FollowMobility Autonomous Follow-Me System White Paper

Smart Collaboration

Reshaping the New Ecology of Human–Machine Synergy in Logistics

Document Title	FollowMobility Autonomous Follow-Me System White Paper
Application Domains	Warehouse logistics, manufacturing plants, campus delivery, airports and ports, retail and supermarket distribution, medical and health care, outdoor travel, etc.
Applicable Products	Follow-me vehicles, unmanned delivery carts, follow-me control modules, follow-me solutions
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1. Introduction

In recent years, demand for automation in logistics, manufacturing, and campus services has continued to grow. However, core pain points in frontline material handling have not been fundamentally addressed. Manual handling remains labor-intensive and highly dependent on human workers, while labor costs continue to rise and workforce stability declines. Traditional AGVs rely on pre-installed magnetic strips and fixed route planning, leading to high infrastructure modification costs and long deployment cycles. Although mainstream AMRs eliminate the need for magnetic strips, they still require complex environmental adaptation and exhibit limited flexibility, along with high operation and maintenance overhead when site layouts or workflows change.

As a result, on-site managers increasingly seek solutions that can rapidly improve handling efficiency and reduce reliance on manual labor, without large-scale environmental modifications or additional operational complexity. In response to this need, a human-centric automatic following paradigm—where equipment collaborates with and adapts to human workflows rather than operating independently—has emerged. In this model, mobility equipment dynamically synchronizes with human activity, functioning as an efficient assistive tool.

Driven by these practical requirements, the FollowMobility automatic following system delivers complete vehicle products, modular components, and integrated solutions. It provides customers and vehicle manufacturers with cost-effective, easy-to-deploy collaborative mobility solutions that enable efficient human–machine cooperation.

2. Category Definition: FollowMobility Autonomous Follow-Me System

2.1 What is FollowMobility ?

FollowMobility is an automatic following solution built around a ***human-led, machine-accompanying*** paradigm. Its objective is not to replace human labor, but to address common frontline operational challenges such as excessive walking, frequent return trips, and high physical load. Leveraging UWB (Ultra-Wideband)

technology, the system enables reliable personnel identification and high-precision positioning. This is combined with IMU (Inertial Measurement Unit) sensor fusion to ensure stable and responsive following behavior.

The system operates without predefined routes or extensive environmental modifications. It autonomously maintains a following distance of 1–7 meters, adapts to dynamic movement states—including walking, turning, and stopping—and remains synchronized with human workflows in real time.

FollowMobility can be deployed flexibly as a complete vehicle solution, standardized modules, or customized system integrations, supporting established applications such as logistics handling, inspection, and maintenance. In addition, it enables vehicle manufacturers to extend the technology to a broad range of products—including golf carts, wheelchairs, strollers, and luggage carriers—providing a collaborative mobility solution that balances practicality, scalability, and ease of integration.

2.2 Core Value of FollowMobility

The core value of FollowMobility is reflected across three dimensions.

First, for end customers, it directly reduces non-productive walking and repetitive back-and-forth movements during material handling, allowing the same number of personnel to accomplish more productive tasks.

Second, for frontline operators, the equipment functions as an “on-body” or “companion" tool. It requires no complex operational logic or specialized training; operators work as usual while the system follows naturally, lowering both cognitive load and operational barriers.

Third, for vehicle manufacturers and partners, the system delivers a differentiated capability that can be rapidly integrated into existing vehicle platforms to create new product lines and expand application scenarios, without the need to develop a full autonomous driving stack from the ground up.

3. System Architecture Overview

The FollowMobility system adopts a fully modular architecture to simplify vehicle integration and lifecycle maintenance. The overall system consists of the following

components:

1.Follow-Me Terminal (Human Interaction Unit)

This subsystem is responsible for user binding and interaction control. Through a wearable device, the system uniquely identifies the follow target and supports multiple operating modes, including follow, pause, and release. Emergency stop and status feedback functions are integrated to ensure on-site operational safety.

Key functions include:

- User identification and binding
- Remote control and mode switching
- Body posture/position target locking
- Emergency stop and warning indication

2. Vehicle Control System (Core Intelligent Brain)

As the central control unit, this system handles multi-sensor data fusion, target-following control, obstacle avoidance decision-making, and functional safety management. It dynamically adjusts vehicle motion in real time based on the operator's walking speed and direction changes, ensuring smooth and stable following behavior.

Components include:

- Vehicle control unit (VCU)
- Sensor fusion modules
- Follow-me control algorithms
- Obstacle avoidance and path planning algorithms
- Functional safety management

Sensors include:

- LiDAR
- Camera modules (optional)
- Ultrasonic sensors
- Collision bumper sensors
- UWB base stations and tags

3. Drive System (Execution Layer)

This layer consists of motors, drive controllers, braking systems, and the power supply. The system supports multiple chassis configurations—including differential drive, four-wheel drive, and in-wheel motors—to accommodate varying payload capacities and operating environments.

Key components include:

- Motor controller
- Differential drive motors
- Independent hub motors (optional)
- Power battery system
- Electromagnetic braking systems

4. Software

The system supports integration with device management platforms, remote diagnostics, and over-the-air software updates, enabling efficient large-scale deployment and fleet operation.

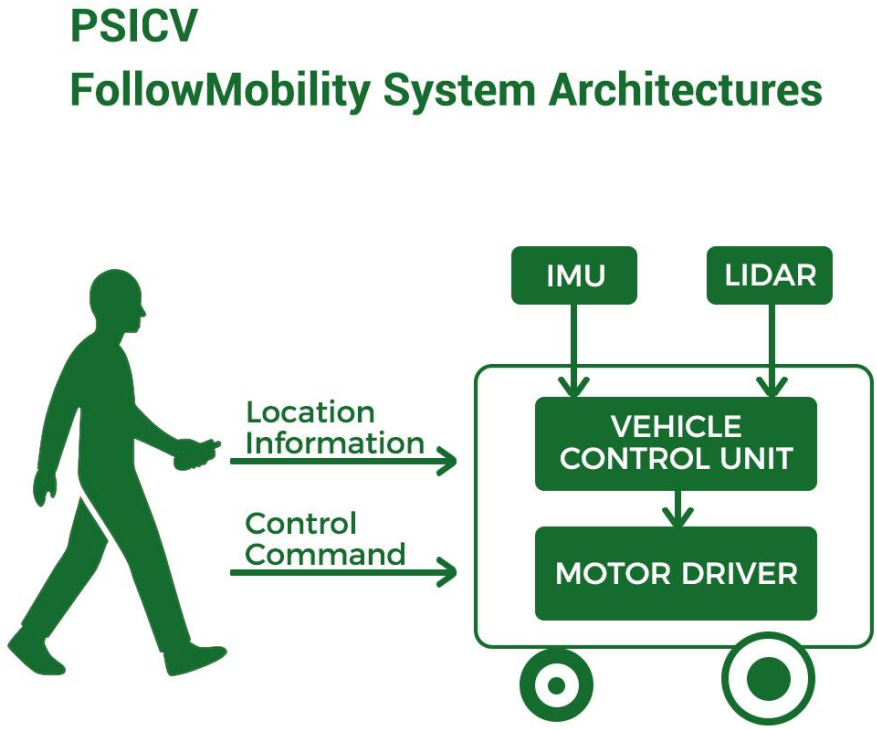

Figure 1 Overall Architecture Diagram of FollowMobility System

4. Core Technical Capabilities

4.1 Following and Positioning

The system reliably identifies and follows target operators in both indoor and outdoor environments. Through multi-sensor fusion, it maintains continuous and stable tracking, ensuring smooth motion even during brief occlusions, stop-and-go transitions, or turns. This minimizes unnecessary start–stop behavior and improves operator comfort.

4.2 Obstacle Avoidance and Safety Control

Using LiDAR, ultrasonic sensors, and contact-based collision detection, the system continuously monitors its surroundings. It can autonomously decelerate, navigate around obstacles, or stop as required, ensuring safe operation in human–machine shared environments.

4.3 Scenario Adaptability

FollowMobility is optimized for real-world operating conditions and performs reliably in environments such as warehouses with dense metal shelving, narrow aisles, ramps, speed bumps, and areas with significant lighting variation. This reduces performance degradation caused by environmental changes.

4.4 Functional Safety Management

Redundancy and protection mechanisms are implemented across critical functions, including braking, communication, and motion state monitoring. In the event of abnormal conditions, the system transitions rapidly to a safe state, meeting baseline reliability requirements for industrial applications.

5. Typical Application Scenarios

5.1 Warehouse Logistics

During order picking, replenishment, and related operations, the follow vehicle moves alongside operators between shelving aisles, eliminating the need for manual cart pushing or repeated back-and-forth transport. In practice, this approach significantly reduces walking distance and improves picking efficiency per unit time.

5.2 Material Handling in Manufacturing Plants

The system supports use cases such as workstation milk-run delivery, line-side replenishment, and semi-finished goods transfer. It is particularly well suited to high-mix, low-volume production environments, where frequent changes in production rhythm demand flexible logistics support.

5.3 Retail / Healthcare / Campus Distribution

In retail settings, the system can be used for assisted shopping or restocking. In hospitals, it supports auxiliary transport of materials and pharmaceuticals. Within campuses or industrial parks, it handles short-distance delivery of documents and supplies, reducing physical strain on staff.

5.4 Inspection and Maintenance Operations

The system assists personnel by carrying tools and spare parts, following inspectors throughout their routes. This reduces carrying load and improves overall inspection and maintenance efficiency.

6. Product Portfolio

6.1 Complete Vehicle Products

FollowMobility offers follow-type logistics vehicles in multiple payload capacities and form factors. These turnkey products can be directly deployed in end-user environments and are ideal for customers seeking rapid implementation.

6.2 Modules Solutions

Designed for vehicle manufacturers and system integrators, these solutions include following control modules, sensors, and software systems that can be integrated into existing vehicle platforms, significantly shortening product development cycles.

6.3 Software and SDK

Standardized APIs are provided to support secondary development and functional customization, enabling seamless integration with customer systems and third-party platforms.

7. Commercial Cooperation Models

FollowMobility supports multiple collaboration models, including complete vehicle sales, module supply, OEM/ODM partnerships, and project-level integrated solutions, addressing the diverse business needs of different partners.

1. Complete Vehicle Sales

- Direct sales of logistics vehicles
- Suitable for supermarkets, factories, hospitals
- One-time revenue + after-sales maintenance services

2. Module Sales

- FollowMobility follow-me module
- Integrated into partner vehicles
- Suitable for mobility scooter / logistics vehicle manufacturers

3. OEM/ODM Partnerships

- Support follow-me model launches for OEM vehicle brands
- Private-label or deep customization
- Co-branding supported

4. Turnkey Solution Model

- Warehouse/industrial park level deployment
- Multi-vehicle coordination + process implementation
- Consulting + software/hardware + operation services

8. Comparison with Traditional Logistics Equipment

Compared with fixed-route automation solutions, FollowMobility achieves a balanced trade-off between deployment cost and operational flexibility. It is particularly well suited to scenarios requiring close human–machine collaboration and frequent process changes.

9. Future Development Direction

Future iterations will introduce multi-vehicle coordination, hybrid operation modes combining following and autonomous navigation, and AI-based behavior prediction to enable more natural human–machine interaction and address increasingly

complex logistics requirements.

10. Conclusion

Through extensive project experience, we have observed that successful intelligent systems are defined not by technical complexity, but by their alignment with frontline needs and ease of adoption. FollowMobility remains focused on a human-led, easy-to-deploy philosophy. Built on UWB and IMU sensor fusion, the system delivers both turnkey vehicle solutions that rapidly improve operational efficiency and flexible modules and platforms that enable vehicle manufacturers to upgrade existing products.

Rather than pursuing complex automation aimed at replacing people, FollowMobility positions automatic following as a practical tool for cost reduction and efficiency improvement for customers, and as a core differentiator for vehicle manufacturers. Looking ahead, we will continue to evolve the technology, expand application scenarios, and work closely with customers and partners to bring intelligent follow-me mobility into a wider range of industries and reshape the future of human–machine collaboration.