

## Chapter 1

# Value Creation

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Daifuku Value Creation Model

Daifuku seeks to streamline logistics and, as a comprehensive manufacturer and integrator of material handling systems, has been able to achieve significant growth. Under our company creed Hini Arata, we promote Value Transformation that helps enhance the competitiveness of our customers and, in tandem with contributing to the development of society, take up the challenge to enhance our corporate value.



Our Competitive Edge

Our strength lies in our in-house development of hardware and software, and our comprehensive support system for customers that includes consulting, design, production, installation, and maintenance. Daifuku boasts a wealth of manufacturing and system integration experience, quickly responding to needs that include designing systems with complex requirements and making on-site adjustments when problems occur. We will establish these strengths at a global level toward achieving further success amid fierce market competition.



1

Consulting

**Well-balanced configuration**

- Storage, transportation, sorting/picking functions, capabilities and costs, from receiving to shipment

**Long-term vision**

- Post-operation scalability and flexibility

2

Planning/Engineering

**Whole system optimization**

- Integrate various aspects such as hardware and its control, software, architecture, and electricity
- Assuming a situation where trouble should occur

3

Design/Production

**Proactive production and R&D**

- Production sites across the world: Thorough quality control in Japan, North America, Asia, and Europe

▶ **Daifuku's global production**

**26** sites



**Global workload adjustment**

- Efficiently distribute production to each region to supply products in a stable manner

**Supply chain development**

- High in-house production rate and operation rate
- Use AI (artificial intelligence) and VR (virtual reality) to shorten the development process

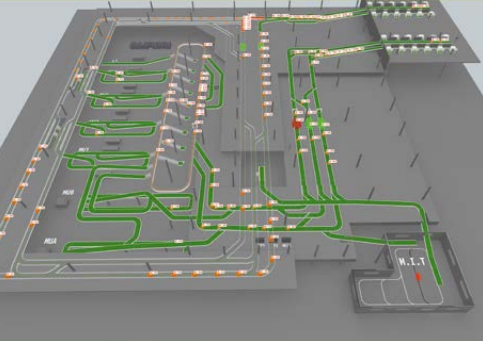
4

Installation/Operation


**Streamlining on-site adjustment**

- High factory perfection
- Preliminary verification using 3D software (Sym3 below)
- Bench strength of human resources with abundant experience in project management

▶ **Sym3 system image**



▶ **Construction site of high-rise automated warehouse system**



5

After-Sales Service

**Abundant service assets around the world**

- More than 31,000 stacker cranes for automated warehouse systems
- Over a total of 5,000 kilometers of automobile conveyor systems

**Extensive service menu**

- Daily maintenance and operation
- Upgrade, remodeling, retrofits

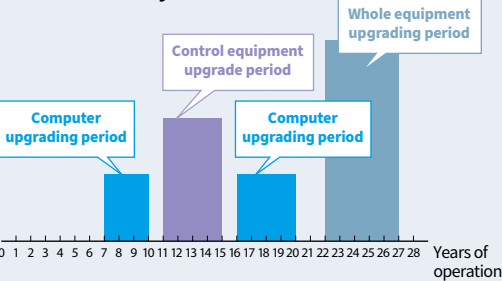
▶ **Service features by business**

Intralogistics	• Maintenance • Inspection, repair • Retrofits
Cleanroom	• On-site services
Automotive	• Upgrades
Airport	• Operations and maintenance

**Strong relationship of trust with customers**

- Fostering with long-term relationships
- A strategic move to win new projects

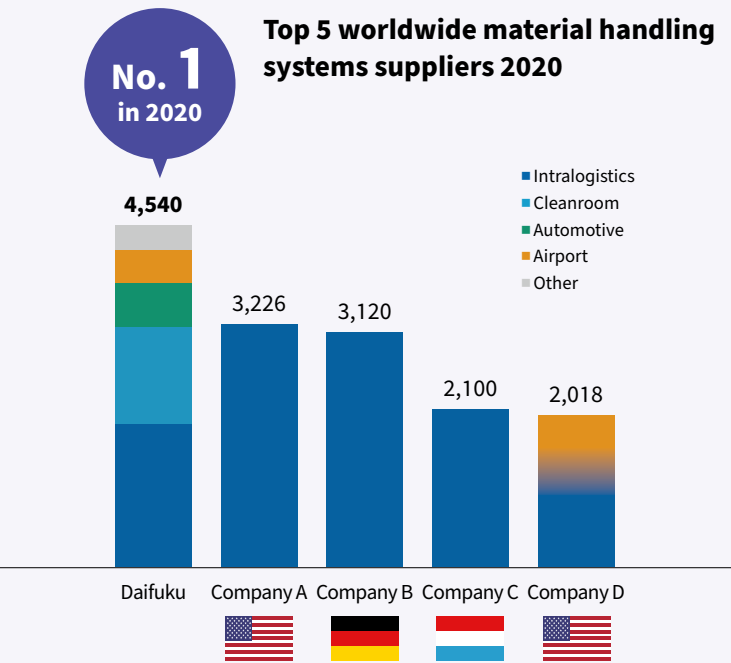
▶ **Retrofit timing and size for automated warehouse systems**



Global Presence

Daifuku has provided the best solutions to customers in various fields around the world. We have been the world's No. 1 in sales within the material handling industry for the seventh straight year. Going forward, we will continue to work with our human resources and sites globally to meet growing demand.

I Results and assets



Net sales (million U.S. dollars)

Source: Modern Materials Handling – May 2021  
(Excluding Daifuku, data for the remaining four companies is calculated from published materials)

**Employees (consolidated)**

**11,697** (Employees outside Japan: 8,045)

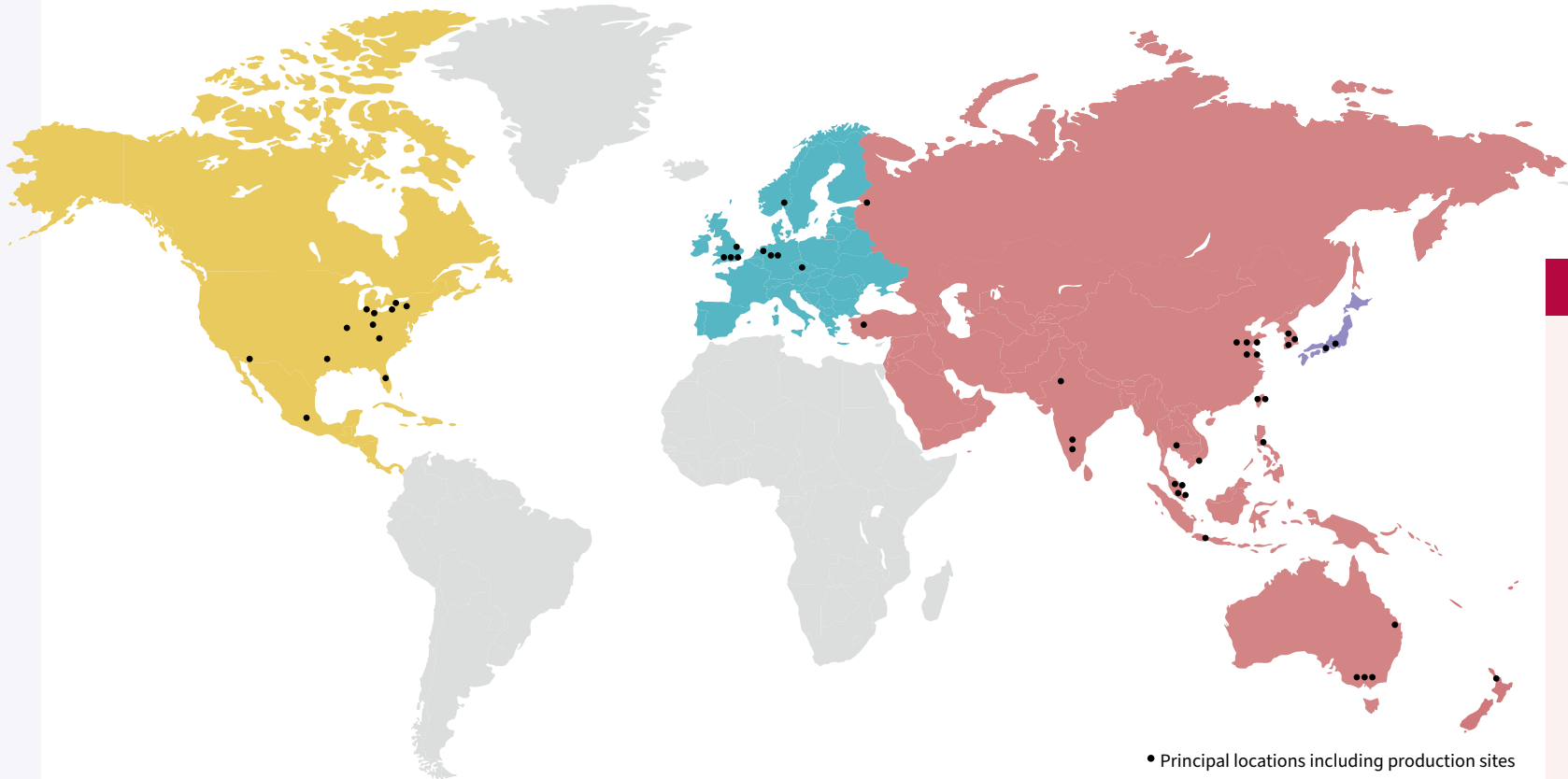
Up 834 yoy (Employees outside Japan: Up 733 yoy)

Along with an expansion in our global network, consolidated employee numbers increased. We invigorate our organization by employing diversified human resources.

**Installation record**

**54** countries

We have sites in 26 countries and regions to receive orders from a broad range of customers worldwide.



• Principal locations including production sites

**Americas**

- Daifuku North America Holding Company
  - Daifuku America Corporation
  - Daifuku Cleanroom Automation America Corporation
- Jervis B. Webb Company
- Elite Line Services, Inc.
- Wynright Corporation
- Contec Americas Inc.
- Daifuku Canada Inc.
- Jervis B. Webb Company of Canada, Ltd.
- Daifuku Airport Technologies Canada Inc.
- Daifuku de México, S.A. de C.V.

**Net sales** (Billion yen)

FY	2016	2017	2018	2019	2020
Net sales	80.7	101.6	105.1	105.9	143.1

**Europe**

- Daifuku Europe Ltd.
- Daifuku Europe GmbH
- Jervis B. Webb Company, Ltd.
- Daifuku Logan Ltd.
- Daifuku Self Services Technologies AS
- Scarabee Aviation Group B.V.

**Net sales** (Billion yen)

FY	2016	2017	2018	2019	2020
Net sales	8.5	9.6	12.8	9.2	13.3

**Japan**

- Daifuku Co., Ltd.
- Contec Co., Ltd.
- Daifuku Plusmore Co., Ltd.
- Daifuku Business Service Corporation
- Daifuku Manufacturing Technology Co., Ltd.
- Iwasaki Seisakusho Co., Ltd.
- Daifuku Airport Technologies Japan Co., Ltd.
- Scarabee Aviation Group - Japan Co., Ltd.

**Net sales** (Billion yen)

FY	2016	2017	2018	2019	2020
Net sales	110.6	132.4	127.6	155.0	163.9

**Asia Pacific**

**Asia**

- Daifuku (China) Co., Ltd.
- Daifuku (China) Manufacturing Co., Ltd.
- Daifuku (China) Automation Co., Ltd.
- Daifuku (Suzhou) Cleanroom Automation Co., Ltd.
- Contec (Shanghai) Co., Ltd.
- Daifuku India Private Limited
- ForgePro India Private Limited
- Vega Conveyors and Automation Private Limited
- P.T. Daifuku Indonesia
- Daifuku Korea Co., Ltd.
- Clean Factomation, Inc.
- Hallim Machinery Co., Ltd.
- Daifuku (Malaysia) Sdn. Bhd.
- BCS Integration Solutions Sdn. Bhd.
- Daifuku Mechatronics (Singapore) Pte. Ltd.
- Singapore Contec Pte. Ltd.
- Taiwan Daifuku Co., Ltd.
- Taiwan Contec Co., Ltd.
- Daifuku (Thailand) Ltd.
- Daifuku Intralogistics Vietnam Co., Ltd.

**Oceania**

- Daifuku Oceania Limited
  - BCS Airport Systems Pty Limited
  - BCS Logistics Solutions Pty Limited
  - BCS Infrastructure Support Pty Limited
  - Intersystems (Asia Pacific) Pty Limited

**Net sales** (Billion yen)

FY	2016	2017	2018	2019	2020
Net sales	114.0	156.8	210.9	170.0	150.4



Global Presence

North America

Stepping up global integrated operations to expand business scale and increase both productivity and profitability

**Shuichi Honda**

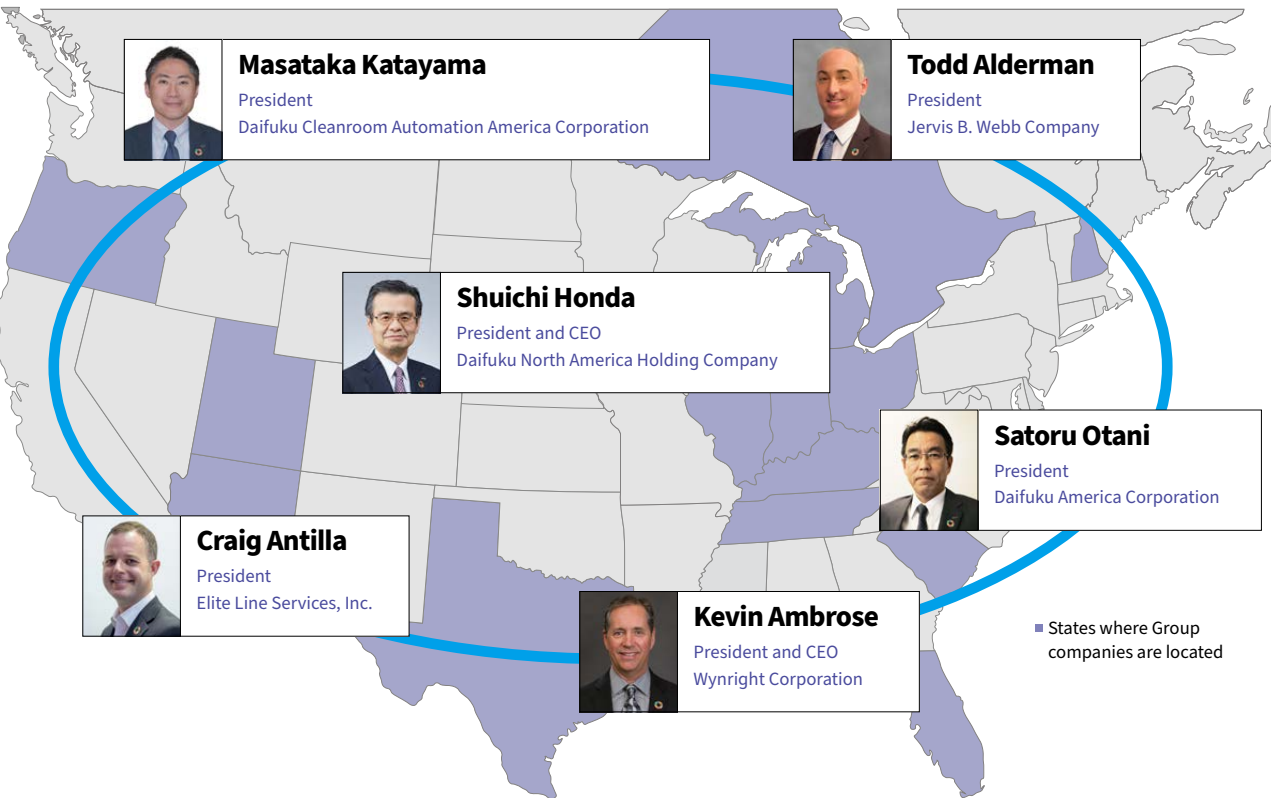
Director  
Senior Managing Officer  
President and CEO of Daifuku  
North America Holding Company



Position of the North America market in the medium-term business plan

Daifuku North America Holding Company runs the Intralogistics, Cleanroom, Automotive, and Airport businesses in North America together with its five affiliates. North American sales surged nearly 1.8 fold, from 76.6 billion yen for fiscal 2016 to 138.9 billion yen for fiscal 2020. It was the region attaining the sharpest growth under the previous four-year business plan. As a result, North America's net sales contributed around 30% of consolidated financial results. Since the market is large and has high growth potential, we define it as the top priority region in the new three-year business plan.

Overview of Daifuku North America Holding Company



The companies acquired through M&A, including Jervis B. Webb Company, our first acquisition in 2007, play central roles in business operations. We should work to forge a sense of unity within the Daifuku Group and strengthen ties inside the Group. To strengthen integrated global operation in separate businesses, in fiscal 2019 we revamped our Group companies based in North America to establish a system with enhanced management efficiency. We will also rebuild our production and procurement frameworks to increase profitability.

In North America, economic activities have resumed in earnest as the COVID-19 vaccination campaign advanced. Some uncertainties remain, including concerns about inflation resulting from supply constraints. Even so, we will heighten our presence in the promising North America market to move the entire Group forward.

Trend by business

▶ Intralogistics

During the pandemic, restrictions on going out and the spread of teleworking led to a quick hike in home delivery demand and accelerated investment in e-commerce. Accordingly, we received many more orders in North America for fiscal 2020. Since considerable demand is expected for the near term, we will endeavor to expand our business by winning orders.

In 2020, Wynright's new plant commenced operation. We will strive to heighten production efficiency and the in-house production ratio, to achieve a production growth effect following an increase in orders and to tackle our issue of increasing profitability.

▶ Cleanroom

Amid the global shortage of semiconductors and the U.S. government policy to increase domestic semiconductor production capacity, we anticipate active new capital investments. On the basis of our past delivery track record, we will build closer ties with customers and thereby capture business opportunities.

▶ Automotive

North America is a market with intense competition among Japanese, American, and European automakers. They are highly eager to make investments and the market is expected to continue to expand. The automobile industry is in a period of major change. We regard it as a major business opportunity and will work to gain orders.

▶ Airport

In this business, sales doubled during the period of the previous four-year business plan. It has grown into the fourth core business of the Group and its business expansion in North America drove the whole Group. Orders have not been severely affected by the pandemic. It maintains a large backlog.

Capital investment

▶ A new plant in the Airport business

Jervis B. Webb will be constructing a new plant on a site of about 20,000 sqm in Boyne City, Michigan, which will be completed in August 2022. The three existing factories will be integrated into this new plant to boost production capacity. In addition to the conventional products in the Airport business, it will also manufacture products handled by other segments and subsidiaries to broaden the range of production. We will concentrate the production facilities to further improve profitability.



## Global Presence

## China

## Demonstrating strong potential over the medium and long terms

### Akihiko Kishida

Managing Officer  
Chairman of Daifuku (China) Co., Ltd.  
Chairman of Daifuku (China) Automation Co., Ltd.



## Business environment in China

China contained COVID-19 earlier than other countries and its economy is rallying. Consumption is now active across the country. A willingness to make capital investments resurged in a multitude of business sectors. Demand is expected to rise, especially for infrastructure and high-tech manufacturing. It is also said that consumer behaviors and corporate management will change to accelerate new business development as society shifts to the new normal.

However, China does face its own challenges, such as rising labor costs, aging of workers, and a reluctance among young workers, mainly the Millennials born in 1985 and later, to work in the manufacturing sector. I believe that the trend toward rationalization and labor saving will gather momentum.

## Trend by business

### ▶ Intralogistics

With the help of solid growth in domestic demand, wholesalers and retailers are actively investing in expanding distribution markets, for instance with the introduction of e-commerce, and are working to increase logistics efficiency.

Competition with major Western competitors and with fast-growing Chinese competitors is intense. Over the medium and long terms, these are markets with high future potential and their scale is expected to be comparable with those of Japan. We will increase local production and stress high quality, low cost, and short delivery lead times. In addition, we will improve our results and bolster our service structure as a system integrator to press ahead with differentiation from the competition.

### ▶ Cleanroom

The semiconductor market expansion will continue into the medium- and long-term future, driven by the growth of 5G and IoT applications and data centers and the global shortage of semiconductors. Among other products, memory semiconductors, system LSIs and C-MOS sensors with a line width of 45 nm are seeing growing demand.

In an aim to move away from importing semiconductors, the Chinese government is making huge investments in expanding the country's semiconductor industry. Despite uncertainty arising from the prolonged U.S.-China trade dispute, we expect demand across the entire high-tech sector will still be high.

On the other hand, investment in flat-panel displays (FPDs) has peaked, but the market is turning around since sales for applications such as computer screens and TV sets rose after soaring demand for teleworking under the pandemic.

As a result, the willingness to make capital investment is improving in both FPDs and semiconductors. However, due to entry restrictions between Japan and China, it is difficult to dispatch engineers from Japan to customers' premises. We will regard it as an opportunity to expand the range of services offered by local staff with the help of remote technical support.

### ▶ Automotive

China's automobile sales volume is returning to pre-COVID-19 levels. However, capital investment by automakers is only moderately rallying, due partly to production limitations imposed by the semiconductor shortage. Meanwhile, capital investment in compliance with new energy vehicle (NEV) regulations, which require companies producing at least 30,000 vehicles in China to produce a predetermined or higher percentage of NEVs, will begin in earnest. In a few years, China's annual car production volume is expected to surpass 28 million units. At that time, automakers will be making active capital investment.

In the NEV market, a large number of new manufacturers have emerged, in addition to the major automakers. They will produce not only high-end electric vehicles (EVs) but also low-end models, like Japan's *kei*-category vehicles, to speed up the creation of new markets. Mainly serving Japanese automakers, we will also strengthen contacts with emerging EV manufacturers as well.

Chinese competitors now have considerable capabilities. In the past, there was a huge gap in quality, but their quality level is nearing ours. We will step up efforts to cut costs and focus on the differentiation of new products.

## Capital investment

### ▶ Daifuku China Training Center

We have set up a training center on the premises of the Songjiang Plant in Shanghai for the purpose of swiftly developing service personnel capable of performing facility maintenance and building up their skills. The center is jointly run by the Intralogistics business and the Automotive business. To offer education and training, it consists of a training facility with real machines and a safety training facility.

### ▶ A new plant in the Cleanroom business

A new plant is being constructed in Suzhou. It is scheduled to come onstream in January 2023. We will thus strive for stable business operation geared to the future expansion of the semiconductor market. The production space layout is designed to suit projects for semiconductors that will be seeing surging demand. The new plant is equipped with a showroom and demonstration lines for semiconductors and for FPDs. They will be used in promotional activities for customers.



### ▶ A new plant in the Automotive business

To boost productivity, the plant in Changshu, Jiangsu Province, is being renovated. Work for the assembling factory ended in February 2021 while that for the machining factory is expected to end in January 2022. To meet environmental regulations that have recently been tightened by the authorities, the new plant is equipped with a solar power system, which is expected to produce 800 kW of electric power, equivalent to the plant's conventional power consumption. The plant will thus be reborn into an environmentally friendly facility.

## Impact of the U.S.-China trade dispute

Some manufacturers exporting to the U.S. are moving their plants out of China. However, there has so far been no major impact. Nonetheless, in the Automotive business, some products were supplied from China to the U.S. Now, they are produced or procured inside the U.S. due to high tariffs and soaring export costs following the RMB appreciation.

The U.S. administration had adopted a policy including export restrictions against China's semiconductor producers. At this time, it is not having an impact.

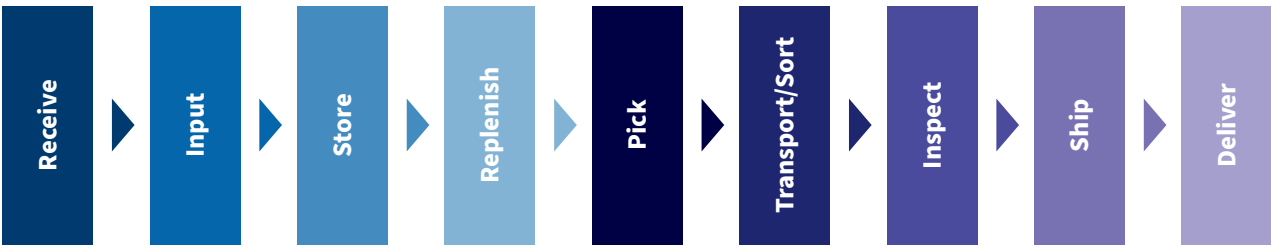


Our Material Handling Solutions

Intralogistics Business

Daifuku provides logistics solutions that meet the needs for automation and labor saving in various manufacturing fields such as food/beverage, pharmaceuticals, machinery/metal processing, electrical appliances, and daily necessities. In addition to the abundant experience and know-how that we have cultivated so far, we are maximizing the automation rate by working on new technologies.

Operation flow of logistics facilities



Products

**Unit Load AS/RS\***

Daifuku's Unit Load AS/RS automatically transports products and parts in pallet units and stores them in high-rise racks. By effectively using the height direction, it is possible to improve storage efficiency.

**High-throughput mini load AS/RS - Shuttle Rack-M**

Daifuku's Shuttle Rack-M is a fast, vehicle-type AS/RS designed to provide temporary storage, sorting, and sequencing functions. Unlike the conventional stacker crane type AS/RS, its shuttle vehicles with a transfer function, which are arranged on a rack, transport in the depth direction and put it in and out of the shelves. It can be used for various load profiles, such as cardboard cases and trays.

**Automated high-speed sorter - Surfing Sorter**

Daifuku's Surfing Sorter is an automatic sorting system that can handle various packing styles such as irregular shapes and long items. The soft-touch slide shoe method enables reliable sorting without worrying about load damage.

\* AS/RS: Automated Storage and Retrieval System



Daifuku's extensive experience and expertise

Providing solutions

Cutting-edge distribution center using the latest technologies

This center targets zero shipping errors. As a cutting-edge facility, the center uses a number of advanced technologies, including 3D image processing that enables high-mix, low-volume handling and robotic piece picking; and AI-based palletizing simulations.

**AS/RS for picking operations**

Provides products in a timely manner to piece-picking robots

**High-throughput mini load AS/RS**

Stores various-sized cardboard boxes and facilitates case shipping

**Case-palletizing robot**

Rapidly palletizes cases of various shapes and sizes

**Piece-picking robot**

Carefully and gently picks individual items of various sizes and weights

**Depalletizing robot**

Picks cardboard boxes from a pallet retrieved from an AS/RS

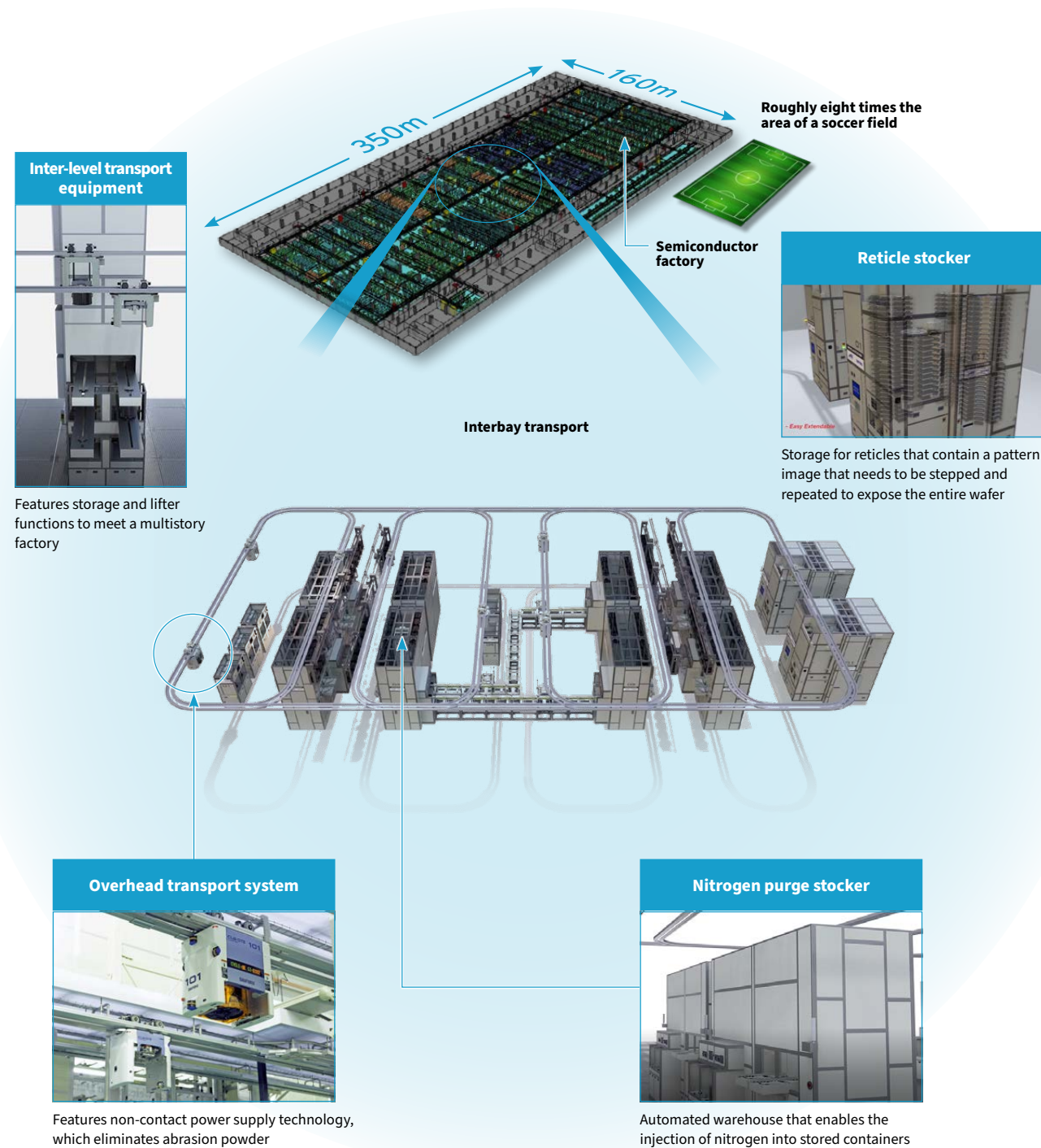


## Our Material Handling Solutions

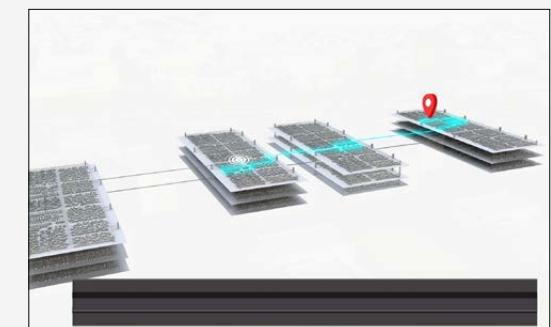
### Cleanroom Business

#### I State-of-the-art semiconductor factory

A semiconductor factory performs around 1,000 manufacturing processes. A large factory has interbay rail tracks with a total length of 10 km on the ceiling of the clean room as well as hundreds of wafer transport vehicles in operation 24/7. Wafers in process require very careful handling. As semiconductors are becoming finer, lower vibration levels are needed. Software for managing vehicle operations according to production plans is also becoming increasingly advanced and sophisticated.



#### I Advanced control technologies supporting production at the latest semiconductor factories

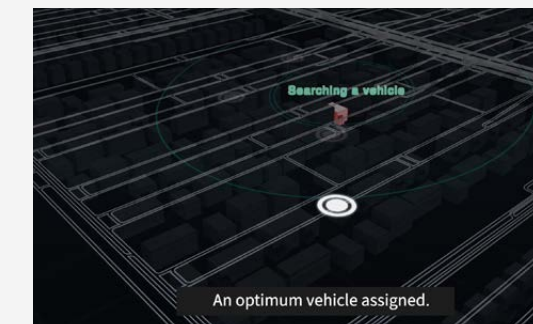


##### On-demand

Positional information and the running status of several hundred wafer transportation vehicles is monitored in real-time over continuous Wi-Fi communications. Optimum vehicle operation is suggested based on constantly changing production process conditions.

##### Scalability

At cutting-edge semiconductor factories known as "GigaFab" facilities, multiple factories need to be connected to transport wafers in all directions. State-of-the-art wafers known as "hot lots" can be processed in a short period of time by having transport vehicles move back and forth between buildings and floors. By considering wafer priority and the status of transportation equipment in real-time, optimum wafer transportation plans can be suggested even between factories.



##### Intelligent

Running rails stretching across the ceiling of clean rooms form a mesh. When a wafer is collected from a production unit, a vehicle that can process the wafer in the shortest time is instantly searched from among hundreds of units. The wafer collected by the vehicle is transferred to the next process in a way that determines how to reach the destination in the shortest time along the mesh rail network, taking into account congestion based on the status of all vehicles in the factory. When determining the travel route, AI-based learning and predictive functions are used to implement overall optimization based on an ever-changing environment.

##### Reliability

The transportation of wafers between manufacturing processes in the semiconductor factory operates 24/7. All control and communication systems are double and triple redundant to provide high levels of reliability so that even if an unexpected failure occurs, it will have no impact on the operation of the semiconductor factory.