

Global Closed-Loop Simulation System for Mobile Robots Market 2026 by Company, Regions, Type and Application, Forecast to 2032

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Abstracts

According to our (Global Info Research) latest study, the global Closed-Loop Simulation System for Mobile Robots market size was valued at US\$ 401 million in 2025 and is forecast to a readjusted size of US\$ 1102 million by 2032 with a CAGR of 15.3% during review period.

A closed-loop simulation system for mobile robots is a virtual validation infrastructure for autonomous mobile robots, automated guided vehicles, unmanned ground vehicles, and mobile manipulators. By integrating 3D environments, robot body models, sensor models, dynamics models, task orchestration models, and control software interfaces, it connects perception, localization, mapping, planning, control, execution, and feedback into a repeatable closed loop. The system addresses high deployment cost, testing risk, insufficient long-tail scenario coverage, long software and hardware debugging cycles, and the difficulty of validating multi-robot collaboration. It typically supports ROS or ROS 2 communication, LiDAR, cameras, IMU, GNSS, radar, and other sensor simulation, as well as model-in-the-loop, software-in-the-loop, hardware-in-the-loop, human interaction, and digital twin synchronization. It can be used in warehouses, factories, campuses, roads, and unstructured ground environments for path planning, obstacle avoidance, scheduling, collision safety, policy learning, and remote operations validation. Its customers include robot OEMs, automation integrators, logistics and manufacturing companies, autonomous driving R&D teams, research institutions, universities, and cloud platform providers. Common delivery models include open-source frameworks, commercial software, cloud-based parallel simulation, private deployment, and project-based customization services.

The industrial value of closed-loop simulation systems for mobile robots is shifting from

R&D support tools to engineering validation infrastructure. Real-world deployment of mobile robots typically faces complex environments, high testing costs, costly on-site interruptions, and safety risks that are difficult to cover comprehensively. Relying only on physical robot testing makes it difficult to validate a large number of long-tail scenarios within a short development cycle. Closed-loop simulation brings 3D environments, robot dynamics, sensor inputs, control software, task orchestration, and feedback mechanisms into one operating chain, enabling R&D teams to repeatedly test localization and mapping, path planning, obstacle avoidance, collision detection, task allocation, and exception recovery in virtual environments. As ROS or ROS 2 interfaces, physics engines, sensor models, and cloud-based parallel computing mature, simulation systems are no longer limited to algorithm development, but are increasingly used for pre-delivery validation, customer-site replay, operations optimization, and safety compliance testing. This shift means that software quality, deployment efficiency, and scalable replication in the mobile robot industry will increasingly depend on closed-loop simulation capabilities. Simulation platforms will also become an important foundation for robot companies moving from single-unit delivery toward fleet-based, scenario-based, and continuously operated business models.

From the downstream application perspective, warehouse logistics and manufacturing lines remain the clearest commercial scenarios for closed-loop simulation of mobile robots. Core requirements focus on throughput efficiency, path conflicts, fleet scale, battery strategies, traffic rules, equipment coordination, and facility layout optimization. Unlike traditional robot simulation, which often emphasizes single-robot trajectories, mobile robot simulation must handle dynamic task flows, complex spatial constraints, and multi-robot collaboration. As a result, discrete-event simulation, 3D spatial simulation, robot control interfaces, and business process models are converging. Digital twin capabilities further amplify the value of these systems by enabling enterprises to synchronize maps, equipment, orders, tasks, and operational data from real factories, warehouses, or campuses into virtual environments, continuously identifying bottlenecks and optimizing scheduling strategies through simulation. As mobile robots penetrate semiconductors, automotive, electronics manufacturing, pharmaceutical logistics, commercial buildings, and campus delivery, customers will increasingly focus on the consistency between simulation results and real operating metrics. Platform vendors will differentiate through high-fidelity environments, real-time data integration, and measurable business indicators.

From a market structure perspective, closed-loop simulation systems for mobile robots sit at the intersection of robot simulation software, mobile robot software, digital twins, and autonomous driving validation tools, so industry boundaries are still forming. Open-

source frameworks are accelerating the diffusion of foundational capabilities through the ROS ecosystem, sensor plugins, and developer communities, while commercial software serves large customers through engineering modeling, visualization, virtual commissioning, HIL/SIL interfaces, enterprise deployment, and technical services. Future growth will be driven by three factors. First, as mobile robot fleets expand, enterprises will need more systematic planning and risk validation before deployment. Second, embodied intelligence and autonomous system development require large-scale, controllable, reproducible, and scalable environments for training and evaluation. Third, cloud-based parallel simulation and digital-twin operations will lower the cost of continuous validation. The industry is expected to move from single-tool competition toward platform ecosystem competition. Vendors that can connect real data, control stacks, sensor models, business processes, and cloud computing resources at the same time are more likely to gain long-term advantages.

This report is a detailed and comprehensive analysis for global Closed-Loop Simulation System for Mobile Robots market. Both quantitative and qualitative analyses are presented by company, by region & country, by Control Task and by Application. As the market is constantly changing, this report explores the competition, supply and demand trends, as well as key factors that contribute to its changing demands across many markets. Company profiles and product examples of selected competitors, along with market share estimates of some of the selected leaders for the year 2025, are provided.

Key Features:

Global Closed-Loop Simulation System for Mobile Robots market size and forecasts, in consumption value (\$ Million), 2021-2032

Global Closed-Loop Simulation System for Mobile Robots market size and forecasts by region and country, in consumption value (\$ Million), 2021-2032

Global Closed-Loop Simulation System for Mobile Robots market size and forecasts, by Control Task and by Application, in consumption value (\$ Million), 2021-2032

Global Closed-Loop Simulation System for Mobile Robots market shares of main players, in revenue (\$ Million), 2021-2026

The Primary Objectives in This Report Are:

To determine the size of the total market opportunity of global and key countries

To assess the growth potential for Closed-Loop Simulation System for Mobile Robots

To forecast future growth in each product and end-use market

To assess competitive factors affecting the marketplace

This report profiles key players in the global Closed-Loop Simulation System for Mobile Robots market based on the following parameters - company overview, revenue, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include NVIDIA Corporation, Cyberbotics Ltd., Coppelias Robotics AG, Open Source Robotics Foundation, The MathWorks, Inc., MORAI Inc., Applied Intuition, Inc., Dassault Systèmes SE, Siemens AG, Robotec.ai sp. z o.o., etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Market segmentation

Closed-Loop Simulation System for Mobile Robots market is split by Control Task and by Application. For the period 2021-2032, the growth among segments provides accurate calculations and forecasts for Consumption Value by Control Task and by Application. This analysis can help you expand your business by targeting qualified niche markets.

Market segment by Control Task

Localization and Mapping Simulation System

Path Planning Simulation System

Motion Control Simulation System

Task Scheduling Simulation System

Collision Safety Simulation System

Policy Learning Simulation System

Other

Market segment by Closed-Loop Level

Model-in-the-Loop

Software-in-the-Loop

Hardware-in-the-Loop

Operator-in-the-Loop

Market segment by Modeling Fidelity

Kinematic Simulation System

Dynamic Simulation System

Physical Sensor Simulation System

Photorealistic Rendering Simulation System

Real-Time Digital Twin Simulation System

Other

Market segment by Application

Warehouse Logistics Validation

Factory Line Commissioning

Campus Delivery Testing

Unmanned Vehicle Road Validation

Research and Education Experimentation

Embodied Intelligence Training

Remote Operations Monitoring

Safety and Compliance Validation

Other

Market segment by players, this report covers

NVIDIA Corporation

Cyberbotics Ltd.

Coppelia Robotics AG

Open Source Robotics Foundation

The MathWorks, Inc.

MORAI Inc.

Applied Intuition, Inc.

Dassault Systèmes SE

Siemens AG

Robotec.ai sp. z o.o.

DUALIS GmbH IT Solution

Visual Components Oy

FlexSim Software Products, Inc.

The AnyLogic Company

SIASUN Robot & Automation Co., Ltd.

AutoCore Technology (Nanjing) Co., Ltd.

TIER IV, Inc.

Autoware Foundation

Market segment by regions, regional analysis covers

North America (United States, Canada and Mexico)

Europe (Germany, France, UK, Russia, Italy and Rest of Europe)

Asia-Pacific (China, Japan, South Korea, India, Southeast Asia and Rest of Asia-Pacific)

South America (Brazil, Rest of South America)

Middle East & Africa (Turkey, Saudi Arabia, UAE, Rest of Middle East & Africa)

The content of the study subjects, includes a total of 13 chapters:

Chapter 1, to describe Closed-Loop Simulation System for Mobile Robots product scope, market overview, market estimation caveats and base year.

Chapter 2, to profile the top players of Closed-Loop Simulation System for Mobile Robots, with revenue, gross margin, and global market share of Closed-Loop Simulation System for Mobile Robots from 2021 to 2026.

Chapter 3, the Closed-Loop Simulation System for Mobile Robots competitive situation, revenue, and global market share of top players are analyzed emphatically by landscape contrast.

Chapter 4 and 5, to segment the market size by Control Task and by Application, with consumption value and growth rate by Control Task, by Application, from 2021 to 2032.

Chapter 6, 7, 8, 9, and 10, to break the market size data at the country level, with revenue and market share for key countries in the world, from 2021 to 2026. and Closed-Loop Simulation System for Mobile Robots market forecast, by regions, by Control Task and by Application, with consumption value, from 2027 to 2032.

Chapter 11, market dynamics, drivers, restraints, trends, Porters Five Forces analysis.

Chapter 12, the key raw materials and key suppliers, and industry chain of Closed-Loop Simulation System for Mobile Robots.

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