LANDLOG Platform

Platform for Connected Construction Sites

LANDLOG open platform connects land, equipment and materials for innovative construction

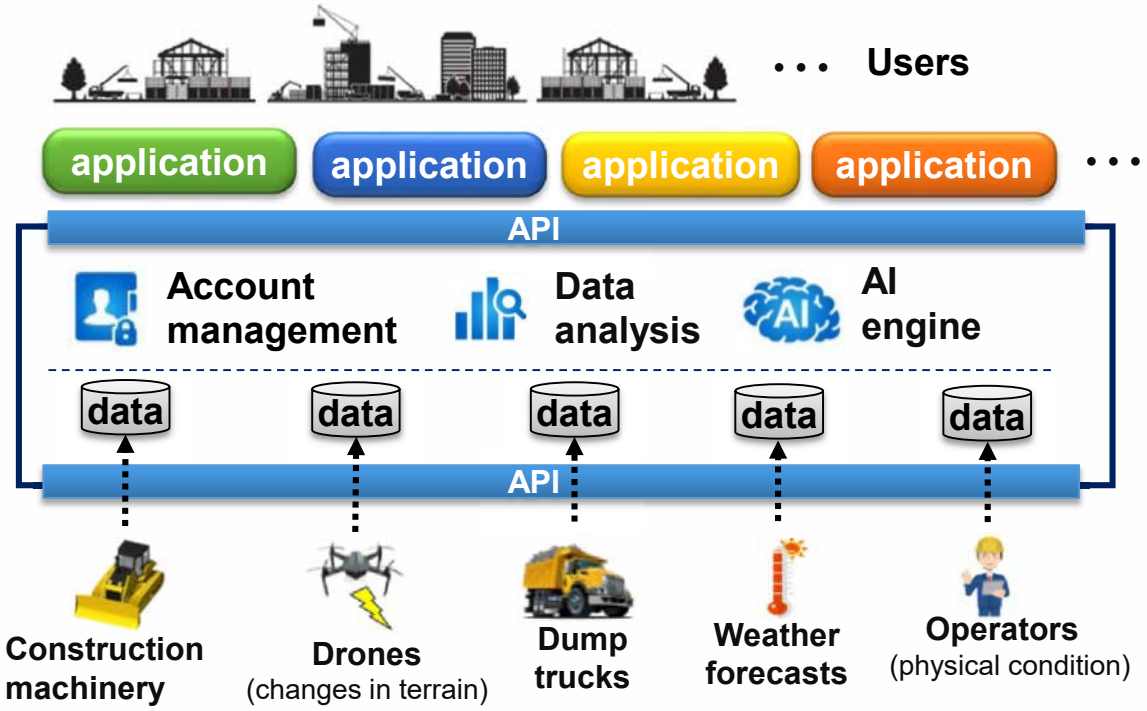
NTT docomo

LANDLOG

Joint development and operation of LANDLOG platform to connect all construction processes

KOMATSU SAP OPTiM® NTT docomo

Overview

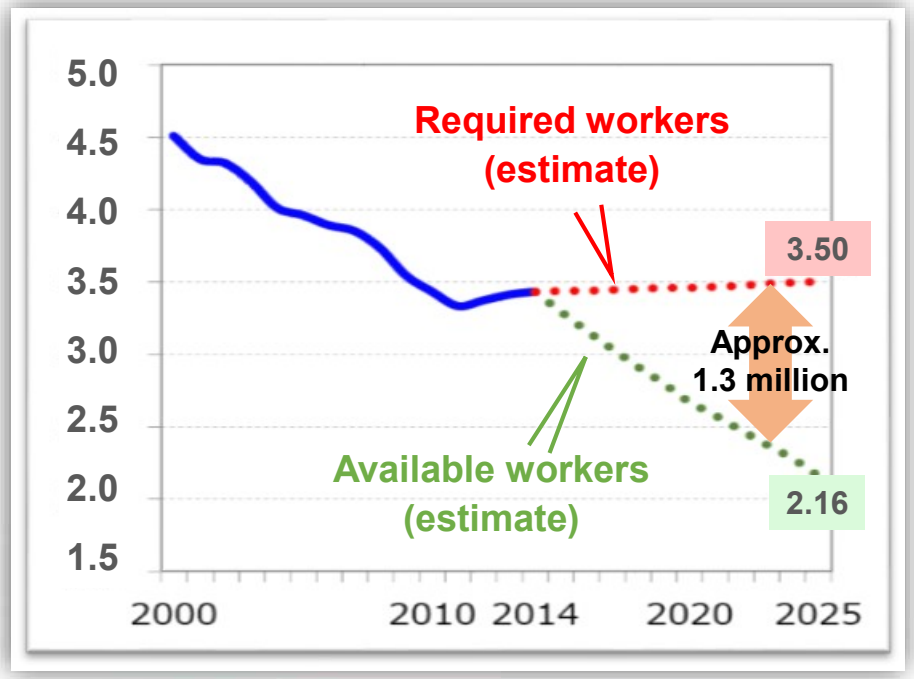


LANDLOG is an open IoT platform that collects and processes data from all relevant construction processes, including land surveys, measurements, design, operations and maintenance. The processed data is provided to users in an easy-to-understand format.

Construction Industry Issues in Japan

(#1)

Unit: million workers



Declining availability of skilled construction workers

Japan's labor shortage is becoming a serious problem, with 40% of skilled workers expected to retire by 2025. Increased productivity is essential to solve this problem.

References:
"Labor Force Survey," Ministry of Internal Affairs and Communications.
"Toward renovation and evolution — long-term vision for construction industry," Japan Federation of Construction Contractors.

Construction Industry Issues in Japan

(#2)

Construction companies, by sales volume

Annual sales (million yen)	Industry breakdown		Average		Combined annual sales (trillion yen)
	Number of companies	Percentage of total	Annual sales (million yen)	Number of employees	
Above 6,000	2,204	0.5%	30,560	502	67.3
3,100 to 6,000	2,317	0.5%	4,156	92	9.6
1,300 to 3,099	8,029	1.8%	1,818	45	14.6
700 to 1,299	14,980	3.3%	832	24	12.5
130 to 699	104,761	23.3%	255	10	26.8
Below 130	318,292	70.6%	43	3	13.8
TOTAL	450,853	100%	37,664	676	145

More than 90% of all construction companies are small or midsized. Regardless of location (rural or urban) or size, all companies need to improve their productivity.

New Construction Machinery

Advanced construction machinery from KOMATSU is helping construction companies to overcome challenges.

Intelligent machine control system

ICT equipment is automatically controlled using 3D design drawings.

Performance accuracy is within ±30mm.

ICT equipment for automatic control of construction machinery was introduced in the Japanese, North American, European and Australian markets in 2013.

Issues Identified After Adoption of Standalone ICT Machinery (#1)

Bottlenecks in pre-process stages due to use of conventional machinery

Subgrade construction for motorway

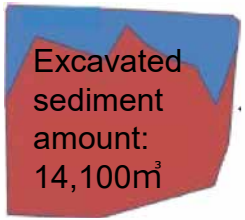
	Digging	Hauling	Filling	Compacting	Sloping	
						・・・
	Conventional Equipment	Dump Trucks	ICT Equipment	Vibrating Rollers	Conventional Equipment	
Amount of sediment handled per day	Conventional Construction	576㎥	412㎥	550㎥		
	ICT Equipment	576㎥	412㎥	825㎥		

Amount of sediment used per day was 412㎥,
so the benefits of ICT construction were not fully realized.

Issues Identified After Adoption of Standalone ICT Machinery (#2)

Inaccurate estimates of required sediment hampered precision construction planning.

Conventional surveying



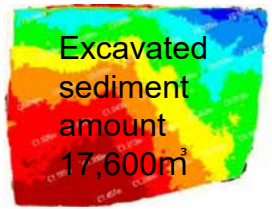
Thousands of terrain points are measured in a week

Difference in estimates:

3,500m³

= 600 10-ton dump trucks

Surveying by drone



Millions of terrain points are measured in 15 minutes

Issues Identified After Adoption of Standalone ICT Machinery (#3)

Drone surveys provided useful 3D visualization of the terrain before and after construction. Nevertheless, the overall process was still inadequate because total construction, including places constructed with non-ICT equipment and workers, as well as material stocks, etc., needed to be visualized in 3D **on a daily basis.**

Issues Identified After Adoption of Standalone ICT Machinery (#4)

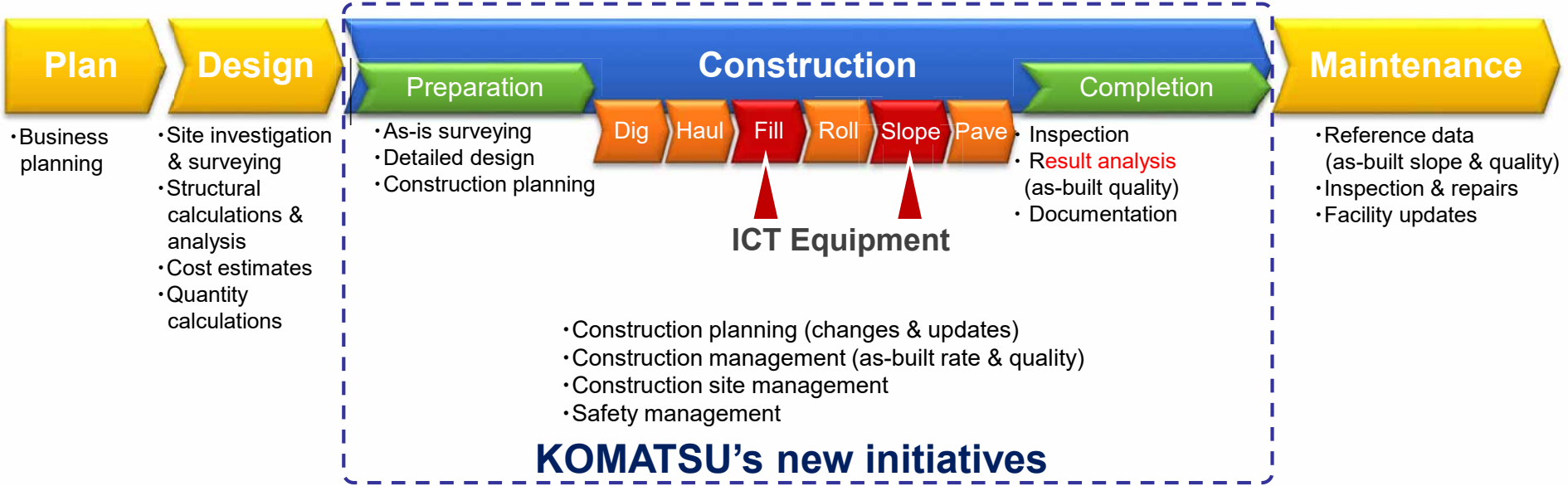
How could construction progress be visualized across an entire site?

In order to visualize the current state of a site that changes day by day,
is it possible to make a 3D survey of an entire site on a daily basis?

Newly Identified Key Initiatives

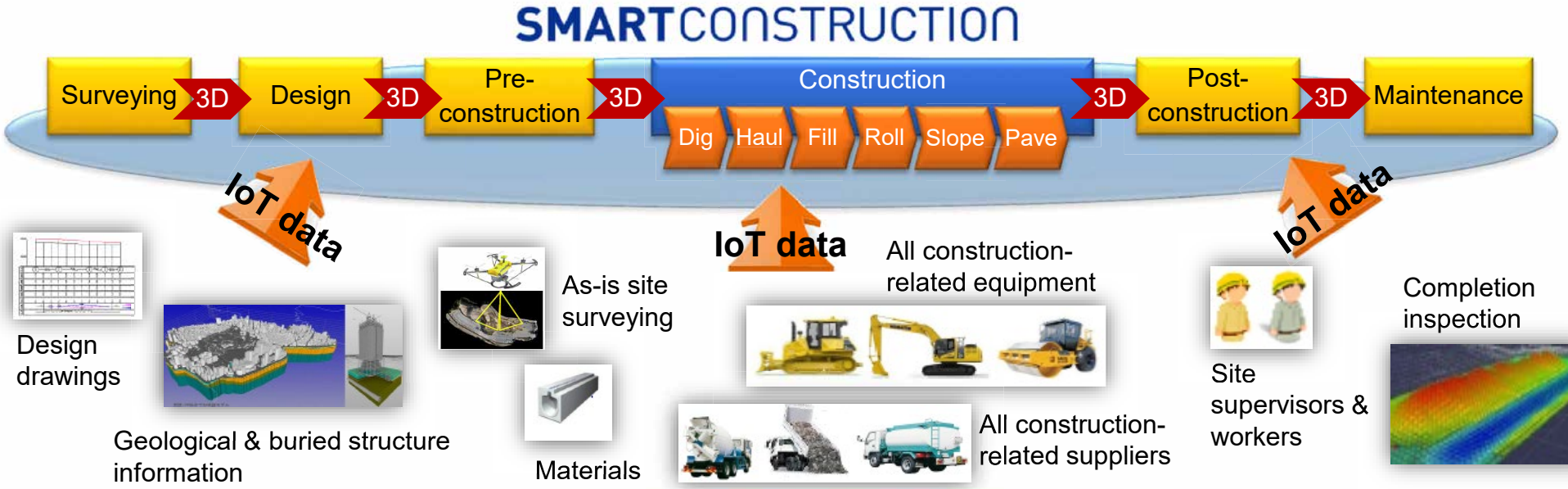
ICT equipment is only part of the entire construction process.

ICT equipment cannot significantly raise overall construction productivity.



KOMATSU Smart Construction

Visualization of site operations by connecting entire construction processes with 3D data



Daily Monitoring with Drones

Drones are used to visualize daily changes in terrain of whole site

Explorer 1

Easy-to-use drone

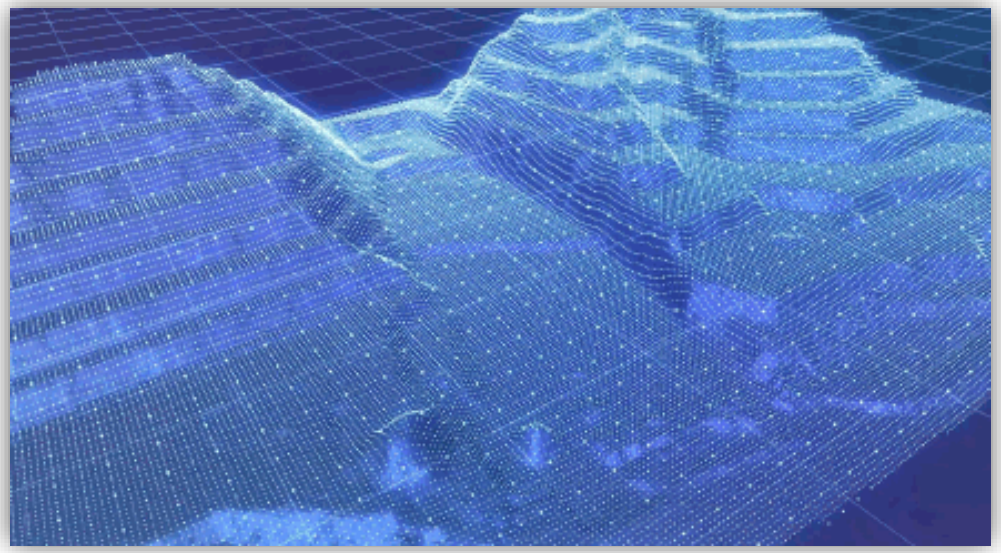
Edge 1

High-performance 3D processor for use at construction sites

Tripod enables easy use even outdoors

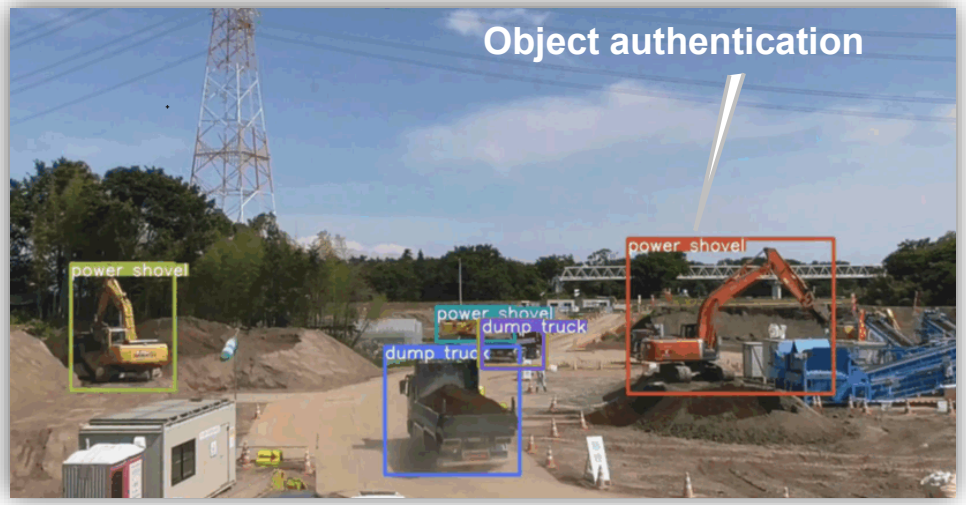
3D Site Data

**Creation of 3D site data, including drone flight,
takes only approximately 30 minutes to complete.**



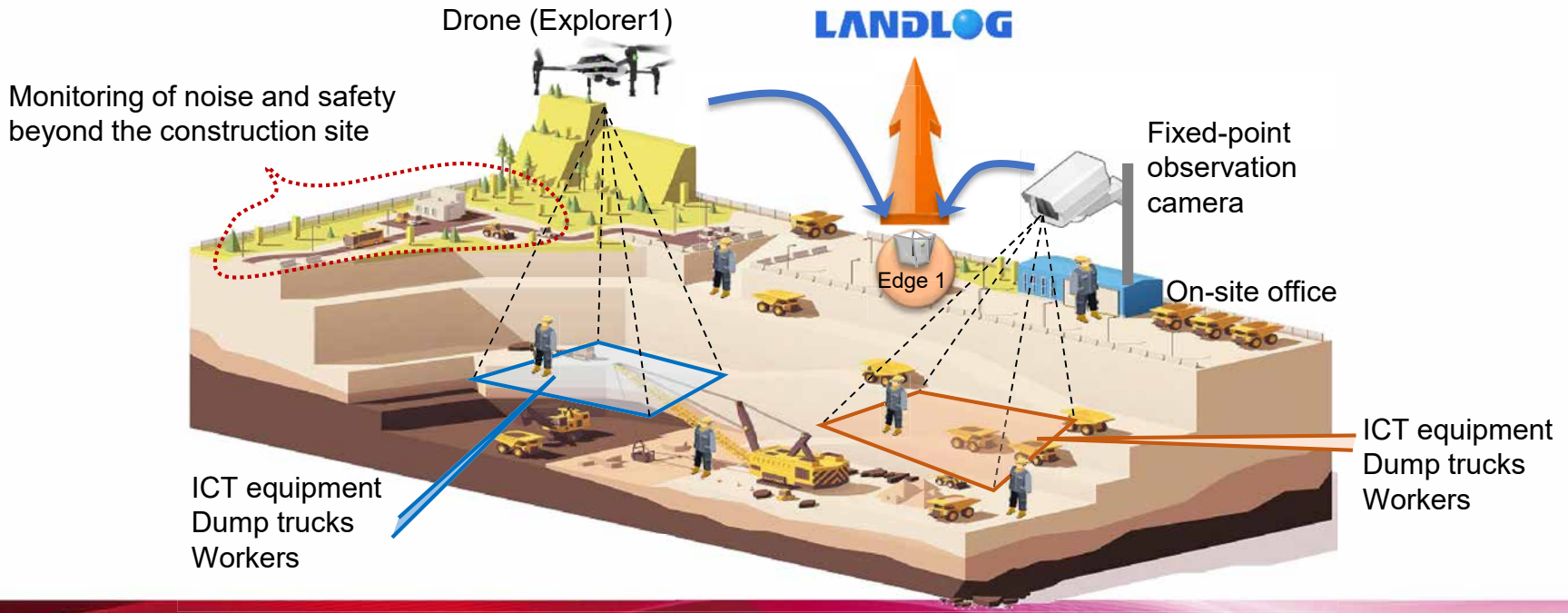
Daily Monitoring with Camera (AI analysis of data)

Construction site data is developed through AI analysis of equipment, vehicle and worker movements captured with on-site camera video.



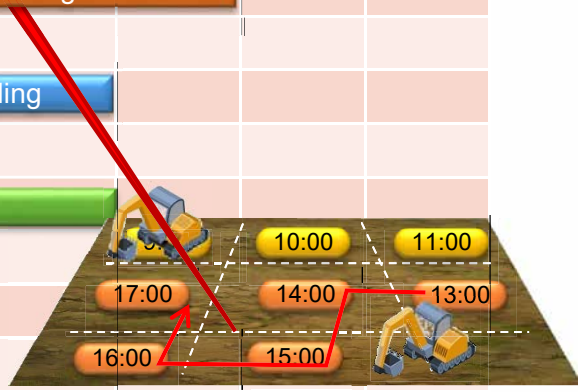
Overall Concept

Construction site data includes not only data from KOMATSU equipment.

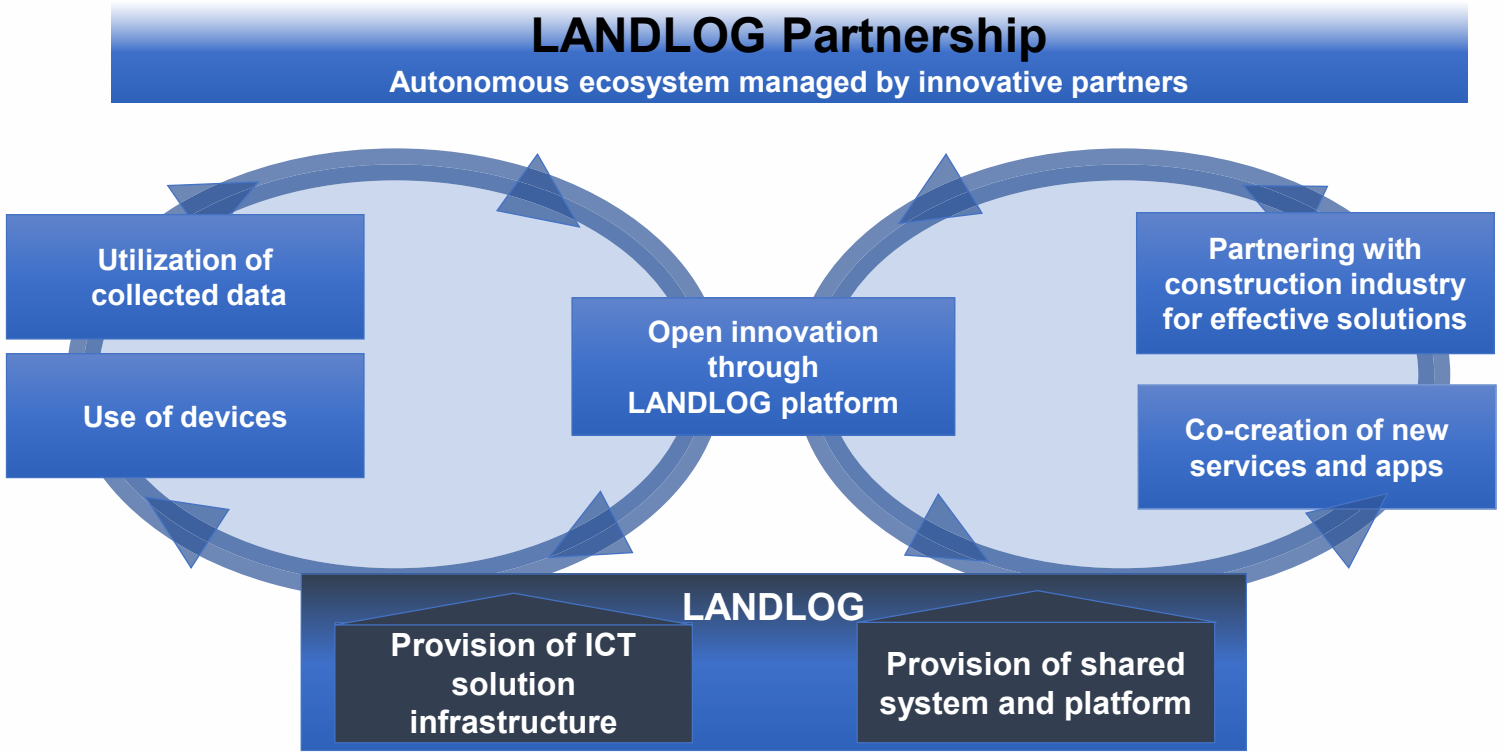


Construction Site Management

Operation Status on Mm/dd/yyyy		8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Hydraulic excavator A	ICT	Slope forming							Slope forming			
Hydraulic excavator B	ICT	Ditch-digging				Loading						
Hydraulic excavator C				Slope forming					Digging & Loading			
Bulldozer A	ICT	Digging & Dozing				Grading						
Wheel loader A									Loading			
Vibrating roller A	ICT								Compaction			
Crawler dump truck A				Loading & Hauling								
Dump truck A									Loading & Hauling			
Dump truck B										Loading & Hauling		
Dump truck C						Offsite hauling			Loading & Hauling			
Worker A		Materials transfer							Inspection survey			
Worker B				Grading assistance						Grading assistance		



LANDLOG Partnership

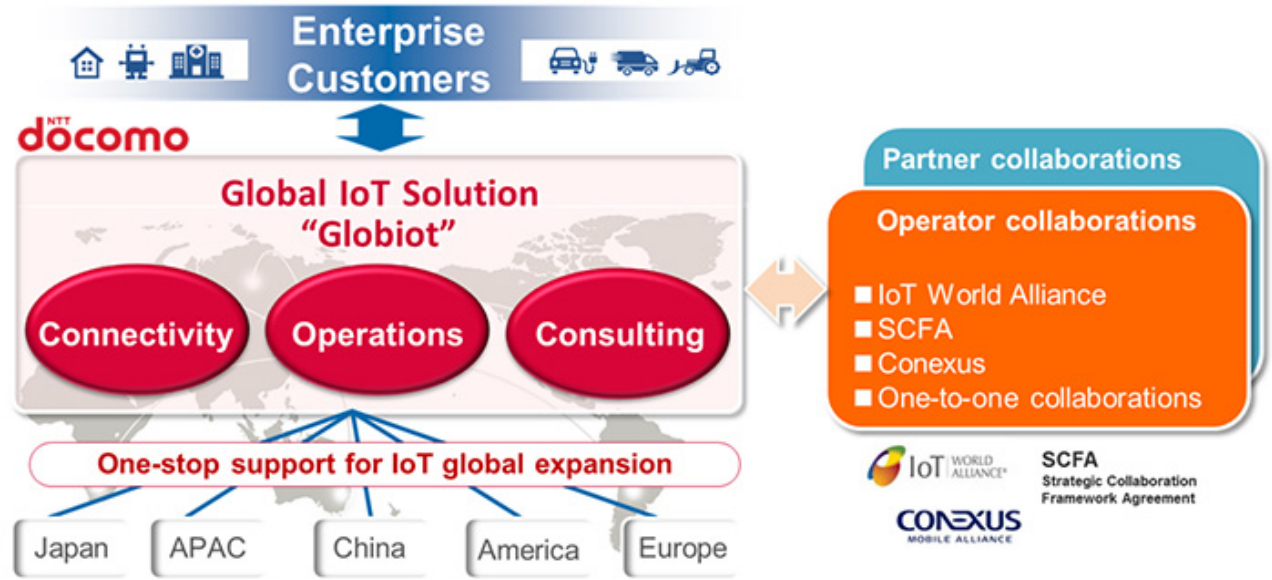


Working Group: Visualizing operations of site workers

Workstyle reforms based on synergistic combination of assets

Global IoT Solution “Globiot”

DOCOMO and Skycatch used LANDLOG to test the data connectivity of EdgeBox for use with the EverydayDrone service available overseas.

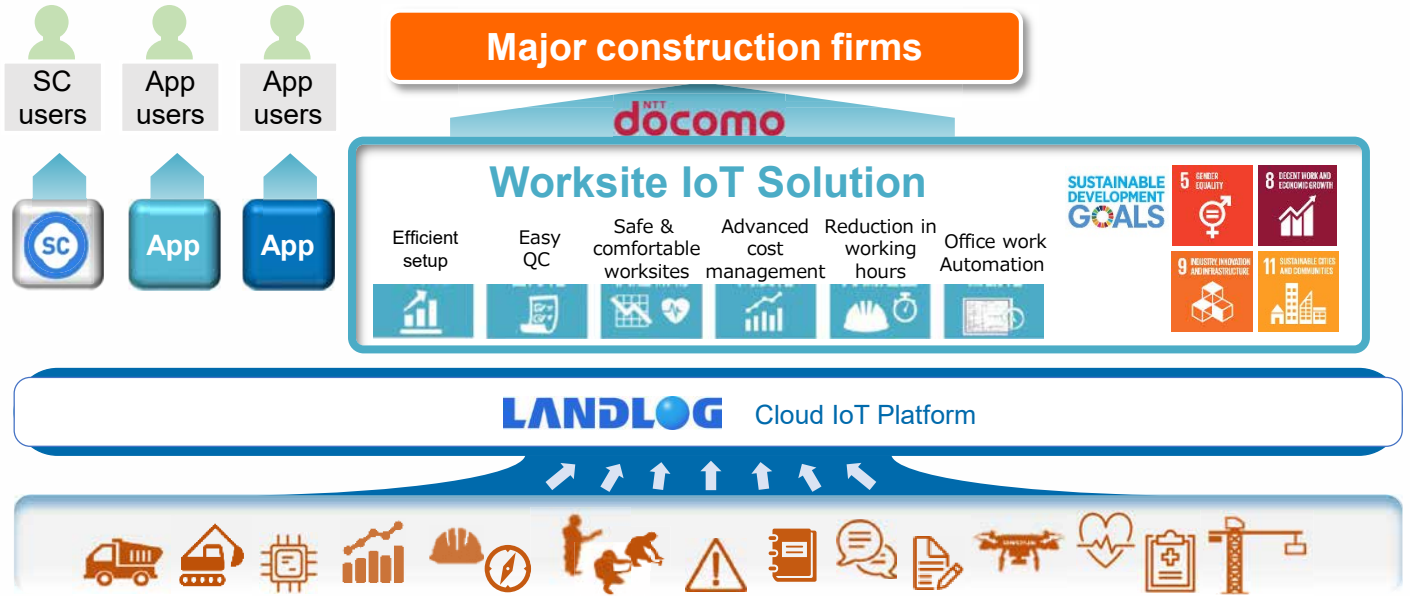


Applications Available with LANDLOG

(#1)

DOCOMO “Construction IoT Solution”

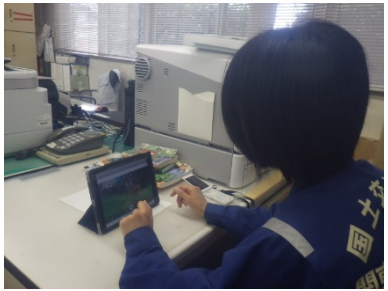
Improving productivity and workstyles in the workplace



Applications Available with LANDLOG

(#2)

Atos “Generation-Eye”
Remote operation support solution

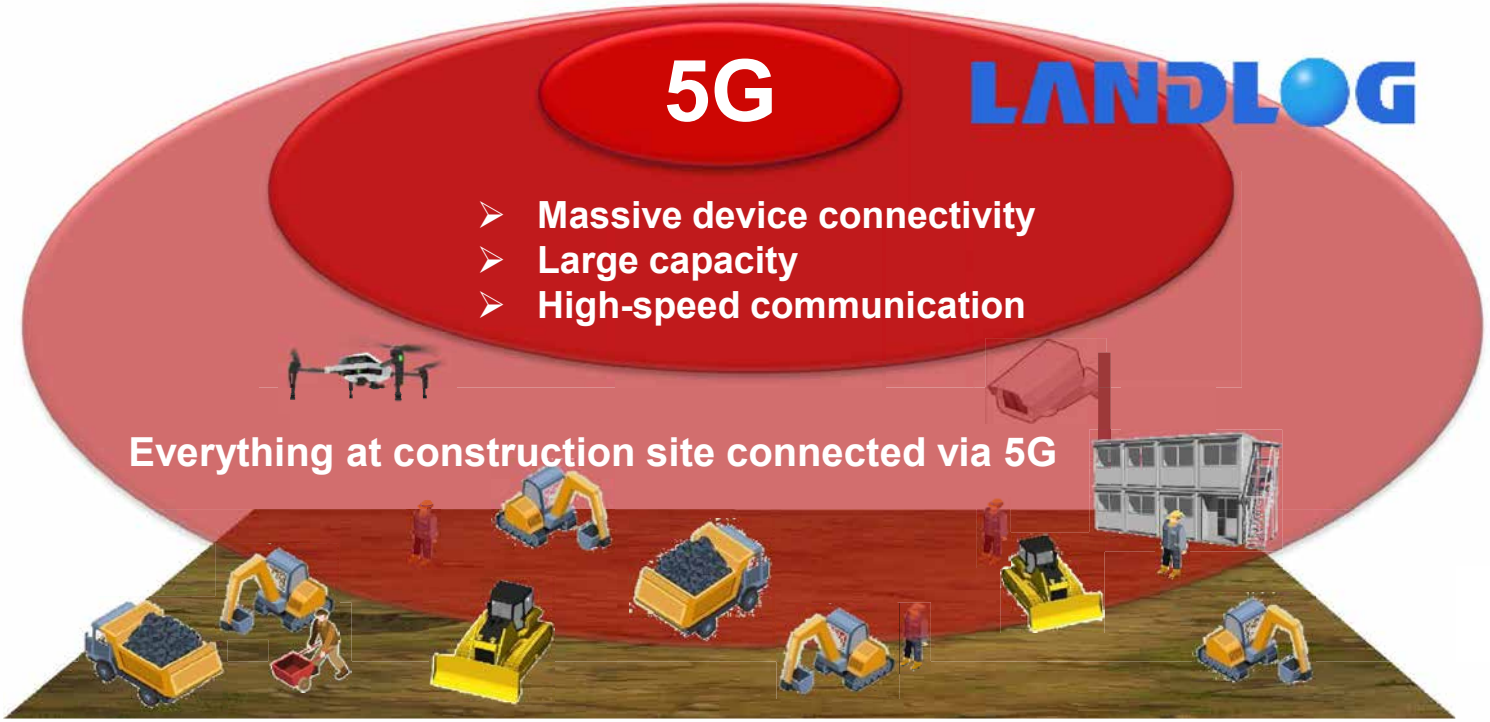


- Construction companies develop the apps
- Economical, because all items are available for rent
- Improves productivity and facilitates creativity

Features of Generation-Eye

- Smooth image transmission
- VoIP voice calls
- Guidance with pointer icon
- Sharing documents and websites
- Support for certain wearable devices
- Internet connection (serverless availability)

LANDLOG in the 5G Era

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docomo
5G