

ADDVERB

3 Real-World Fleet Management Success Stories

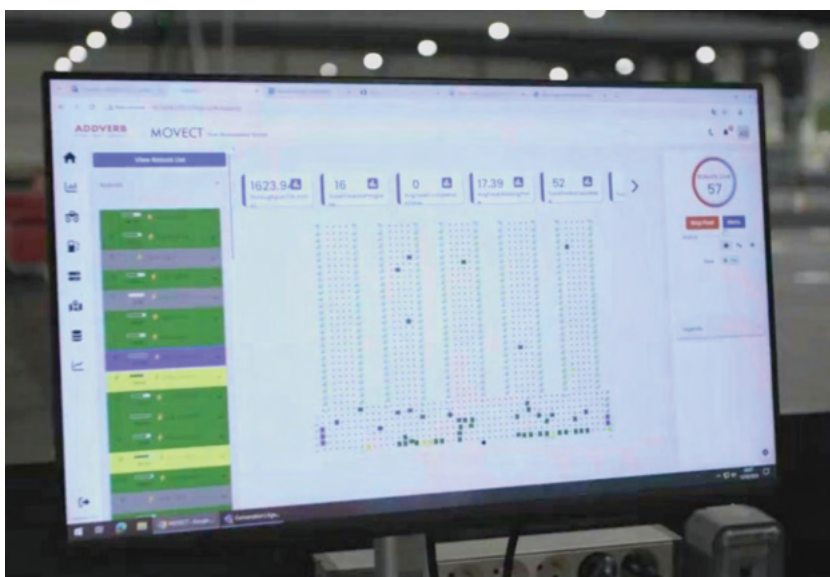
That showcase the power of Addverb's Advanced Software



Movect

The concept of **Fleet Management System (FMS)** is driven from the simple tools focusing primarily on the operations of vehicle fleets in road transportation. Used primarily by large logistics players to plan, organise and optimise their large delivery fleets, these systems were initially known as fleet monitoring systems. These were designed to optimise vital operational tasks as per the inventory availability. The tasks included route planning, maintenance scheduling, fuel management and performance monitoring for the drivers.

Real Time Networks



According to *Deloitte Insights*, organisations that deploy advanced fleet and warehouse management solutions can realise up to a 40% increase in operational efficiency and 25% reduction in downtime.

Deloitte Insights, 2023

Revolutionising **Warehouse Fleet Management**

However, it all changed for better with the advent of automation and use of robotic fleets for managing logistics within a warehouse. The early 1960s indicated the arrival of Automated Guided Vehicles (AGVs), which initiated automation in material handling within warehouse environments. With the emergence of Autonomous Mobile Robots (AMRs) in the 21st century, the dependence on sophisticated navigation and decision making algorithms widened the scope from fleet monitoring to fleet management. Today, FMS is an essential component of modern warehouse operations, providing a framework that facilitates coordination among human workers, automated systems, and robotic assets. By delivering real-time visibility, predictive analytics, and intelligent task allocation, these systems ensure that operations run smoothly.

www.roboticstomorrow.com

This whitepaper delves into the core features of contemporary FMS, and more added features that makes the fleet management system from Addverb stand out. And not just features, we also delve into the real world use cases that have helped us solve our customer challenges.

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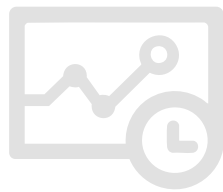
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Evolution From

Logistics Monitoring Systems

An effective **Fleet Management System** is characterised by a suite of features meticulously designed to provide real-time visibility and control over robotic operations. Key tracking functionalities include:



Real-Time Location Tracking:

Tracking location of a robot is the most fundamental feature for an FMS. It provides continuous monitoring of each robot's position within the facility.

This enables the operations manager to be away from the floor and yet be aware of the robots that are not performing as expected.



Route Optimisation:

With its roots in the fleet monitoring system, basic route optimisation feature analyses the operational environment to determine the most efficient paths for robots, thereby minimising transit times and reducing overall energy consumption, which is crucial for sustainability efforts. However, considering the large count of environmental unknowns – this feature can go much beyond than just finding the shortest path.



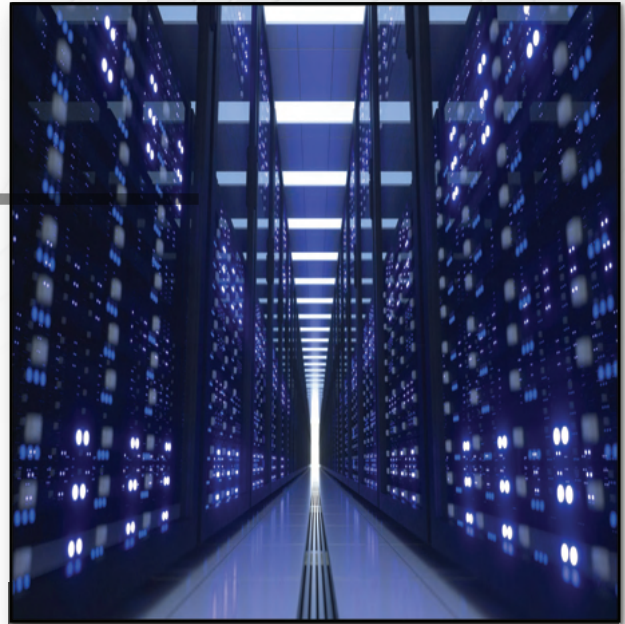
Performance Analytics:

Aggregated data on robot activity enables comprehensive analysis of operational efficiency metrics. By identifying areas needing improvement, organisations can implement targeted strategies to enhance productivity and reduce downtime.



Geofencing:

It is a security feature that establishes virtual boundaries within designated operational areas, triggering alerts when robots deviate from predefined zones. Such capabilities not only enhance safety but also ensure regulatory compliance.



These tracking features, driven from the conventional fleet monitoring systems used to monitor vehicle delivering across locations, are fundamental necessity for maintaining a fleet of robotics. **However, as the advancement in the automation has progressed much beyond the usual vehicle management – the features driven from fleet monitoring system limit the system flexibility.**

Movect:

Addverb's Fleet Management System

Addverb's Fleet Management System or FMS offers much more flexibility and functionalities beyond the contemporary FMS solutions. As it helps robots find the correct movement path for required metric.

We call it Movect : Move + Correct

Apart from offering functionalities to monitor and optimise fleet of same type of robots, Movect extends this capability to multiple type of robots. Hence, it doesn't matter if you are looking to manage sorting robots, AGVs and AMRs to be used for sorting, intralogistics or even storage - it can all be done at one place.

www.addverb.com

Developing on the Fleet Monitoring System Features:

Monitor your fleet and robot locations

Get a visual of the entire fleet operations with different type of robots, this is only compatible with Addverb's robots as of now

1

Assign Pick, Drop and

Charging Locations through a graphical interface. Pickers with various fatigue models can be incorporated, also drop locations of various requirements can be emulated.

2

Get one-view of the health of your fleet

Monitor 11 health parameters for your robots to diagnose inefficiency or non-performance issues.

5

Optimise Paths and Assign Tasks

Run various scenarios and identify which one gets you the best performance and which one gets the best savings.

3

Integrate with WCS, WES of your choice

Integrate with your WMS, WCS or WES for better control over visibility through Standard VDA5050 communication protocol.

4

Advanced Features:



Be robot agnostic, manage sortation robots based on AGVs, Material movement robots based on natural navigation. Movect is compatible to manage multiple robots and multiple fleets at a time.



Create and run simulations from scratch like you are creating a presentation.

- *Test different scenarios and routes at not just existing design but also extended tables or floors.*
- *Identify most populated areas through a dynamic heatmap.*
- *Find out expected performance and throughput.*



Recreate the past by downloading and implementing the log files from other sites and find out what happened.



Isolate Zones for identifying issues and applying special conditions. A zone can be any combination of continuous three or more nodes.



Manage Zone Congestions by creating Traffic Lights. They offer the flexibility to manage the inflow and outflow of robots in a zone based on rules such as zone count, zone area, existing robots, etc. Both one-way and two-way lights are available to simplify workflow.

Case Study

Do you think adding more bots increases throughput?

INDIA'S LARGEST EYEWEAR BRAND

To illustrate the tangible impact of advanced FMS features, consider the case of India's largest eyewear retailer, which operates a high-throughput distribution centre located in the Indian state of Haryana. The company faced a critical challenge during its outbound sorting process. To enhance throughput, Addverb initially increased the number of sorting robots deployed within the Zippy sorting system. While this strategy resulted in immediate efficiency gains, the situation quickly



escalated into a logistical challenge. As the number of robots exceeded certain thresholds, severe congestion and traffic bottlenecks emerged, leading to a marked decline in throughput, contrary to the intended outcome.

Solving Sorting System Congestion through Zone-Based Fleet Control

To tackle congestion, we used the Zone Congestion Module of Movect, Addverb's Fleet Management System. It regulates robot traffic by defining operational zones with three or more continuous nodes, enabling real-time, dynamic flow control. This ensures smooth and efficient robot navigation across the facility.



We identified 5 such nodes where the traffic light were installed with preset rules. As an example, for one of the traffic light, we defined a rule that if there were 4 or more robots in a queue from one direction, the robot will reroute the path or else it would take a shortest path. This minimises actual blockage and tipping point as shown below in graph.

Key Features Utilised:



Zone-Based Controls: Robots follow pre-defined paths based on real-time traffic, reducing congestion and improving flow.



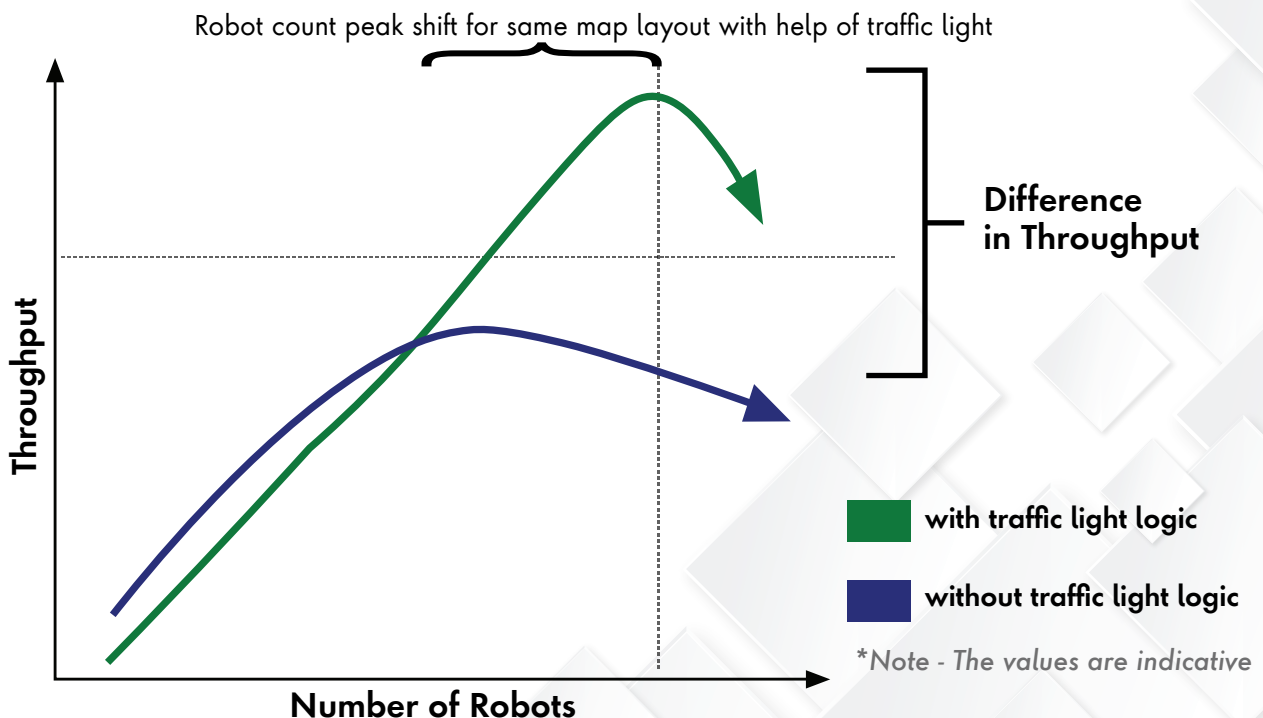
Custom Rule Conditions: These enable specific flow behaviours that are tailored to the layout and density of each zone.



Traffic Light System: Configurable one-way and two-way traffic lights are utilized to manage the inflow and outflow of robots based on factors such as robot density, zone area, and operational timing.

Results

By implementing intelligent movement rules and optimising robot coordination, Addverb successfully eliminated congestion and improved overall system efficiency. The structured zoning approach prevented blockages, allowing for smoother operations and sustained high throughput. Thereby we were able to achieve 2231 sorts per hour (85% increase from original solution) as throughput by adding just 6 more robots into the system and keeping other variable same as earlier.



Case Study

Log-based debugging is history.

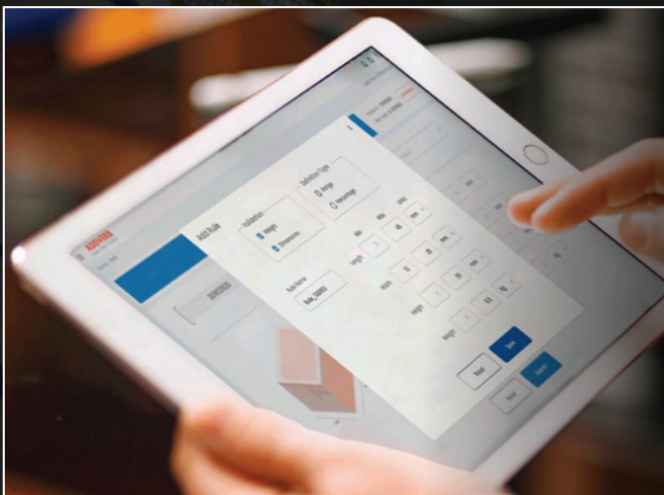
FROM LOGS TO SIMULATION IN FRANCE

Mondial Relay, a prominent France-based logistics provider, became one of Addverb's first international clients to deploy the FMS-based Zippy sorting solution. However, the implementation occurred during the height of the COVID-19 pandemic, which posed an unprecedented challenge: international travel restrictions made it virtually impossible to provide traditional on-site support.



The Challenge: Navigating Implementation in Unprecedented Times

Typically, the deployment of such advanced systems includes the presence of on-site support engineers who assist with customer onboarding, troubleshooting, and performance monitoring. With the inability to dispatch support personnel due to travel restrictions, the Addverb team had to pivot to a fully remote support strategy. We created an opportunity from this challenge by developing a system that works as a replayer from the logs.



The Replayer Feature

Conceptualised as a "CCTV for robot operations," the Replayer transforms raw log data into a dynamic visual timeline that reconstructs every move made by the robotic fleet. This simulation-like tool provides an intuitive, graphical interface for monitoring and diagnosing robot behavior in retrospect.

Key Features Utilised:



Velocity Profile: Monitors speed and movement trends to detect delays or inefficiencies.



Battery & Charging Insights: Tracks power levels and charging patterns to flag performance-impacting issues.



Event Markers: Pinpoint anomalies, helping engineers quickly locate root causes.



Robot Interactions: Provides a 360° view of robot positions during conflicts or failures for better diagnostics.

The Impact: Transforming Troubleshooting Efficiency

Addverb's Replayer feature cut troubleshooting time by 10x at the Mondial Relay site, resolving issues in minutes instead of hours. This boosted project speed, reduced costs, and improved customer satisfaction. Replayer is now a key tool in Addverb's remote support strategy, enabling fast, effective resolutions worldwide.

FMS logs Data from current process to Agent and FMS log File.

Replayer Mode is Set true.

FMS uses Replayer functionality to parse data from Agent & Log Files.

Using the Data, FMS replayer recreates the earlier scene.

Debugging Process is undertaken using the data from replayer.

Function from FMS codebase enables speed control (fast/slow) & time stamp retrieval.

Workflow of FMS Replayer

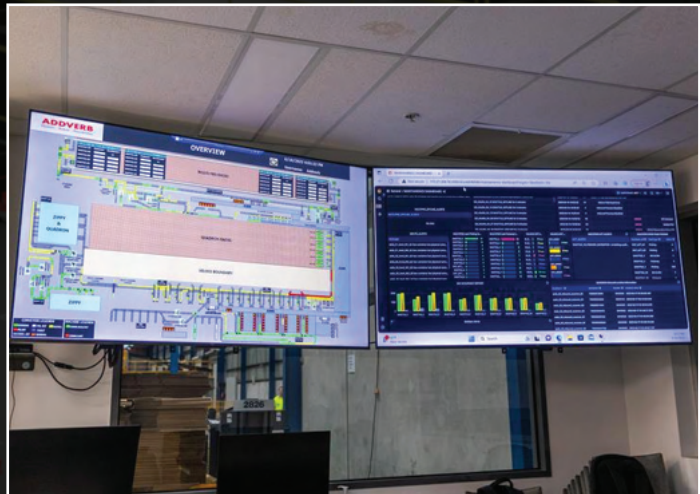
Case Study

How do you decide if you really need more robots?

One of fastest growing E-commerce

A leading e-commerce company, already using Addverb's Zippy robotic fleet in their warehouse, aimed to significantly increase throughput to meet growing order volumes. While expanding the number of robots seemed like a logical step, the client was uncertain whether the gains in throughput would justify the added cost of procuring and deploying more robots.

The client wanted a reliable, cost-effective method to evaluate the potential impact of increasing their robot fleet—without making immediate capital investments. They were looking for a realistic, low-risk way to simulate throughput improvements and optimize robot utilization within their existing infrastructure.



Action



Visual representation of Ghost Robot

To meet this need, Addverb introduced a unique solution called **Ghost Simulation**:

- Virtual robots (ghost agents) were embedded into the real warehouse map.
- These virtual agents simulated real robot behaviours – handling pick, drop, and charging operations – as if they were physically present.
- Real robots interacted with the ghost agents, adjusting their routes and actions as though the full fleet was on the ground.
- Multiple simulations were run using trial-and-error to test different fleet sizes and routing strategies under real-world conditions.

Key Features Utilised:



Virtual Agents: Simulated robots mimic real pick, drop, and charge behavior on the live warehouse map.



Real-Time Interaction: Physical robots respond to ghost agents as active fleet members.



Scenario Testing: Simulations model fleet size, routing, and conditions to forecast performance.



Hybrid Approach: Enables throughput analysis without deploying additional hardware.

The Impact: Transforming Troubleshooting Efficiency

Addverb's ghost simulation showed a **60% throughput boost** with just **15% more robots**. Real-world results matched with **99% accuracy**, validating data-driven scaling without layout changes and strengthening client trust for future innovations.

About

ADDVERB

Addverb is committed to bridging the gap between innovation and practicality in the field of robotics and automation. With a focus on transforming intralogistics, Addverb offers a comprehensive suite of products and services designed to optimize warehouse operations and supply chains. Our expertise in developing advanced fleet management systems empowers businesses to fully harness the potential of robotic automation, driving efficiency, growth, and competitive advantage in an ever-evolving marketplace.

