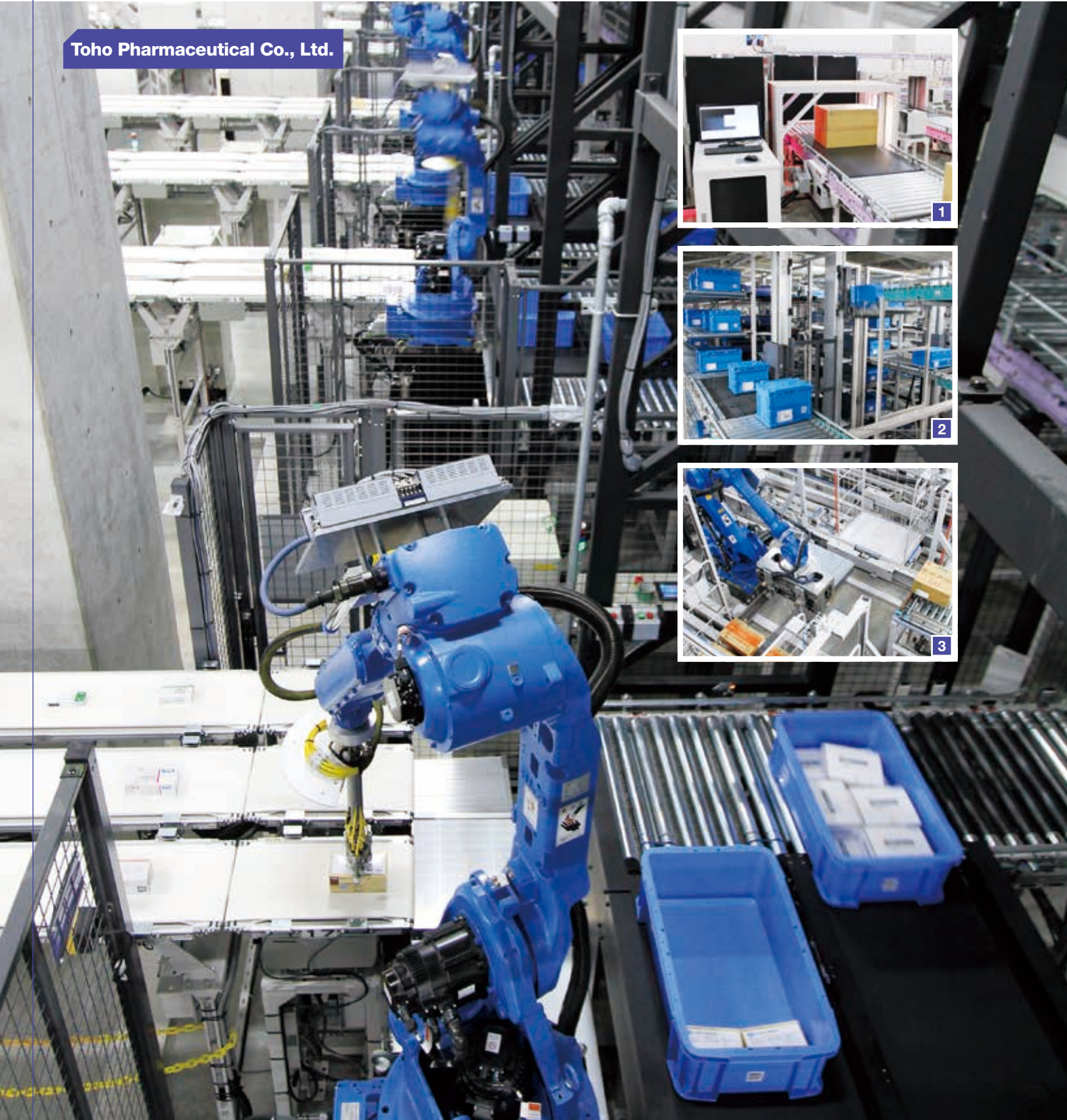


FA&DA

Industry ▶ **Pharmaceutical Wholesaling**

Solution ▶ **Innovative Logistics Systems Using Robotics Technology**

Toho Pharmaceutical Co., Ltd.



**Daifuku built state-of-the-art logistics systems by fusing robotics technologies. These systems attained 99.99999%, or “seven nines” accuracy, the highest in the industry.**



This station groups items assembled for delivery by destination.

As a systems integrator, Daifuku offers logistics systems that meet customers' real needs in virtually all fields. At the large-scale distribution center “TBC Saitama” (provisional name) of Toho Pharmaceutical Co., Ltd., a pharmaceutical wholesaler, major themes in systems design were not only efficiently handling shipments of a large number of items in small lots, but also introducing robots that would reduce labor inputs, as labor becomes increasingly scarce in the years ahead. Daifuku worked with its customer to develop and deliver state-of-the-art logistics systems that make use of robots. Case picking by robots, with some exceptions, is 100% automated from delivery to the distribution center to shipments. In addition, Daifuku went beyond this accomplishment to use robots for piece picking from a large number of items, a step which was previously thought to be too difficult.

Moreover, Daifuku expanded the scope of automation by integrating computer systems with its various automated storage and retrieval systems (AS/RSs). As a result, the number of personnel was reduced by half compared to distribution centers of the same size, and productivity was doubled, while accuracy of shipments attained the highest level of 99.99999%, described as “seven nines.”

**Accurate Management of Pharmaceutical Products**

Pharmaceuticals received from manufacturers are automatically inventoried and managed by lot based on bar-code information or data from automatic word recognition equipment. These systems enable both the reduction of labor inputs and increased traceability of about 30,000 pharmaceutical items. (Photo 1)

**Automated Through to Shipments**

Products to be shipped are matched and loaded into collapsible totes, and then placed on a conveyor. Next, they are temporarily stored on the Shuttle Rack mini load AS/RS for shipments. They are then retrieved in the delivery vehicle in the reverse order that they will be delivered in, to increase the efficiency of removing cases at the point of delivery. The totes for shipment are loaded automatically on roll box pallets. (Photo 2) Meanwhile, cases of various shapes and sizes are transported by an automatic palletizing robot, which then palletizes them in an optimal manner quickly onto roll box pallets. (Photo 3)

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# eFA

Industry ▶ **Smart Mobility**

Solution ▶ **Wireless Charging System**

## More than 20 Years of Experience in Wireless Power Supply Systems

Daifuku's transport and storage systems that use HID\* noncontact power supply technology are safe and dustless and are suited to cleanroom environments. Daifuku has delivered more than 10,000 such systems for production lines in the semiconductor sector where they are operating non-stop for 24 hours a day and 365 days a year, as well as in automobile production lines.

\* HID: High-efficiency inductive power distribution

## Expansion into Wireless Charging Technology

In addition to its conventional plant business, Daifuku has launched a device business that makes use of noncontact power supply technology. In February 2016, with the cooperation of Komatsu Forklift Japan Ltd., Daifuku commercialized a wireless battery charging system for electric forklifts using its new technology called the D-PAD (the first system of its kind in the world according to Daifuku's own research and is patent-pending). The system realizes a high level of transmission efficiency and

reduces damage and accidents due to contact failure of electric plugs.

(Photos 1 and 2)

Going forward, Daifuku will focus on developing technology for detecting foreign objects and workers as well as work to develop systems with improved and longer transmission capabilities to enhance the quality and functionality of its D-PAD technology, improve their cost performance, and expand applications in a wide range of industries. Efforts are also being focused on identifying new markets that will make the smart mobility society a reality.



Overhead monorail system Cleanway using HID for semiconductor factories

# AFA

Industry ▶ **Automobiles**

Solution ▶ **Introducing New Approaches for Both Equipment and Maintenance**



Overhead FDS chainless conveyor system on the assembly line of Honda de Mexico, S.A. de C.V.

The Daifuku Group has a strong record for installing systems for automobile production lines around the world, principally to Japanese and U.S. automakers. These systems include not only conveyor systems for transporting car bodies from one work process to another but also automated guided vehicles. For example, Magna T.E.A.M. Systems Inc., which manufactures SUVs on a subcontracting basis, makes use of the SmartCart automatic guided cart, one of the main products of U.S. Daifuku Group company Jervis B. Webb Company. (Photo 1)

## Applying the Internet of Things (IoT) in Manufacturing Fields

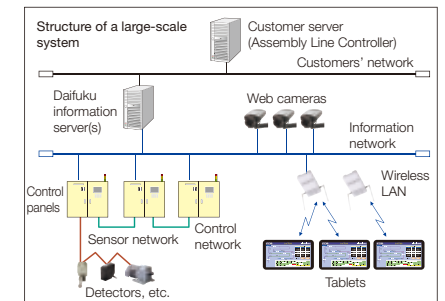
In the field of automobile production line systems, one of the key factors in determining equipment utilization rates is maintenance. As a new mode of human

machine interface (HMI), Daifuku has developed a mobile system that uses a tablet terminal (see below right). Through the use of wireless LANs, this new system provides information on the status of utilization in real time, reports abnormal displays, and monitors input/output status. Moreover, it can maintain systems through remote operations and provide information on when to replace parts with limited lifetimes and other preventive maintenance-related information.

In addition, the tablet terminal can read the QR codes located at each operating point and become a multipurpose tool that operates those points, thus making it possible to design operation control boxes located on the production line substantially smaller and simpler. Also, another strength of this tablet terminal system is that it can play a role in explosion-proof and other environments

where it is not possible to install control panels.

The system provides necessary information, such as machine design drawings, anytime, anywhere, and in portable form, thus making it possible for work in collaboration with the workplace through a computer terminal. These system capabilities enhance conditions in the workplaces of Daifuku's customers and are expected to increase the convenience of operations.



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# ATec

Industry ▶ Airports

Solution ▶ **New Concept of Mobile Inspection Technology Improves Ergonomics**



Five Group companies—BCS Group, Daifuku Logan Ltd., Elite Line Services, Inc., Jervis B. Webb, and Logan Teleflex, Inc.—exhibit jointly at Passenger Terminal EXPO 2016 (Cologne, Germany).

**The Daifuku Group has provided a new product to avoid workplace accidents at airports, realizing the integration of humans and machines with its ergonomics approach.**

### TSA's Challenge

The Transportation Security Administration (TSA), an agency of the U.S. Department of Homeland Security with authority over the security of the traveling public, deploys security officers for more than 450 commercial airports and provides 100% screening of all checked baggage for explosives. For over a decade, the TSA has experienced growing ergonomics issues from workers lifting heavy bags from and to the conveyor systems within the Checked Baggage Resolution Areas (CBRAs). This was connected to increased claims from workers who had back injuries.

### MIT Benefits

Jervis B. Webb Company developed the Mobile Inspection Table (MIT), a first of its kind, to address the issues the TSA was facing. The MIT uses Automatic Guided Cart technology, which Jervis B. Webb has been providing in other industries for more than 15 years.

The groundbreaking MIT, also known as a collaborative robot, or "cobot," offers a goods-to-person ergonomics approach within the CBRA. The traditional belt conveyors and static search tables in the CBRAs will be replaced with MITs. Bags are automatically loaded on the MIT and delivered to a security officer. This cobot technology allows the security officer to search the bag directly on top of the MIT, thereby eliminating injuries caused by lifting, twisting, or turning. **(Photo 1)**

The MIT is highly sought after because of the increased ergonomics, elimination of lifting injuries by TSA employees, flexibility, quick installation time, and direct tracking as well as adheres 100% to the latest Planning Guidelines and Design Standards for Checked Baggage Inspection Systems standards. The integration of the technology with Jervis B. Webb's baggage handling control system, WebbView, and the Sym3 software and controls package of BCS Group Limited enables mobile access based dashboard functionality, as well as consolidated data gathering. **(Photo 2)**

Detroit Metropolitan Airport and Orlando International Airport are the first airports receiving this MIT cobot technology in 2016 where Cleveland Hopkins International Airport and many more will follow. Looking ahead, the MIT will be shown at many trade shows globally to expand the MIT business.

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# LSP

Industry ▶ Automobile Service Stations

Solution ▶ **Double-Action I.B.S.\***

### Cleans Even Hard-to-Reach Places

In November 2015, Daifuku launched its FABRICA drive-through car wash machine equipped with the new double-action I.B.S. (patent pending in Japan). This is the only unit in the industry with inclined and separate side brushes. By designing the side brushes with an incline, the machine can clean the underside of the rear spoiler, which conventional brushes had difficulty in reaching, when washing the rear of the vehicle. **(Photo 1)** In addition, FABRICA is equipped with brushes that can operate separately at differing heights on the right

and left according to different vehicle heights, enabling it to wash a wide range of vehicles.

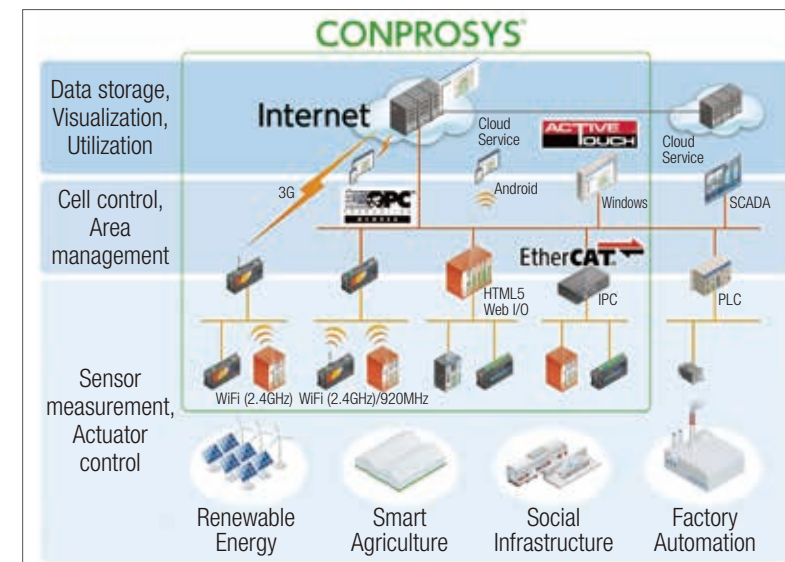
FABRICA has a number of additional options, including functions for adjusting the volume of water for cleaning the underside of the vehicle and a roll jet wheel washing function using high-pressure water

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ejection. For customers who have demanding car wash requirements, FABRICA is a high-value-added washing machine. As FABRICA is expected to win a high evaluation in the market, Daifuku is working to expand sales.

\* I.B.S.: Incline touch brushing system



### Responding to the Rapid Expansion in the M2M/IoT Market

Daifuku subsidiary Contec Co., Ltd., has developed its CONPROSYS device cloud service to provide M2M/IoT solutions, and global marketing of this service began in May 2015. This service is a combination of intelligent IoT devices with various telecommunication functions incorporated into firmware, M2M controllers that can connect in a wide range of combinations with various control equipment, and cloud services and software for data collection. Contec is expanding sales of this system

to a wide range of fields as a package for remote monitoring for use, first, in factory automation (FA) applications, and then for social infrastructure, renewable energy, and agricultural IT applications.

During fiscal 2015, Contec developed 26 products in the CONPROSYS series and plans to develop 24 more products in fiscal 2016, with the aim to achieve 50 products in total. CONPROSYS draws on Contec's strengths developed for more than 30 years as a leader in the PC-based electronic measuring and FA control markets, as it has offered remote

# Contec

Industry ▶ M2M/IoT\*

Solution ▶ **Simple, Convenient, Easy-to-Use Device Cloud Service**

monitoring packages for photovoltaic facilities and social infrastructure.

The Daifuku Group is pursuing the development of simple, convenient, and easy-to-use products and services for the M2M/IoT market, which is expanding in terms of applications and industries, and is actively working to increase the value added of its product and service offerings.

\* M2M: Machine to Machine, IoT: Internet of Things



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