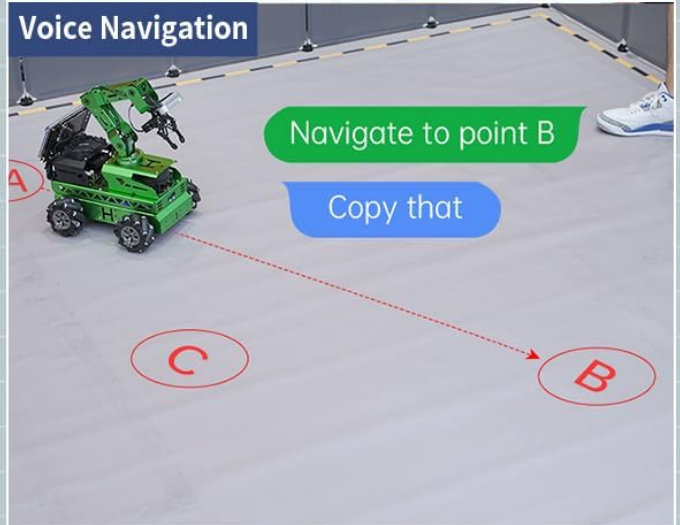


Lidar Exclusive Function

Lidar Mapping



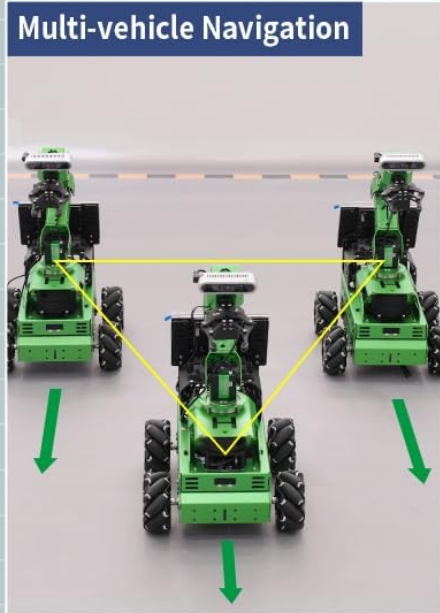
Voice Navigation



Obstacle Avoidance



Multi-vehicle Navigation



Lidar Tracking



Figure 5.1: Lidar functions including mapping (Cartographer, Hector, Karto, Gmapping), voice navigation, obstacle avoidance, multi-vehicle navigation, and Lidar tracking.

5.2. 3D Depth Camera Exclusive Functions

The 3D depth camera enables advanced vision capabilities such as 3D SLAM mapping, depth map data generation, KCF target tracking, augmented reality (AR), road sign detection, and MediaPipe development.



Figure 5.2: 3D Depth Camera functions including RTAB-VSLAM 3D mapping and navigation, depth map data, point cloud, KCF target tracking, augmented reality (AR), road sign detection, and MediaPipe development.

5.3. Far-field Microphone Array

The integrated 6-microphone array provides sound source localization, speech recognition, and voice interaction, enhancing the robot's ability to understand and respond to verbal commands.

AI Autonomous Navigation and Transportation

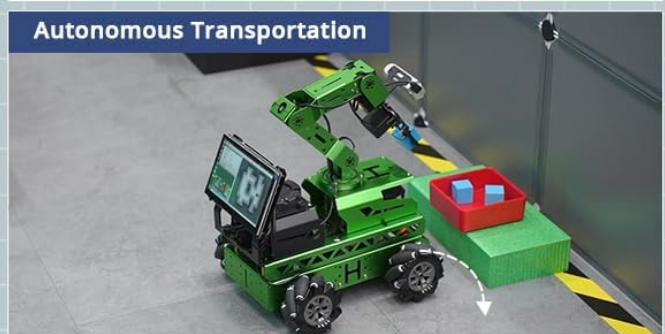
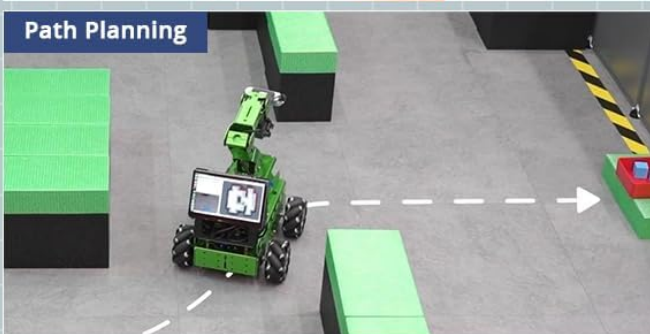
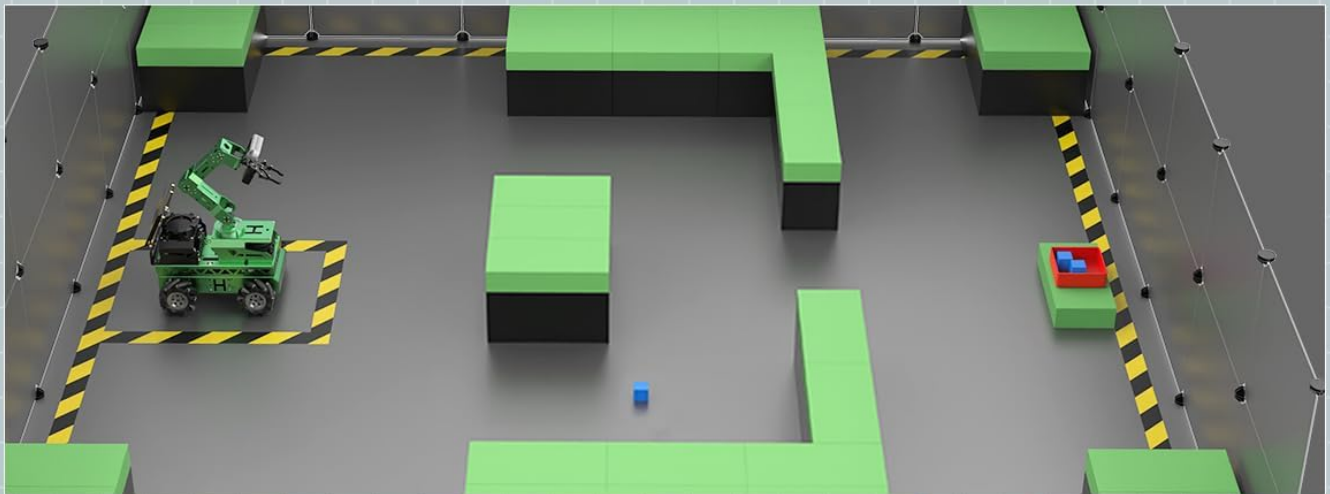


Figure 5.3: Far-field microphone array functions including sound source localization, voice line following, and voice navigation.

6. SOFTWARE AND DEVELOPMENT

6.1. ROS1 & ROS2 System Image

The JetRover supports both ROS1 and ROS2, offering real-time control, modular development, and broader applications. Docker container technology is adopted for application packaging.

③ SLAMTEC A1/ EAI G4 Lidar

Lidar model	Ranging radius	Ranging frequency	Scanning frequency	Angle resolution	Sampling frequency	Communi- cation rate	Ranging accuracy
 EAI G4	0.12m-16m	1000mA	5Hz-12Hz	0.2°	9k	230400bps	2.0%(1m < distance ≤ 8m); 2cm(distance ≤ 1m)
 SLAMTEC A1	0.15m-12m	100mA	5.5Hz-10Hz	1°	8k	115200bps	1% of the range (≤3m); 2% of the range (3 - 5m); 2.5% of the ra

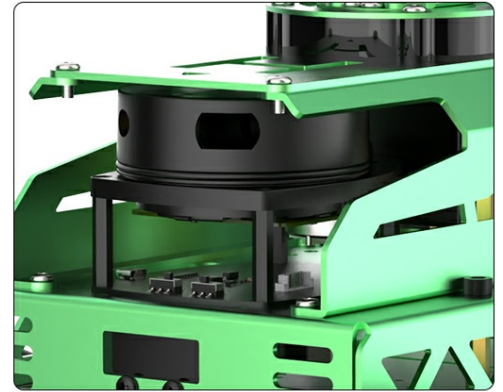


Figure 6.1: Comparison of ROS1 and ROS2, and the adoption of Docker container technology for system deployment.

6.2. Simulation and URDF Models

The JetRover provides tools for body simulation control and URDF model display in RViz, facilitating algorithm debugging and improvement.

④ Far-field Microphone Array

The circular 6-microphone array exclusively developed by HiWonder, incorporates a 6-channel microphone array from iFLYTEK, along with integrated sound processing, a sound card adapter, and a built-in speaker. It offers superior noise reduction and clear audio capture. Supporting features like sound source localization, speech recognition, voice control, text-to-speech (TTS) playback, and voice interaction, this module, when paired with Large AI Model, delivers a seamless, natural voice interaction experience between humans and robots.



Parameters			
Pickup distance	10m	Supported languages	Mandarin & English
Robot integration	Support	Combined with robot	Supported; It could realize voice-controlled navigation and movement features.
Audio noise reduction	1°	Command phrase recognition	Phrase quantity: unlimited Character limit: 10 characters per phrase
Coverage angle	360°	Linux Developmen	Complete SDK and sample code provided Supports offline command recognition Returns recognition results, wake angle, audio data, etc.
Echo cancellation	Support		

Figure 6.2: Body simulation control for algorithm verification and URDF model display in RViz for observing mapping and navigation performance.

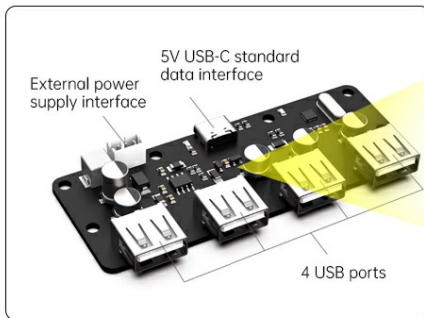
6.3. Learning Capabilities

The JetRover offers extensive learning opportunities across various functions and AI model capabilities.

5

USB HUB

The USB-HUB integrates a 5A high-current DC-DC power supply that converts one to four, solving the problem of insufficient ROS main control interfaces and insufficient power supply for high-power peripherals. Ultra-thin design, multiple layers can be stacked and cascaded without a driver.



6

ROS Robot Control Board

The ROS robot control board uses the high-performance STM32F407VET6 main control chip and has built-in key configurations such as the important IMU attitude sensor.

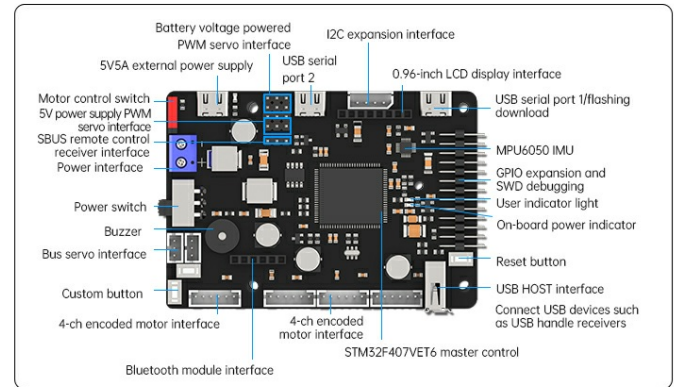


Figure 6.3: A comprehensive list of learning topics covering robot underlying functions, mapping, human-machine interaction, vision processing, deep learning, and AI model capabilities.

7. PACKING LIST

The JetRover Developer Kit includes the following components:

JetRover Developer Packing List



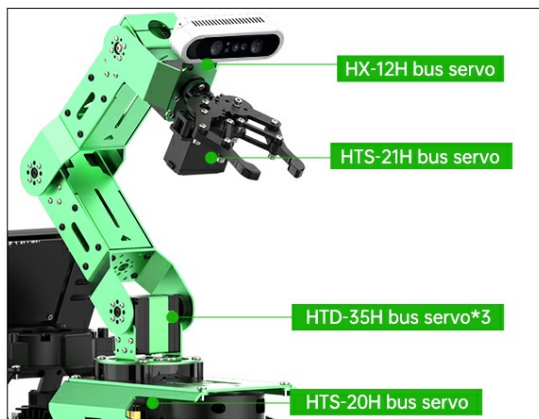
Figure 7.1: Visual representation of the JetRover Developer Packing List, including the robot, Lidar, charger, controller, 7-inch LCD screen, 6-microphone array, 3D depth camera, and accessories.

8. SPECIFICATIONS

Detailed technical specifications for the HIWONDER JetRover M1 model and its key components.

2

Vision Robot Arm and Serial Bus Servo



Servo model				
HTD-35H bus servo	HX-12H bus servo	HTS-21H bus servo	HTS-20H bus servo	
Product weight	64g	36.3g	63g	58g
Dimensions (mm)	51.1x20.14x40	35.19x26.19x27.2	40*20*40.5	40*20*40.5
Operating voltage	9-12.6V	9-12.6V	9-12.6V	9-12.6V
Moving speed	0.18sec / 60° 11.1V	0.2sec / 60° 11.1V	0.16sec / 60° 11.1V	0.18sec / 60° 11.1V
Stall torque	35kg.cm 11.1V	12kg.cm 11.1V	21kg.cm 11.1V	20kg.cm 11.1V
Rotation range	0~240°			
Control method	UART serial port command			
Communication baud rate	115200			
Protection	stall protection and overtemperature protection			
Parameter feedback	temperature, voltage, position			
Gear Category	Metal Gear			

Figure 8.1: Table of JetRover M1 specifications (Chassis type, Size, Weight, Motor, Encoder, ROS controller, Control method, USB expansion, Operating system, Software, Communication method, Programming language, Servo type, Package weight, Package size) and detailed dimensions.



Figure 8.2: DaBai Depth Camera specifications including Model, Accuracy, Field of View, UVC, Resolution, Supporting OS, Data Interface, Power consumption, Safety, Working range, 3D technology, Working scene, and Operating temperature.



Figure 8.3: Vision Robot Arm and Serial Bus Servo specifications for HTD-35H, HX-12H, HTS-21H, and HTS-20H servos, detailing Product weight, Dimensions, Operating voltage, Moving speed, Stall torque, Rotation range, Control method, Communication baud rate, Protection, Parameter feedback, and Gear Category.



Figure 8.4: SLAMTEC A1 and EAI G4 Lidar specifications including Lidar model, Ranging radius, Ranging frequency, Scanning frequency, Angle resolution, Sampling frequency, Communication rate, and Ranging accuracy.



Figure 8.5: Far-field Microphone Array specifications including Pickup distance, Supported languages, Robot integration, Audio noise reduction, Coverage angle, Command phrase recognition, and Linux Development.



Figure 8.6: Details of the USB HUB (5A high-current DC-DC power supply, 4 USB ports, built-in overcurrent/overheat protection) and the ROS Robot Control Board (STM32F407VET6 main control chip, IMU attitude sensor, various ports and buttons).

9. WARRANTY AND SUPPORT

For warranty information, technical support, and troubleshooting, please refer to the official HIWONDER website or contact their customer service. Detailed guides and resources are available to assist with any inquiries or issues.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question