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PRESS RELEASE

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Full-Scale Deployment of Robots with General-Purpose Autonomy Software on Construction Sites

Physical AI improves productivity in construction management

Kajima (President: Masafumi Kiryu) has begun full-scale deployment on its construction sites of autonomous robots (the “Robot”) that use autonomy software based on physical AI developed by FieldAI (CEO: Ali Agha; headquartered in California, USA). The Robot consists of an autonomy unit implementing this technology, mounted on any robot. The autonomy unit is made up of cameras, LiDAR*1, and an edge AI*2 device, and gives any robot the equivalent of human “eyes” and a “brain.” By taking over some of the routine tasks in construction management, such as site rounds, visual documentation, and 3D scanning, the Robot creates an environment in which engineers can focus more on advanced technical judgment and safety management.

Kajima has been collaborating with FieldAI since 2023, before physical AI attracted broad attention, refining the technology through operation on real job sites. To date, the Robot has completed over 2,000 autonomous missions across a range of robot types, tasks, and sites. The defining feature of this initiative is that it goes beyond demonstrations under limited conditions: the Robot is in continuous use on active construction sites where conditions change daily.

An enterprise-level service agreement reached in 2025 moved the collaboration from individual projects to full-scale deployment. In roughly a year since signing, Kajima has deployed the Robot at more than 10 construction sites in Japan, and deployment continues to expand to new sites and applications under the agreement. Drawing on the knowledge accumulated across a wide range of operating conditions, Kajima will pursue a new approach to construction management in which physical AI robots support routine tasks.

*1 LiDAR: Technology that emits laser light and measures distance and shape from the reflected light.
*2 Edge AI: Technology in which AI processes data and makes decisions on the device itself rather than in the cloud.



An autonomous robot

Background to Development and Deployment

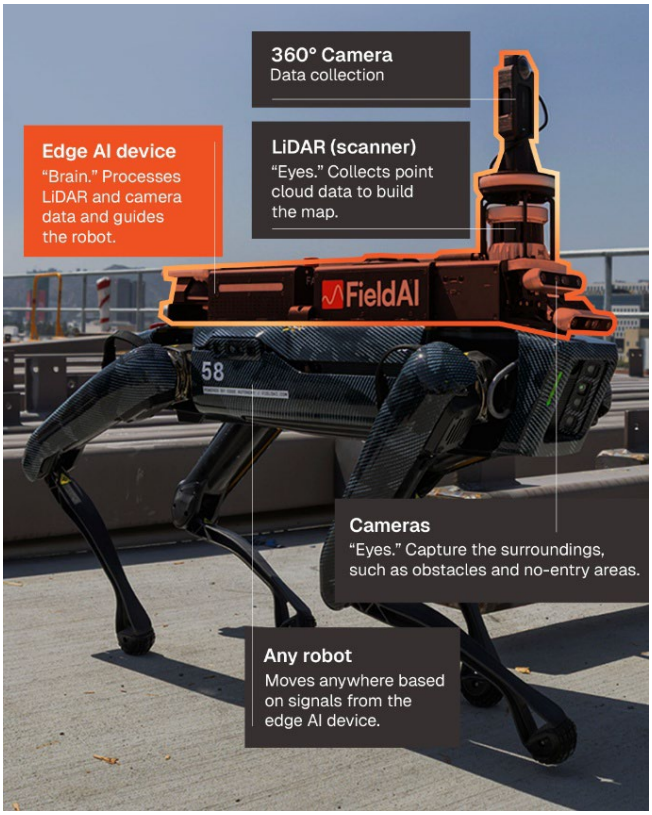
Kajima is developing a range of technologies to address the shortage of workers in the construction industry and to realize workstyle reform. Construction management on a job site spans a wide range of work, from routine tasks such as confirming work procedures and progress through site rounds, visual documentation, and 3D scanning, to the technical judgment required for safety, quality, and schedule management. There is therefore a need to reduce the burden on engineers while both ensuring safety and improving productivity.

At the same time, every construction site is a one-off production built in place: the working environment differs greatly from site to site, and as work progresses, the shape of the structure and the placement of materials and equipment change daily.

In response, Kajima, in collaboration with FieldAI, is introducing a new site management method using autonomous robots that adapt to changing site environments and carry out some tasks in place of engineers.

Overview of the Robot

The Robot mounts an autonomy unit, consisting of cameras, LiDAR, and an edge AI device, on any robot, giving it the equivalent of human “eyes” and a “brain” and thereby achieving autonomous mobility within the site with no human intervention. The edge AI device (the “brain”) instantly processes the imagery and point cloud data of the surrounding environment captured by the cameras and LiDAR (the “eyes”) and determines in real time which direction is safe to travel. This enables autonomous operation even indoors, in underground spaces where GNSS*3 is unavailable, and in environments where external communication is difficult.



Autonomy unit

This “brain” is FieldAI’s core technology, its physical AI model “FFM” (Field Foundation Models™). By combining data-driven learning with physics-based reasoning and uncertainty quantification, it can handle situations it has not previously learned and environments that change daily, and continue operating safely.

Unlike conventional robot control technology, which requires systems to be customized for specific sites, it functions as a general-purpose “brain” applicable to a wide variety of robots and tasks.

On first startup, the Robot autonomously explores an unknown area and generates a three-dimensional map of it. From then on, it makes its rounds autonomously while avoiding obstacles, automatically taking photographs and point cloud measurements while updating the map in response to changes on site. When work is complete, it returns to its charging station and uploads the collected data. The data is organized and consolidated automatically and can be viewed and used on the web at any time. In addition, when a user specifies any location from a tablet or PC, the Robot travels there autonomously, and video from that location can be viewed in real time.

*3 GNSS: A system that uses satellites to determine current position on the ground.

Use Cases for the Robot

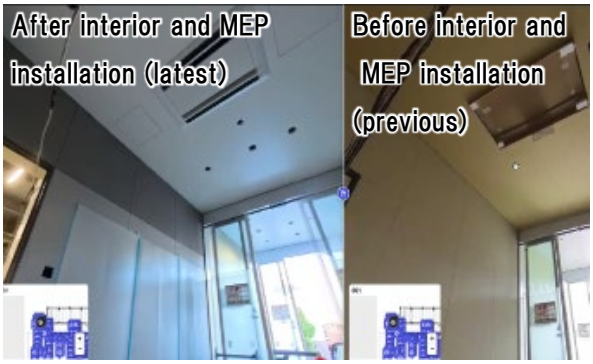
Because the same software handles different tasks, the Robot is used across a range of use cases, with additional applications planned:

■ Autonomous security patrols

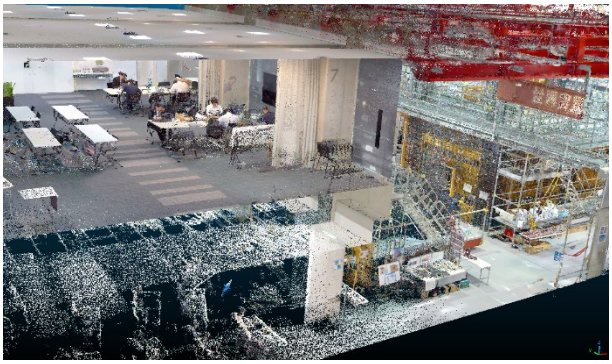
The Robot autonomously patrols the site at any time, including on non-working days, late at night, or early in the morning, supplementing security operations. When it detects an anomaly, it issues an alert using flashing high-intensity LEDs and audio, and the person in charge can view the captured video in real time. This supports early detection of anomalies and a rapid initial response.

■ Digitizing the entire site

While autonomously making its rounds of the entire site, the Robot takes photographs and point cloud measurements. Because construction status and dimensions can be determined from this data, this streamlines construction progress management.



Construction progress checks using automatically captured 360° photos



Captured high-resolution color point cloud data

■ Disaster recovery sites

At disaster recovery and other emergency sites following earthquakes, heavy rain, and other events, a rapid initial response is required even before site safety has been confirmed. Deploying the Robot in place of people to safely obtain photos, point cloud data, and real-time video from within the site speeds up the initial response.



Exploration and point cloud measurement in a culvert that is difficult to inspect



Captured high-resolution color point cloud data

Future Plans

Kajima will continue to roll out the Robot progressively to its job sites. By having robots take on some routine tasks such as site rounds, visual documentation, and 3D scanning, Kajima will create an environment in which engineers can focus more on advanced technical judgment and safety management. Kajima will also apply this autonomy software to other technologies it is developing, advancing further autonomy in machinery and aiming to realize safe, highly productive construction sites where people and machines work together.

(Reference)

About FieldAI

FieldAI is a U.S. company that develops autonomy software that works across many types of robots and vehicles. It was founded in 2023 by engineers and researchers with experience at NASA/JPL, DeepMind, Tesla, NVIDIA, and Amazon, led by CEO Ali Agha. The team that preceded the company has a track record that includes winning an autonomous mobility competition hosted by DARPA (the U.S. Department of Defense’s agency for military technology research and development).