

Hardware in the Loop Market by Type (Open Loop, Closed Loop), Vertical (Automobile, Aerospace, Defense, Power Electronics, Research & Education) and Region (North America, APAC, Europe, Rest of the World) - Global Forecast to 2027

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Abstracts

The hardware in the loop market size is estimated to be valued at USD 817 million in 2022 and is projected to reach USD 1,291 million by 2027, growing at a CAGR of 9.6% from 2022 to 2027. Many industries such as automobile, aerospace, defense, semiconductor, and energy are continuously working on reducing the time period utilized in product development stages where electronic controls are a crucial part of the product. Model-based design techniques such as V-cycle are implemented by companies to speed up the development of control systems during the development phase of a product. Hardware in the loop is used in the last stage of the V-cycle product development of control systems.

In aircraft, complex electromechanical systems such as propulsion control systems, avionics, and flight control systems have electronic controllers and mechanical components. With the advancement in these systems, their complexity also increases, which requires rigorous testing, thus increasing the product development time. Hardware in the loop testing provides benefits such as early testing using a virtual environment and system simulations; this allows testing of the controllers and components, which can be tested in tandem with the product development phase. This reduces the time duration of the testing and development phases.

“Closed Loop: The fastest type in hardware in the loop market”

Closed loop testing is done on controllers that have a feedback loop. It is important to

correct any error or drift in the output of the machine as the controller will receive a signal from the actuator or sensor. Hardware in the loop test system can mimic this functionality by utilizing a physics or mathematical model for simulating the machine, system, or plant. This will ensure the controller is operating in the desired state to achieve the output and is correcting any error in the output. The rising implementation of autonomous driving and ADAS across the automotive sector is expected to boost the demand for closed loop hardware in the loop systems in the future

“Power electronics: Fastest vertical of hardware in the loop market”

Hardware in the loop testing helps in testing power electronic devices, such as electric motors and converters, by simulating the load connected to it; this helps in faster and reliable testing of these devices. LS Electric, a South Korean company providing power electronics solutions, used Typhoon HIL system to resolve some of the control engineering problems. The company faced the challenge of setting up a strong controller design for 15 Power Electronic Building Block (PEBB), with verification for parallel operations and communication performance. Using Typhoon HIL solution’s real-time verification on a microsecond time-step scale, it was able to verify its high-speed controller for multiple PEBB operations with the aim of increasing the efficiency, reliability, and longevity of the system.

“US: The highest market share in North American hardware in the loop market”

The US has the largest aerospace market. Hardware in the loop testing is widely adopted by the manufacturers and suppliers of aerospace equipment in the country. General Electric, Lockheed Martin, Boeing, SpaceX, and Blue Origin are some of the prominent players in the aerospace and defense industries. The power electronics sector is strong in the country, with major manufacturers such as Texas Instruments, Magna Power Electronics, and Colorado Power Electronics catering to the power grid, power generation, and distribution applications in the US.

The study contains insights from various industry experts, ranging from component suppliers to Tier 1 companies and OEMs. The break-up of the primaries is as follows:

By Company Type: Tier 1– 40%, Tier 2– 25%, and Tier 3 – 35%

By Designation: C-level Executives– 35%, Directors– 28%, and Others – 37%

By Region: Europe– 45%,North America– 30%,APAC– 20%,RoW– 5%

dSPACE GmbH (Germany), NATIONAL INSTRUMENTS CORP. (US), Vector Informatic GmbH (Germany), Elektrobit (Germany), OPAL-RT Technologies (Canada), Speedgoat GmbH (Switzerland), Robert Bosch GmbH (Germany), IPG Automotive GmbH (Germany), Acutronic Holding AG (Switzerland), Plexim GmbH (Switzerland), Konrad GmbH (Germany), MicroNova (Germany), LHP, Inc (US), Genuen (US), Typhoon HIL (US), ModelingTech (China), Bloomy Controls (US), Controllab (Netherlands), Pickering Interfaces (UK), Applus+ (Spain), Add2 Limited (UK), BlueHalo (US), Siemens (Germany), Spirent Communication (US), and UAV Navigation (Spain)are among the many players in the hardware in the loop market.

Research Coverage:

The report segments the hardware in the loop market and forecasts its size, by value, based on by type, vertical, and region.

The report also provides a comprehensive review of market drivers, restraints, opportunities, and challenges in the hardware in the loop market. The report also covers qualitative aspects in addition to the quantitative aspects of these markets.

Key Benefits of Buying the Report

The report will help the leaders/new entrants in this market with information on the closest approximations of the revenue numbers for the overall market and the sub-segments. This report will help stakeholders and gain more insights to better position their businesses and plan suitable go-to-market strategies. The report also helps stakeholders understand the pulse of the hardware in the loop market and provides them information on key market drivers, restraints, challenges, and opportunities.

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