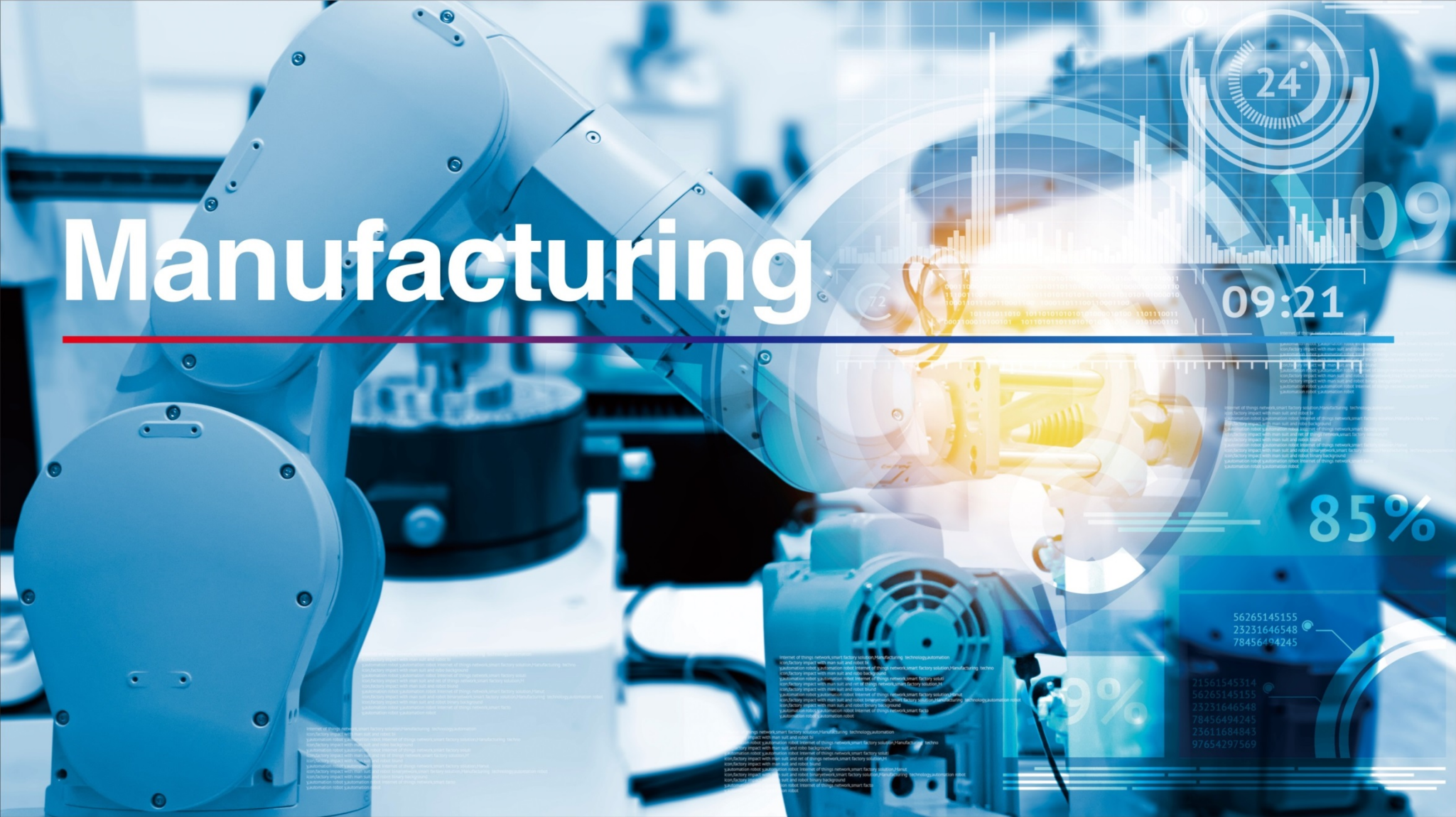

Manufacturing
24
09:21
85%
56265145155
23231646548
78456494245

LANDLOG

Platform for Connected Construction Sites

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

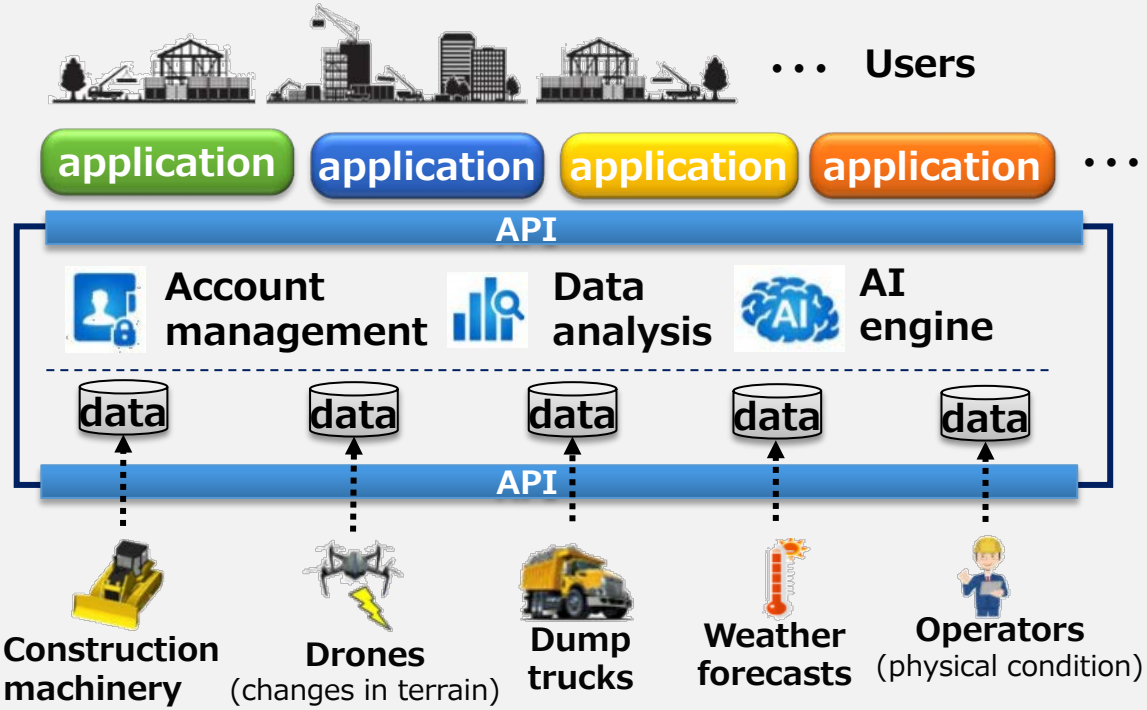
NTT docomo

LANDLOG

Joint development and operation of LANDLOG platform that connects all construction processes

KOMATSU SAP OPTiM NTT docomo

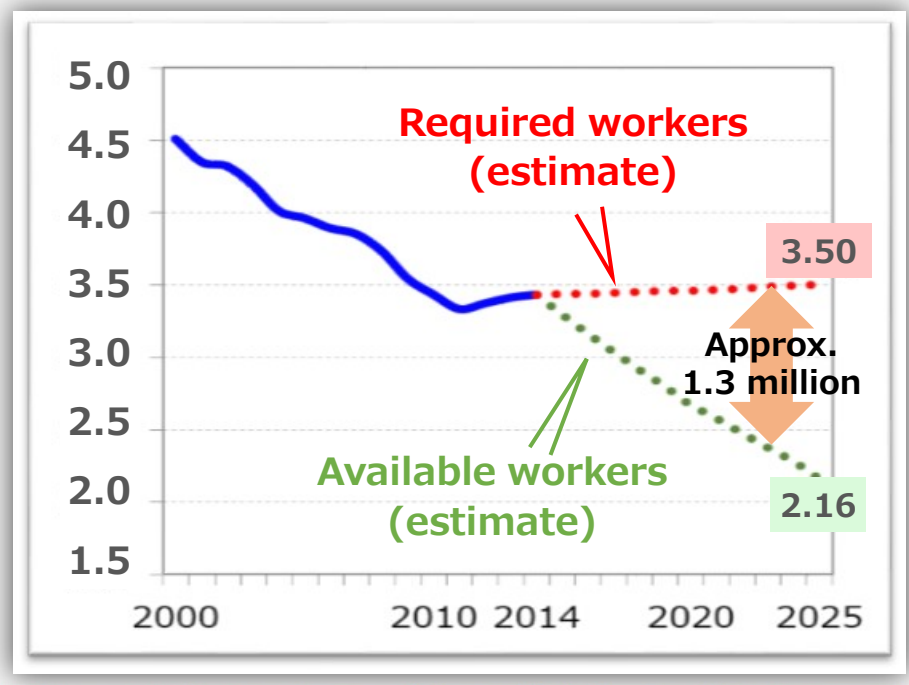
Overview



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 3,000	8,029	1.8%	1,818	45	14.6
700 to 1,200	14,980	3.3%	832	24	12.5
130 to 600	104,761	23.3%	255	10	26.8
Below 120	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 into the Japanese, North American, European and Australian markets in 2013.

Challenges after Market Launch

(#1)

Bottlenecks in pre-processes

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		Digging	Hauling	Filling
	Conventional Construction	576㎥	412㎥	550㎥
	ICT Equipment	576㎥	412㎥	825㎥

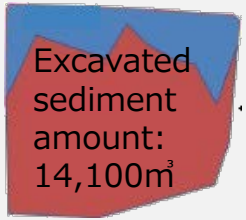
Amount of sediment used per day was 412㎥,
so the benefits of ICT construction were not fully realized.

Challenges after Market Launch

(#2)

Inaccurate estimates of required sediment hampered precision construction planning.

Conventional surveying



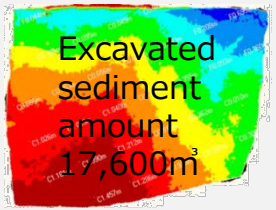
Thousands of terrain points are measured in a week.

Difference in estimates:

3,500m³

= 600 10-ton dump trucks

Surveying by drone



Millions of terrain points are measured in 15 minutes.

Challenges after Market Launch

(#3)

Drone surveys provided 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 stocks, etc., needed to be visualized in 3D **on a daily basis.**

Challenges after Market Launch

(#4)

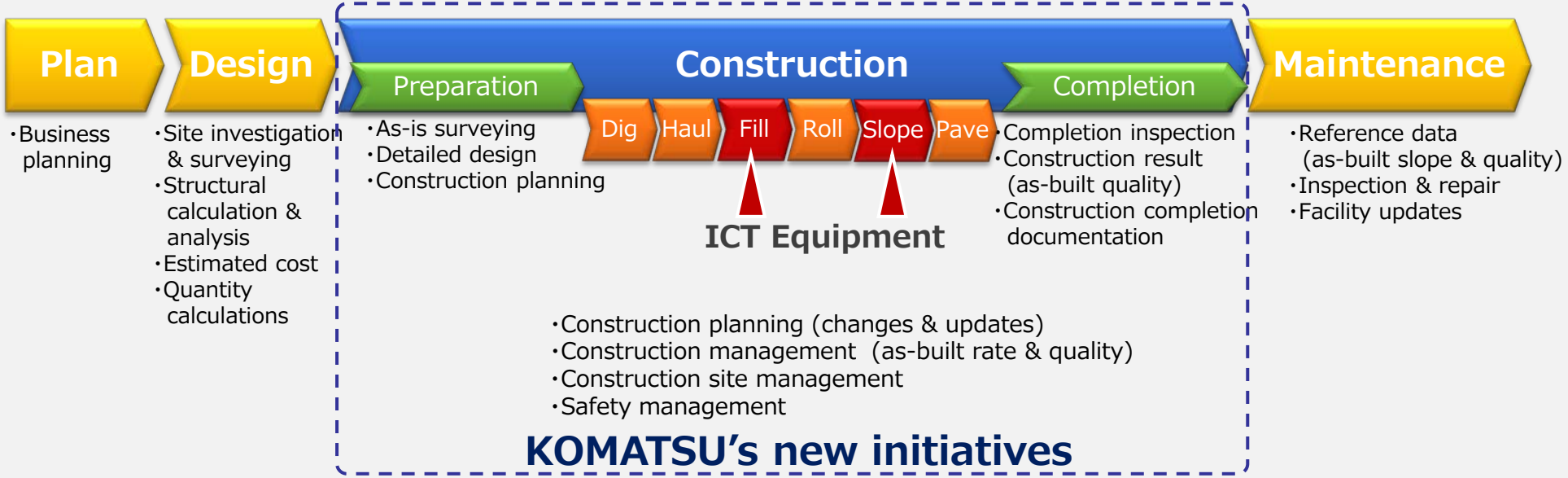
How could construction progress be visualized across an entire site?

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

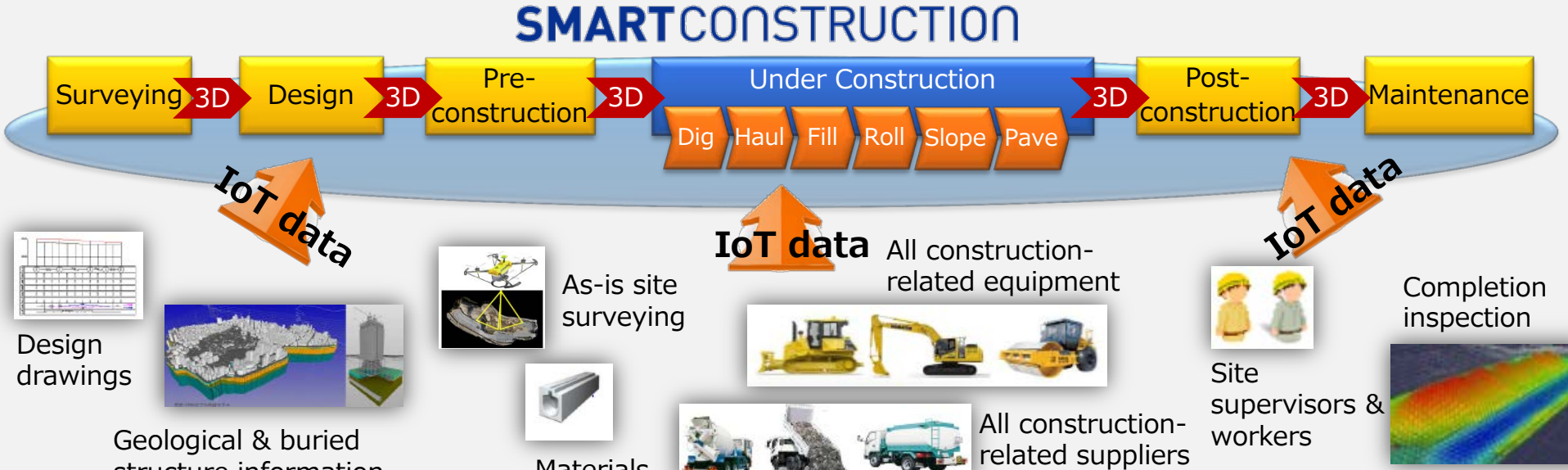
ICT equipment is only part of the entire construction process.

ICT equipment cannot significantly raise overall construction productivity.



KOMATSU Smart Construction

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



Daily Drones

Drones are used to visualize terrain changes of whole site daily

Explorer 1

Easy-to-use drone

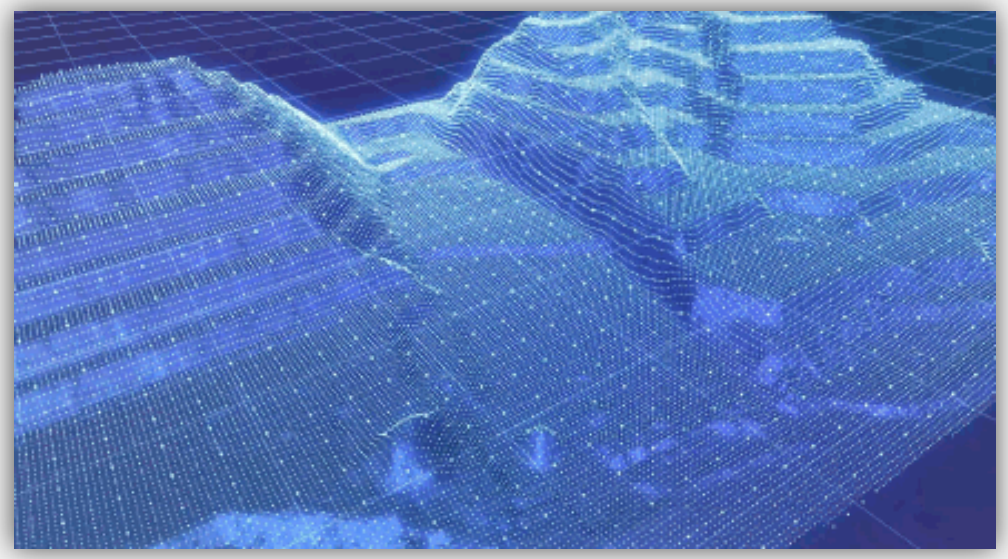
Edge 1

High-performance 3D processor for use at construction sites

Tripod enables easy use even outdoors

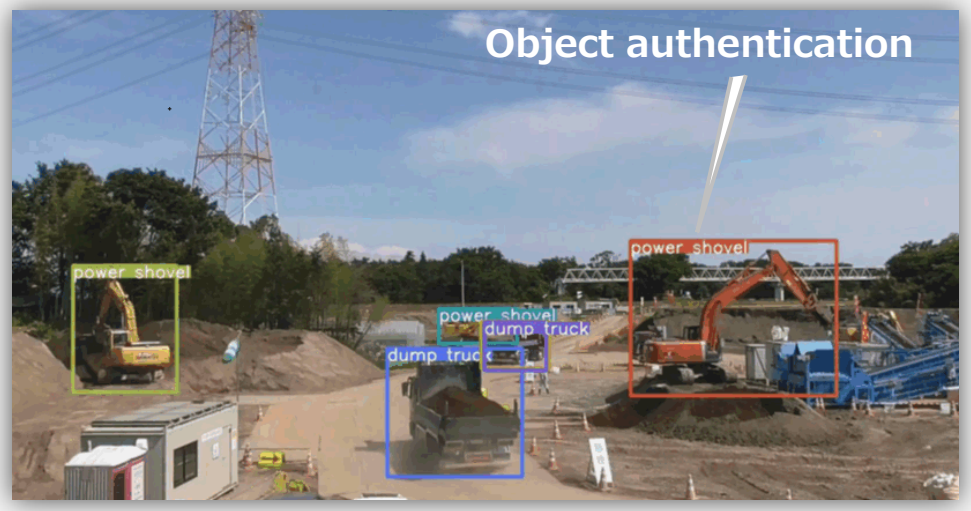
3D Site Data

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



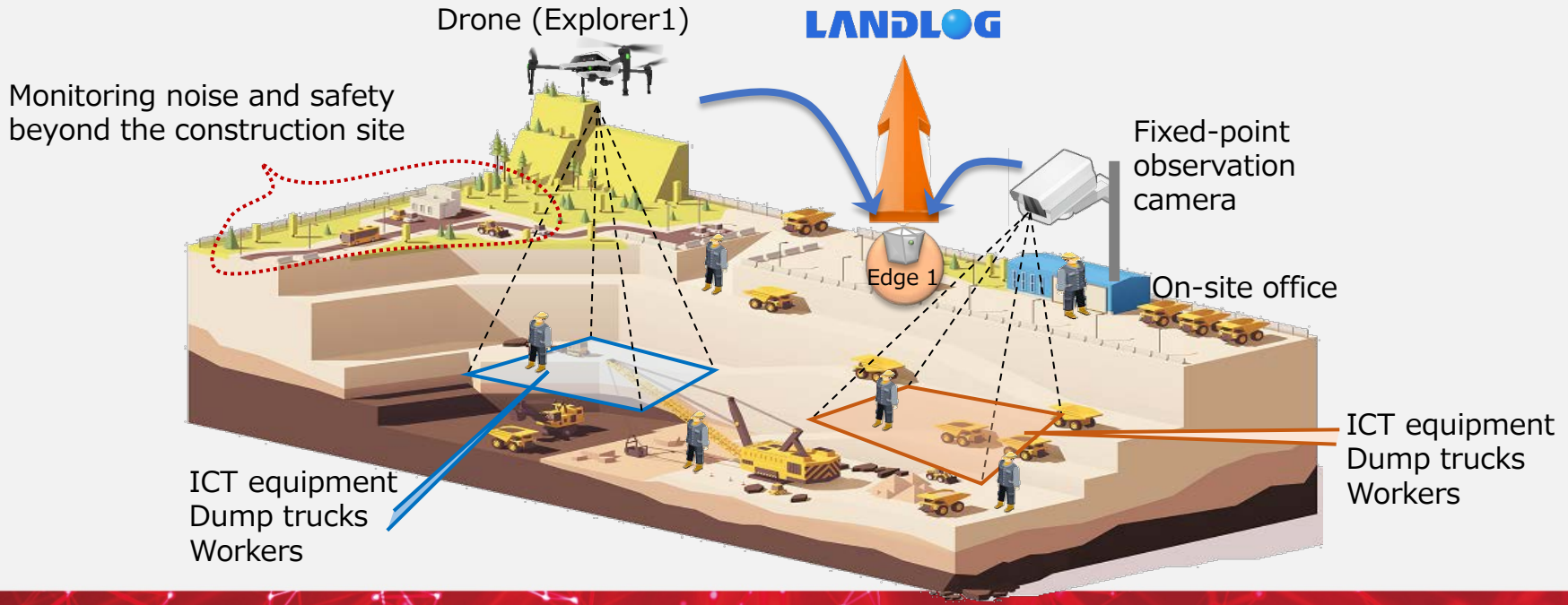
Daily Camera (AI analysis of camera data)

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



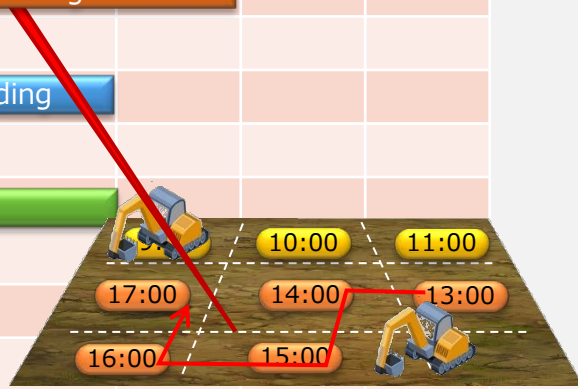
Overall Concept

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 future with 5G

5G

LANDLOG

- Massive device connectivity
- Large capacity
- High-speed communication

Everything on construction sites will be connected with 5G.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