MITSUI FUDOSAN

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For immediate release

Mitsui Fudosan Co., Ltd.

Newly Developed Business-area Cleaning Robot Officially Introduced Into Tokyo Midtown Hibiya

Tokyo, Japan, April 13, 2018 - Mitsui Fudosan Co., Ltd., a leading global real estate company headquartered in Tokyo, announced today that it has jointly developed with Panasonic Corporation a new business-area cleaning robot aimed at increasing efficiency in building management. While keeping the total cost for building management operations at the existing level, the introduction of this robot will increase the efficiency of these operations and drastically reduce the personnel costs for cleaning. Mitsui Fudosan has officially introduced this new business-area cleaning robot for office-floor cleaning operations at Tokyo Midtown Hibiya, which was completed in February this year.

The newly developed business-area cleaning robot

Tokyo Midtown Hibiya

Japan currently faces a rapidly aging society with fewer children coupled with personnel shortages, and these problems also present significant issues in the field of building management. To provide attentive and high-quality services, Mitsui Fudosan has been pursuing three-pronged management through a core structure that includes Mitsui Fudosan Building Management Co., Ltd. and Mitsui Fudosan Facilities Co., Ltd. We have made improvements aiming at creating many productive and comfortable work environments for operations staff, such as unifying the uniforms of the three companies and improving the environments of the work areas and rest areas.

Furthermore, Mitsui Fudosan had started to improve the cleaning operations, which involved a large amount of human labor in building management.

Mitsui Fudosan had introduced a business-area cleaning robot on a trial basis in some of the buildings to improve cleaning operations, but had not been able to achieve satisfactory levels of quality and efficiency for the cleaning operations. Therefore, Mitsui Fudosan decided to develop a business-area cleaning robot with a functionality in terms of quality and business performance that exceeded that of human cleaning operations.

In the development of the robot, Mitsui Fudosan worked together with Panasonic, which has a proven track record in home-use robot devices and suchlike. For about two years of trial and error, the companies worked to fuse Mitsui Fudosan Facilities' expertise*1 in cleaning operations and Panasonic's home-use cleaning robot technology (accumulated through the of RULO, etc.). To improve the practical aspects of the robot, the companies repeatedly conducted field tests in office buildings where work was being carried out. As a result, the joint efforts improved the practical aspects of the robots in these environments.

*1. Cleaning operationss undertaken by Mitsui Fudosan Facilities: 358 buildings, about 129,166,925 ft^2 (12,000,000 m^2)

Currently, the aim of introducing robots to clean buildings is not to achieve completely automated cleaning together with the associated costs, but to carry out cleaning efficiently by means of having humans and robots work cooperatively together and share the cleaning work, with humans and robots each doing the work that they are good at. To achieve this, the following three points were emphasized.

●**Point 1: Safety and security**

The robots are equipped with many safety technologies. In addition to the voice guidance active during cleaning, safety mechanisms include a warning light that alerts people nearby, an automatic stop activated when the sensor detects an obstacle, etc., an automatic stop activated when there is any contact, a drive recorder that records the surrounding circumstances during the robot's operation, and a function that immediately sends an alert to employees' smartphones, etc. when there is an emergency stop. We have developed these safety technologies to enable human beings and robots to safely carry out cleaning operations together.

●**Point 2: Automated cleaning function for floors up to the walls by a high-precision sensing and control**

The most important technological point in the development of the business-area cleaning robot is the driving control derived from finely detailed sensing and control that enables cleaning to be automatically carried out up to the very edge of the wall. For a robot, it is difficult to move straight forward on a reverse-piled carpet, and it requires advanced driving control technology to stop just short of a wall without coming into contact with the wall and damaging it, yet cleaning up to the very edge of the wall. The companies have achieved meeting these requirements to a high level with the new business-area cleaning robot.

●**Point 3: A total cost that makes it realistic to introduce the robot**

To minimize the increase in cost, we have achieved the necessary cleaning functionality by using high-technology capabilities, without using high-performance parts. As a result, the robot can be introduced at a low cost compared with that of an existing business-area cleaning robot. Furthermore, by introducing a robot that is compact, easy-to-carry, easy-to-maintain, and easy-to-operate, the number of cleaning workers that need to be involved in cleaning common-use corridors can be reduced to about half, thereby enabling the total cost of cleaning operations to be kept to the existing level, and making the introduction of the robots realistic.

Mitsui Fudosan plans to introduce these cleaning robots sequentially to the office buildings and suchlike that it completes from now on. At the beginning of April, Mitsui Fudosan also introduced cleaning robots at the DiverCity Tokyo Plaza shopping center, and has been moving ahead with the implementation of labor-saving facility management work operations by using ICT, even at retail facilities.

Looking ahead, Mitsui Fudosan will continue to make use of robots and ICT, aiming to create an even easier-to-work environment.

Mitsui Fudosan uses the statement BEYOND THE OFFICE for its building business. Mitsui Offices will continue to provide distinctive office buildings that go beyond conventional concepts to generate new added value for customers, providing a place for new lifestyles catering to a variety of working and non-working times rather than simply being places to fulfill a job.

BEYOND THE OFFICE

MITSUI FUDOSAN

＜Attached materials＞

■Outline of introduction of cleaning robot (Tokyo Midtown Hibiya)

Date of introduction	February 1, 2018 (scheduled to start actual operations from May)
Robot cleaning area	Corridors and elevator hallways of standard office floors: approx. 69,965.42ft^2 (approx. 6,500 m^2)
Number of robots introduced	6 robots

■Basic spec of cleaning robot

Dimensions (WxDxH)	23 inches x 25 inches x 28 inches (590 mm x 650mm x 730 mm) (With handle folded up, and including remote control holder)
Weight	60 lbs (27 kg) (including battery)
Dust capacity	(Dust box) 1 L (Paper dust bag) 5 L
Product features	・Automated cleaning function for floors up to the walls ・Operational status notification function (cleaning completed, emergency stop, etc.) ・Simple operation by using tablet (selection of cleaning areas, setting of prohibited-to-enter areas, etc.) ・Various safety mechanisms (bumper sensor, laser sensor, warning light, voice guidance, drive recorder, etc.)