Connective Industries

Industry & Distribution Solutions/Robotic SI

May 28, 2026

Manufacturing & Industry, Robotics

1. Development of Wireless Control Terminals with Intuitive Operation

Recent years have seen rising demand for wireless control terminals that are reliable and easy to use to improve the ease of operation, clarity of display, and safety of equipment used in the manufacturing industry. While the control panels used on equipment in the past provided intuitive operation in the form of physical switches such as buttons or levers, they also suffered from a high cost of installation and were not always visible due to their fixed location. To overcome this problem, Hitachi has developed a wireless control terminal that incorporates human machine interface (HMI) functions into a tablet personal computer (PC) with a built-in game controller. The terminal provides safe and reliable operation that is precise and intuitive and that operators can use from the plant floor where they have a direct view of what is going on. The main features are as follows.

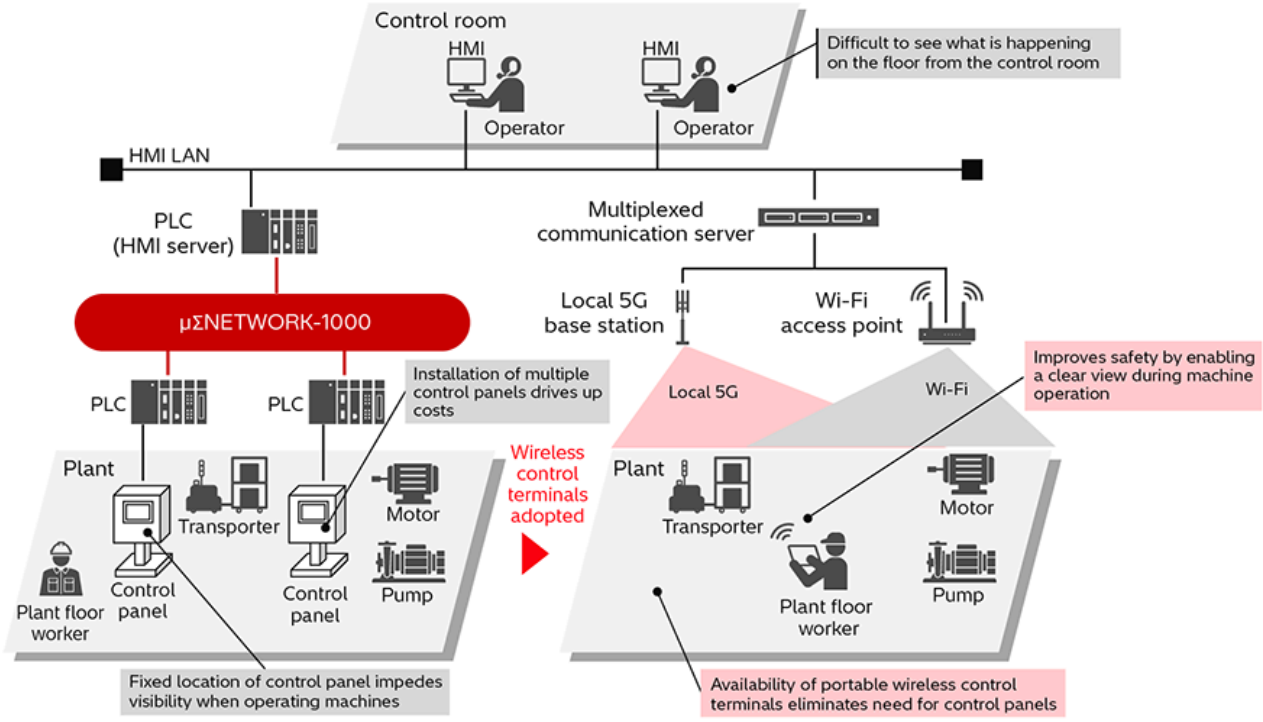
(1) Intuitive operation using a game controller together with a touch panel
(2) Highly reliable communications over both local fifth-generation (5G) and Wi-Fi* networks

(3) Safety functions to prevent misoperation and an indicator that warns when communication fails

Hitachi intends to promote progress in manufacturing by having the terminal adopted more widely and by using it to make the manufacturing workplace safer and more efficient.

(Commencement of operation of first installation: August 2025)

* See the list of “Trademarks.”



[1] System Configuration of Wireless Control Terminals

LAN: local area network, PLC: programmable logic controller

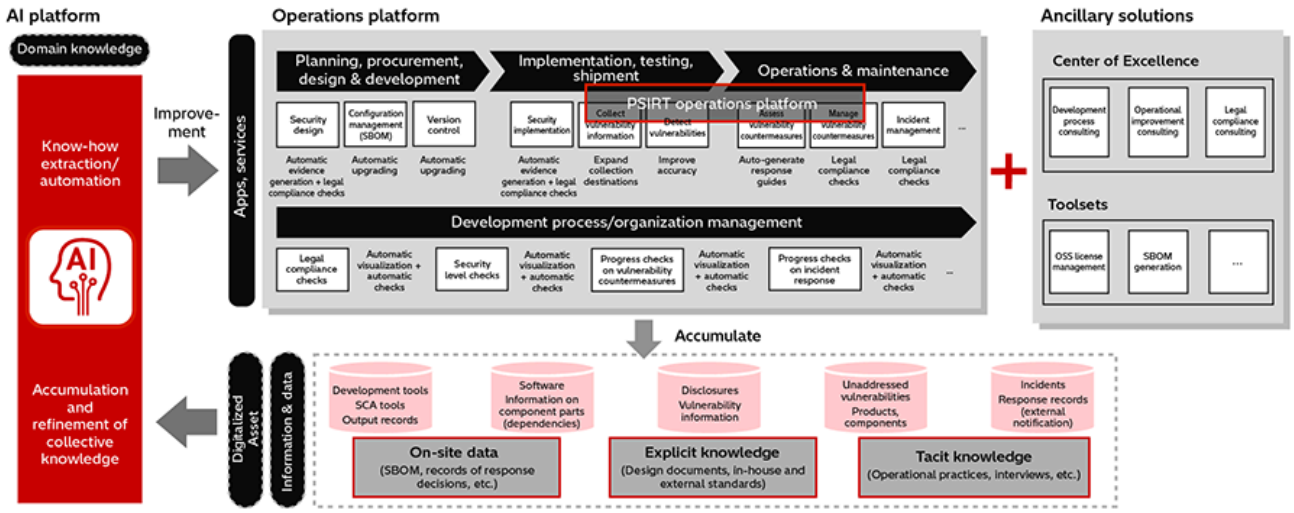
2. Leading as Customer Zero to Improve Resilience to IoT Security Risks

As growth in demand for the Internet of Things (IoT) has brought heightened security risks, providing security measures is an urgent task for the manufacturers of this equipment. Meanwhile, the European Union’s (EU) Cyber Resilience Act (CRA)[*1] imposes obligations to generate a software bill of materials (SBOM) and to report serious security incidents. Unfortunately, implementing this across entire supply chains that extend

globally and span different companies is proving difficult. Reasons for this include a shortage of personnel with security skills in the development industry and the difficulty of finding the time (and budget) to implement security measures, with the dependence of the security process on individuals inhibiting the accumulation of knowledge.

In response, Hitachi's Connective Industries Sector is taking action to boost the efficiency and automation of security activities across the entire product lifecycle by drawing on the operational technology (OT) contained in the domain knowledge it has built up in the field of information technology (IT) both inside and outside Hitachi and combining it with advanced artificial intelligence (AI). The first step in this direction was the launch in September 2025 of an operational platform for vulnerability management by product security incident response teams (PSIRTs). In the future, Hitachi intends to spread the benefits of its own "customer zero" activities across wider society by accumulating and refining its domain knowledge relating to product security and by strengthening and expanding AI-powered digital services.

*1. The CRA entered force in December 2024. The act obliges manufacturers of digital products sold in the EU to incorporate security features into their products.



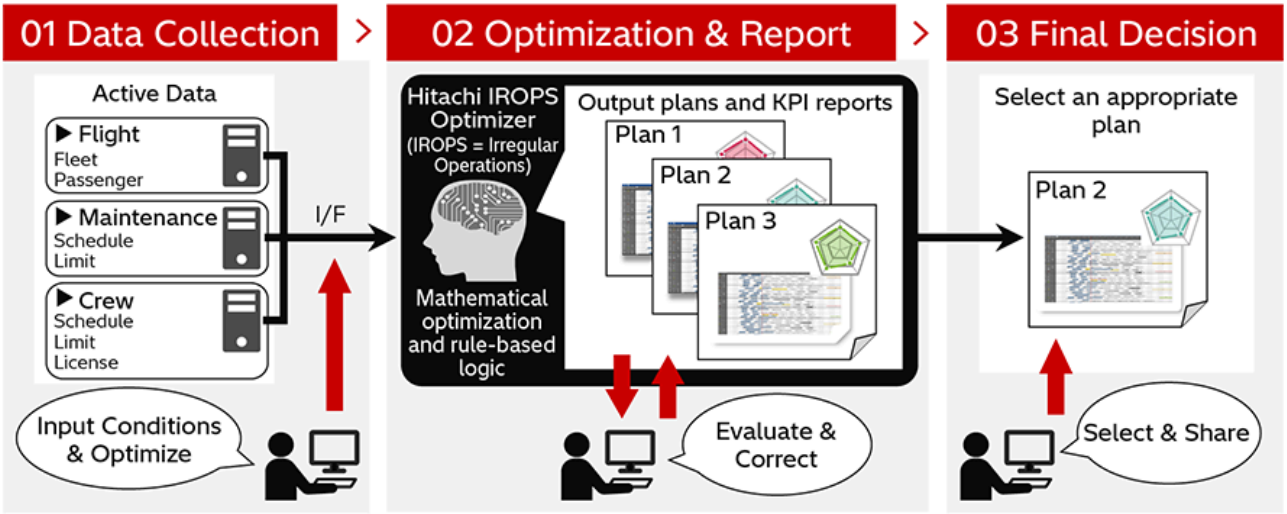
[2] How Hitachi Aims to Treat itself as "Customer Zero" for the Enhancement, Expansion, and Integration of Digital Services

OSS: open source software, SCA: software composition analysis

3. Service for Automatic Flight Rescheduling Using Mathematical Optimization

Hitachi has partnered with All Nippon Airways Co., Ltd. (ANA) to develop an automatic system for the rapid rescheduling of fights on domestic routes when these are disrupted by weather or mechanical faults. The system commenced operation in July 2025.

The system consolidates data on a wide range of factors, including flight scheduling, maintenance planning, flight crew assignment, and airport conditions, to automatically generate multiple flight schedule revisions. It uses a mathematical optimization algorithm to generate schedules that fit within maintenance plans and schedule constraints while minimizing delays and flight cancellations. Whereas ANA previously had special practices in place for rescheduling, which was done by staff with a decade or more of experience, a series of practical trials undertaken since 2019 by ANA in partnership with Hitachi Consulting Co., Ltd. has demonstrated the ability to output scheduling revisions that match those produced by experienced staff while shortening the time taken to devise these schedules by up to 70%. This is helping to improve customer satisfaction with ANA's services by providing passengers with more timely notification of changes. In the future, the plan is to deploy the technology as a Lumada solution in ANA's international operations and to other airlines around the world.



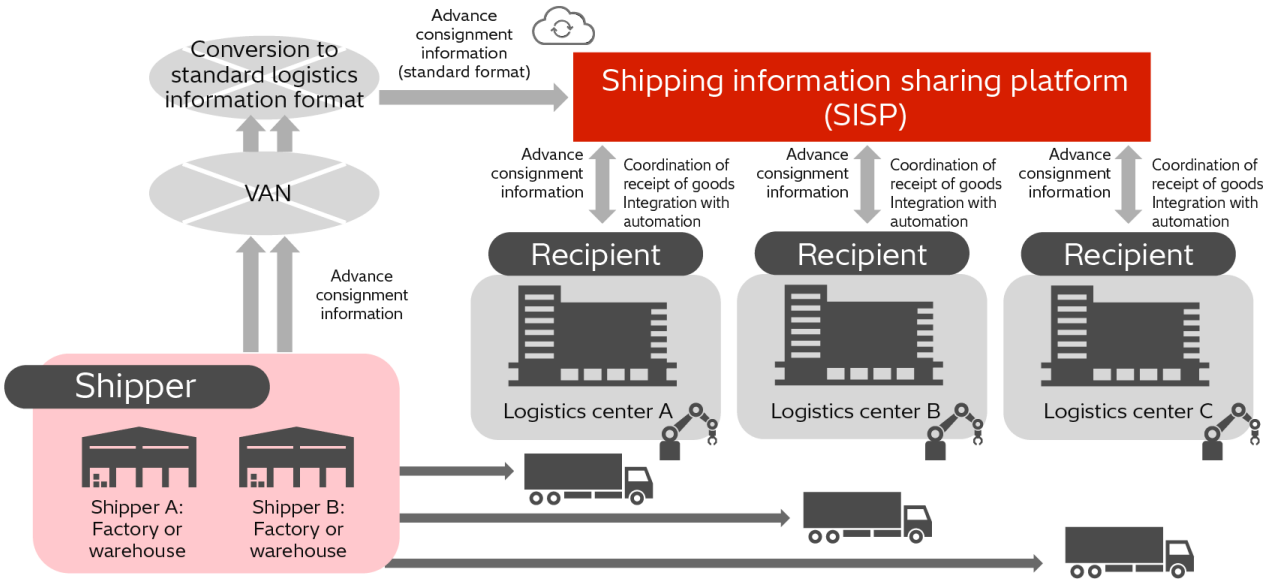
[3] Service for Automatic Flight Rescheduling

4. Use of Supply Chain Information Sharing Platform and Equipment for Automating Inward Goods Handling to Reduce Instances of Trucks Clogging up Berths

Common reasons why trucks get held up in unloading berths include the driver having to manually restack pallets after unloading or the shipper failing to provide the recipient with vehicle details or inform them about the quantity of goods and how they are packaged. In the latter case, this causes the efficiency of the inward goods checking process to be degraded by consignment information not being provided until the last minute due to missing items or partial shipments.

Hitachi is working to minimize this problem of trucks clogging up berths by using a shipping information sharing platform (SISP) to let companies exchange information in real time. This allows inwards goods processing to be done with more timely information by having the shipper use SISP to provide recipients with consignment information in advance that links delivery data to the delivery truck. It has been demonstrated that this shortens the time taken by 17% for single-consignment pallets and by 31% for multi-consignment pallets. Hitachi is also working to automate pallet restacking by using mobile collaborative robots supplied by Hitachi Automation, Ltd. This approach has proven capable of handling about 90% of all items, especially those such as beverages that are shipped in cases.

In addition to making inward goods processing more efficient by providing the recipient with confirmation of consignment information supplied by the shipper in advance, the workload is also reduced by using mobile collaborative robots



[4] Shipping Information Sharing Platform for Seamless Exchange of Data

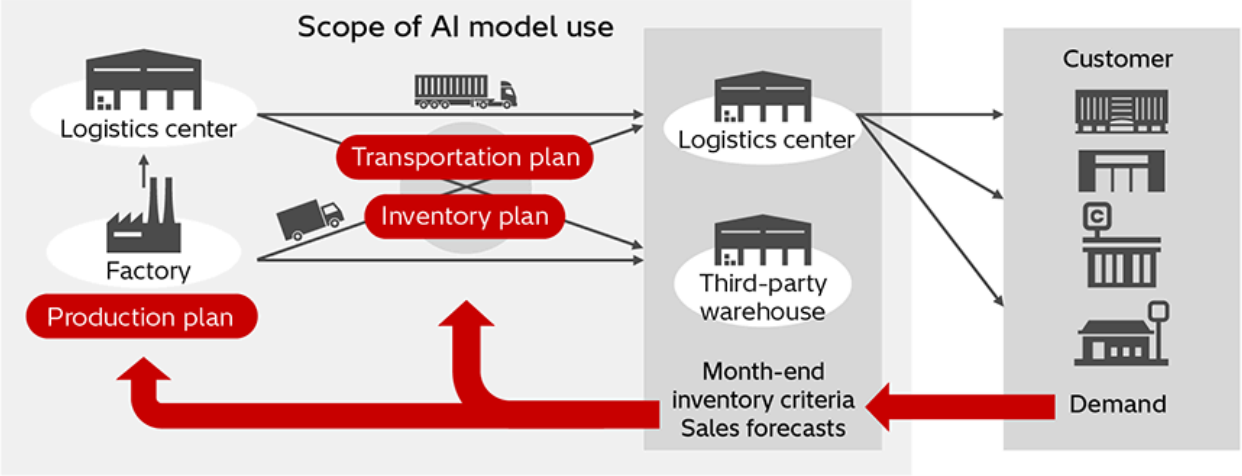
VAN: value-added network

5. Use of AI for Optimized Supply Chain Planning

Challenges that have arisen over recent years, including severe fluctuations in demand, labor shortages, rising transportation costs, and regulatory changes, are making it increasingly difficult to optimize the overall operation of supply chains using existing planning practices that rely on experience and intuition. It is against this background that ice producer Nichirei Ice Co., Ltd. has adopted Hitachi's service for optimized scheduling to precisely plan its operations in a way that cuts distribution costs while also coping with the wide swings in demand that accompany changes in the weather.

The service generates integrated plans for production, transportation, and inventory using mathematical optimization to consider a mix of constraints that would be too complex for a human. By coordinating production constraints with transportation timings and quantities determined from consideration of detailed logistical constraints that are tied to what is happening on the ground, the service can maximize truck capacity utilization to minimize truck use and cost. It can also provide the scheduling flexibility to respond promptly to supply and demand fluctuations while minimizing the risk of products being out of stock or of inventory limits being violated. In addition to the benefits of optimizing overall supply chain operation in ways that would be difficult to achieve manually, this also delivers wide-ranging improvements that include less reliance on the skills of specific individuals and a reduction of about 70% in schedule preparation times.

The same approach can be applied to strategic simulation as well as to scheduling. This contributes to greater corporate competitiveness and the resolution of societal challenges by providing a valuable tool for building supply chains that are resilient to change. It also helps with implementing the company-wide planning and key performance indicator (KPI) management required by revisions to the laws governing goods distribution that came into force in 2024 and the chief logistics officer's (CLO) task of strengthening logistics strategy to reflect business considerations.

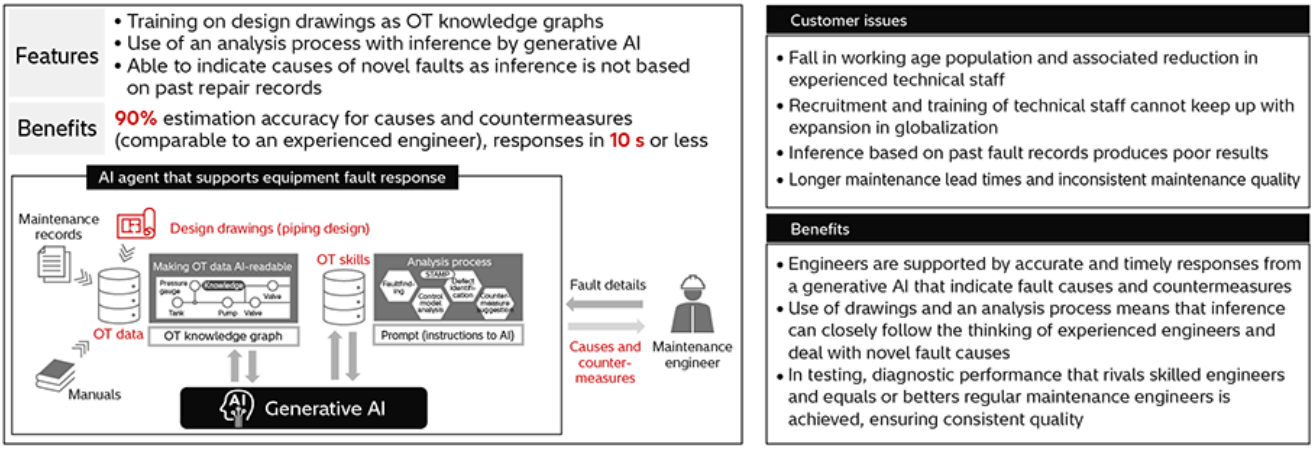


[5] Optimization of Supply Chain Scheduling to Generate Integrated Demand-driven Plans for Production, Transportation, and Inventory

6. AI Agent Service for Equipment Fault Diagnosis

Driven by the shift to global operations together with aging demographics and a low birthrate, the shortage of experienced maintenance staff represents a challenge for the manufacturing industry. This in turn calls for timely and accurate maintenance support that uses OT data derived from sources such as sensors or work logs. In response, Hitachi has been implementing interactive on-site AI that uses generative AI to support maintenance operations, responding to fault details entered by maintenance engineers with the fault cause inferred from past instances. Whereas previous use of AI based on the retrieval of past instances has struggled to deal with faults that are new or only resemble past faults, the accuracy of fault cause identification has been significantly improved by incorporating the system-theoretic accident model and processes (STAMP) and causal analysis using system theory (CAST) frameworks into the analysis of system safety to make design information AI-ready and replicate the thought processes of experienced staff. In a trial with Daikin Industries, Ltd., the proportion of correct responses from an AI based on the retrieval of past instances was improved by 23% and the system was able to provide accurate responses to complex problems.

In the future, it is hoped that the benefits of incorporating site practices into AI will include shorter maintenance lead times, more consistent work quality, and reduced manufacturing losses.

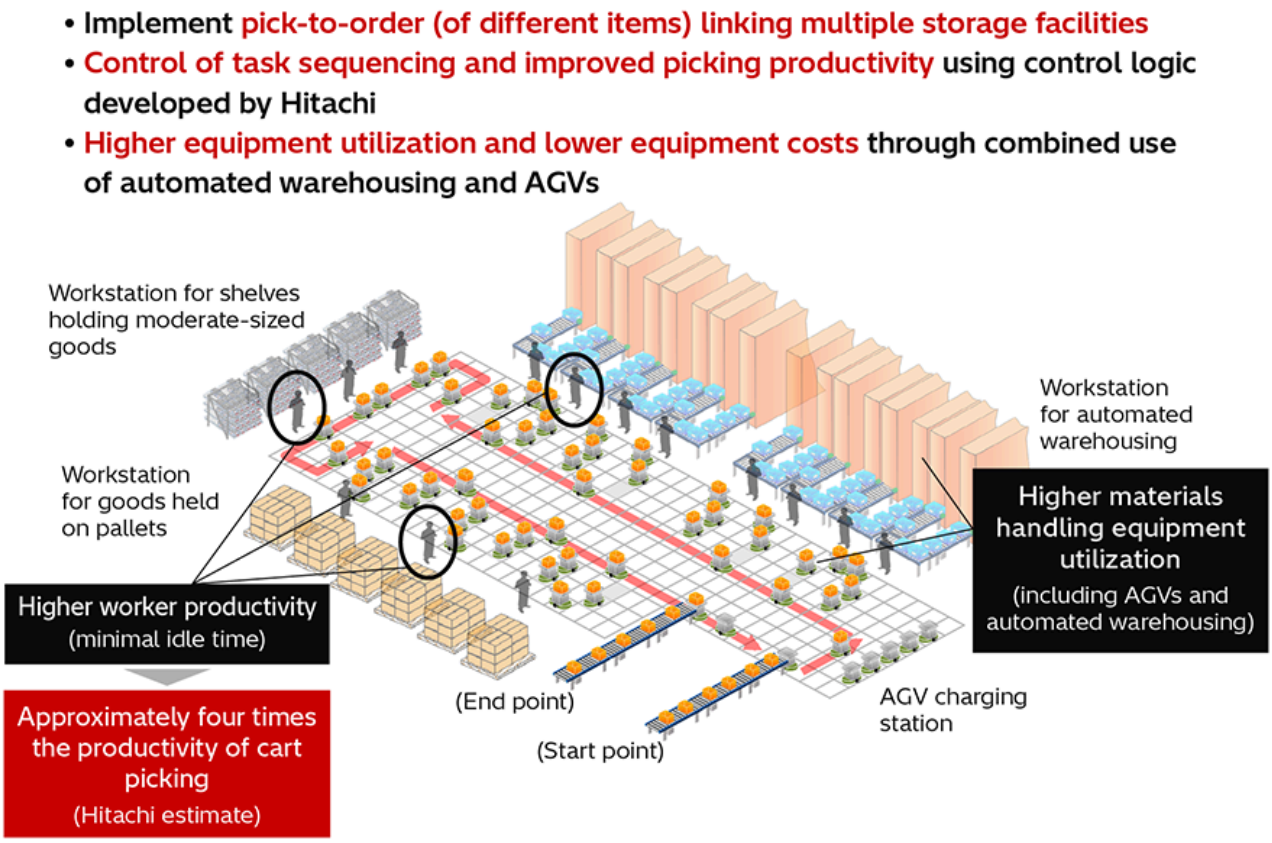


[6] Features and Benefits of AI Agent Service

7. Next-generation Warehouse Solution for Streamlining Increasingly Complex Automation

With electronic commerce (e-commerce) having become an essential part of daily life, logistics centers are being called on to ship a wide range of goods in an accurate and timely manner. While these logistics centers cannot do without the installation of materials handling equipment for automation, provision of this equipment on its own will not necessarily deliver the benefits needed. Rather, what matters is to streamline the overall process and have the different equipment interoperate with each other.

Hitachi has developed software for next-generation warehouse automation that tracks the progress of work in real time and issues optimal instructions. This solution operates as the brains of the logistics workplace, ensuring optimal execution through interoperation with a universal warehouse control system (WCS) from Hitachi Industrial Products, Ltd. and integrated control of different materials handling equipment. The work process combines the goods-to-person (GTP) model for picking with order-to-person (OTP) for getting the dispatch orders to the workers, enabling loss-free operation without any waiting time. Use of the software raises dispatch speed and puts sustainable logistics practices in place that will underpin the growth of e-commerce.



[7] Operation of a Logistics Center Using Hitachi's Next-generation Warehouse Automation Solution

AGV: automatic guided vehicle

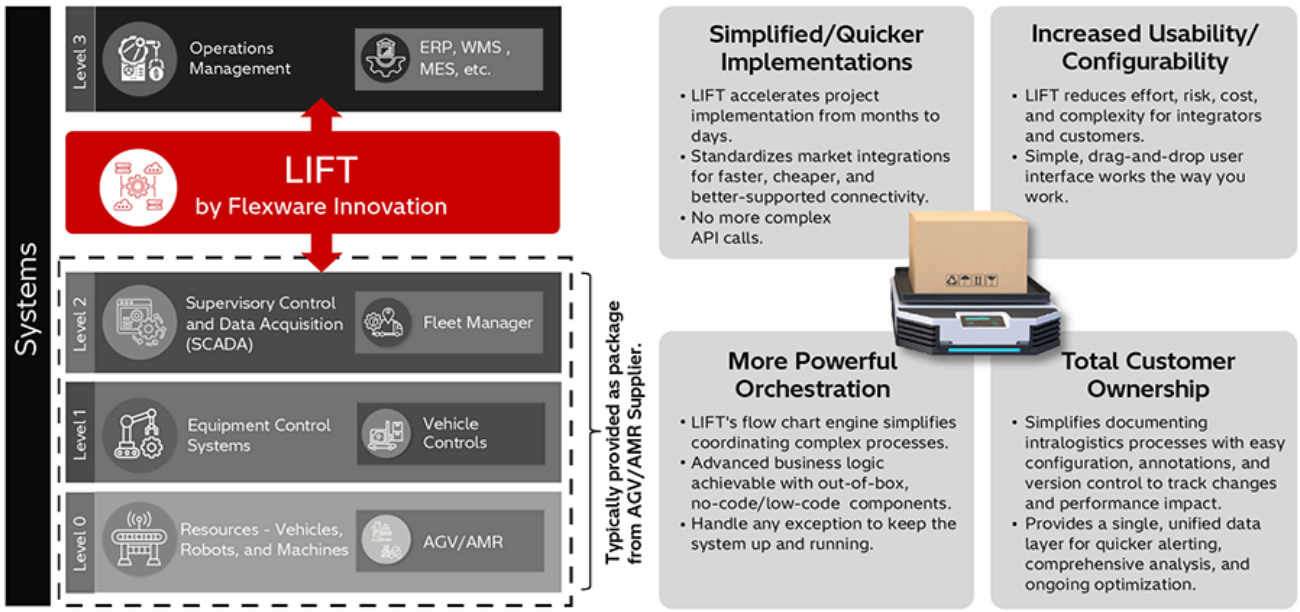
8. Driving Efficiency in Manufacturing Intralogistics with Orchestration by LIFT

Manufacturing intralogistics is rapidly transforming as labor shortages and production variability drive the adoption of Automated Guided Vehicles (AGVs) and Autonomous Mobile Robots (AMRs). However, integrating multiple OEM platforms and legacy systems often results in extended deployment timelines and increased operational complexity.

Logistics Integration Framework Technology (LIFT) addresses these challenges through a system-agnostic platform that INTEGRATES diverse technologies and SIMPLIFIES orchestration across the factory floor. Acting as an "invisible adhesive," LIFT enables real-time material flow control and ensures seamless INTEROPERABILITY between OT and IT systems. Its advanced orchestration engine simultaneously manages AGVs and AMRs from different vendors, dynamically resolving routing conflicts and preventing deadlocks—capabilities that differentiate LIFT from conventional solutions.

By leveraging standardized interfaces and a modular architecture, LIFT significantly shortens implementation timelines and reduces maintenance complexity. These features allow manufacturers to OPTIMIZE intralogistics, eliminate silos, and accelerate the transition toward smart, connected factories.

(Flexware Innovation, LLC)



[8] Overview of Manufacturing Intralogistics with Orchestration by LIFT

ERP: enterprise resource planning, WMS: warehouse management system, MES: manufacturing execution system, SCADA: supervisory control and data acquisition, API: application programming interface

9. Innovative Indoor Feed Production System

Livestock farming requires vast water resources and extensive land for feed production, posing serious challenges such as climate change and increasing environmental impact. Traditional feed supply has also been highly dependent on weather and regional conditions, making stability and sustainability difficult to achieve.

To address these issues, JR Automation partnered with Forever Feed Technologies to develop an innovative indoor feed production system. This automated solution can produce up to 50 tons of sprouted grains per day, reduce water usage by 95%, and replace approximately 28 square kilometers of feed crops. Furthermore, JR Automation's advanced robotics and control technologies enable full automation and process optimization, achieving both sustainability and efficiency.

Through this initiative, the system enhances livestock productivity while reducing environmental impact, ensuring a stable feed supply unaffected by climate change or land constraints. (JR Automation)

[9] Automated Production of Sprouted Grains with the innovative indoor feed production system

10. Solutions for Development of Software-defined Products

The automotive industry has struggled in recent years to achieve timely product development that is in tune with more diverse user needs and evolving user perceptions of value, while also having to deal with ever higher development workloads as technical innovations have made systems larger and more complex.

The “software-defined” approach has attracted attention as a way of overcoming both challenges. In addition to the separation of hardware and software and a design focus on software to minimize hardware dependence while providing greater software standardization and higher development efficiency, this approach also enables ongoing software upgrades using over-the-air (OTA)[*1] updating. This software-defined trend has reached the automotive industry and is likely to be adopted in industrial and construction machinery also. Nevertheless, knowledge of both hardware and software is still needed for the development of efficient and high-quality edge devices.

Hitachi Industry & Control Solutions, Ltd. offers solutions for the development of software-defined products that provide comprehensive support for every step in development from the very earliest stages, extending from the planning and concept phases to operations and software updating. In doing so, the company draws on four key strengths to provide engineering services with high added-value for practical software-defined product development. These strengths are extensive experience with the development of edge devices; skills that have been built up over 50 years of involvement

in embedded development by the company and its predecessors; partnerships with industry organizations, semiconductor manufacturers, and operating system (OS) vendors; and a workforce of more than 800 specialist staff*2.

(Hitachi Industry & Control Solutions, Ltd.)

*1. The updating of software over a wireless network.

*2. As of October 2025.

[10] Solutions for Development of Software-defined Products that Leverage Strengths in Edge Technologies

SE/MBSE: systems engineering/model-based systems engineering

11. GMP Data Integration Platform for Digital Transformation of Pharmaceutical Manufacturing

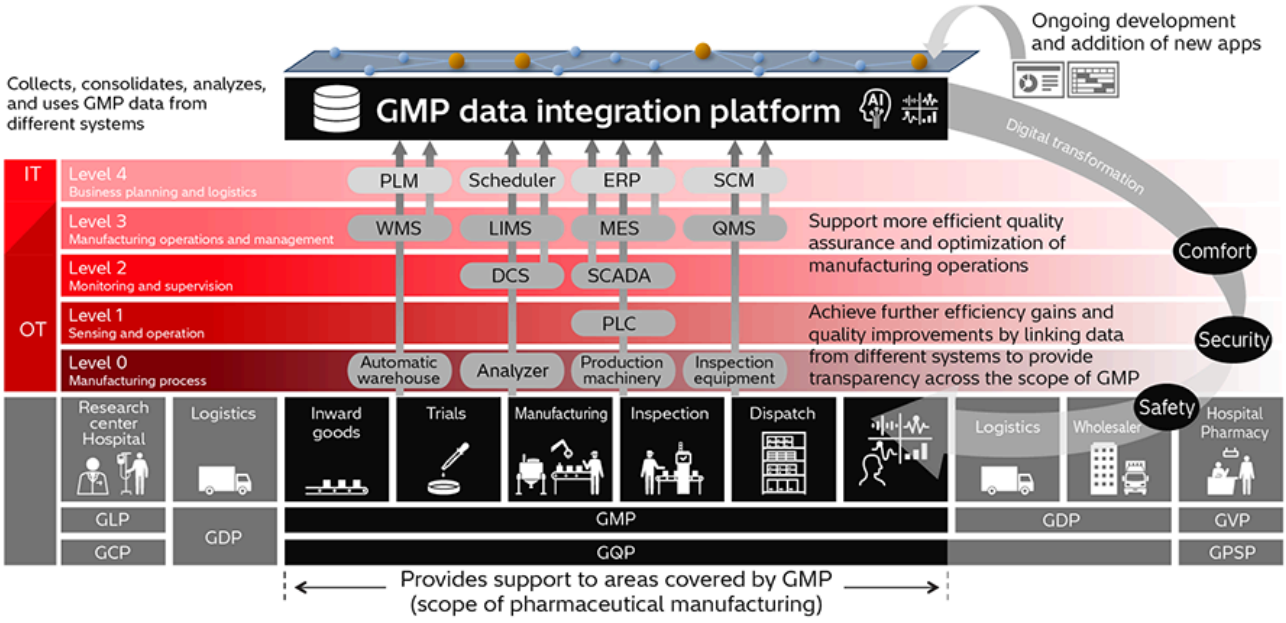
Pharmaceutical manufacturing has been confronted with a variety of complex challenges over recent years, including quality issues, frequent changes to mandated pricing, and a shrinking workforce. The manufacturing workplace itself has an urgent need to put data to use in improving efficiency and maintaining quality, while also dealing with the diverse modalities associated with growth in generics and bio-pharmaceuticals and maintaining reliable drug supplies. These background factors make it important that operations be

upgraded in compliance with the good manufacturing practice (GMP) standards for managing pharmaceutical production and quality.

Hitachi's GMP data integration platform helps to make quality assurance more efficient and to optimize manufacturing operations by consolidating data from the different systems used within the scope of GMP application, including the MES, laboratory information management system (LIMS), and quality management system (QMS). Equipped with functions such as the use of AI to support the annual review process, integrated monitoring, KPI tracking, and anomaly detection, the platform helps to ensure a safe and secure supply of pharmaceuticals by enabling users to exploit OT knowledge of pharmaceutical manufacturing as a point of difference.

The goal for the future is to work as One Hitachi to deliver platforms for the digital transformation (DX) of pharmaceutical manufacturing that provide support from drug development and clinical studies to manufacturing and distribution.

(Service launch date: April 2026)
(Hitachi Industry & Control Solutions, Ltd.)



[11] GMP Data Integration Platform

PLM: product lifecycle management, SCM: supply chain management, DCS: distributed control system, GLP: good laboratory practice, GCP: good clinical practice, GDP: good distribution practice, GQP: good quality practice, GVP: good vigilance practice, GPSP: good post-marketing study practice