Contactless
Standard Platform
AI-based robot operation
The New Normal Era

Hills
Hills Engineering Co. Ltd

Technology revolution completes a new social innovation.
It would not be too much to say that human history has begun with logistics.

In the Bible, I think Genesis and Exodus are the genres that represent the flow of logistics.
However, human beings have existed in human history, making more than necessary efforts.

In particular, as we enter the industrial world, all industries have become mechanized rapidly, but in the logistics industry, we think that machines have become masters and play an auxiliary role in the civilization formed by human wisdom in the back of mechanization.

Against this backdrop, the logistics industry, which is in the middle of the manufacturing and distribution industries, has developed a situation in which people have to work even at night because of its relatively low value added characteristics, and work at the logistics center.

However, now that human-made machines have become intelligent and hyper-connected, a new trend of fourth-class industries has come, and so far, robots are working like human beings in the age of robots. The Distribution Center, where people worked silently in a labor-centric 3D (Difficult, Dangerous, Dirty) environment, will be a human-centered CES logistics center, a human-centered CES logistics center, convenient, safe, and human-centered logistics center that supports logistics tasks that are optimized for longer enjoyment.

In addition, Hills Engineering will be the leader in human-centered logistics industry Remodeling in harmony with the Trinity, which is a field of CES that first, a logistics consulting(Consulting) from a management perspective that presents optimized human-centered operation and logistics strategy, and a logistics engineering(Engineering) that implements this optimized operation method specifically by applying engineering technology, Finally, a logistics system(Solution/System) that organizes and applies a information-engineered knowledge and technology to utilize sustainable of these constructed logistics systems.
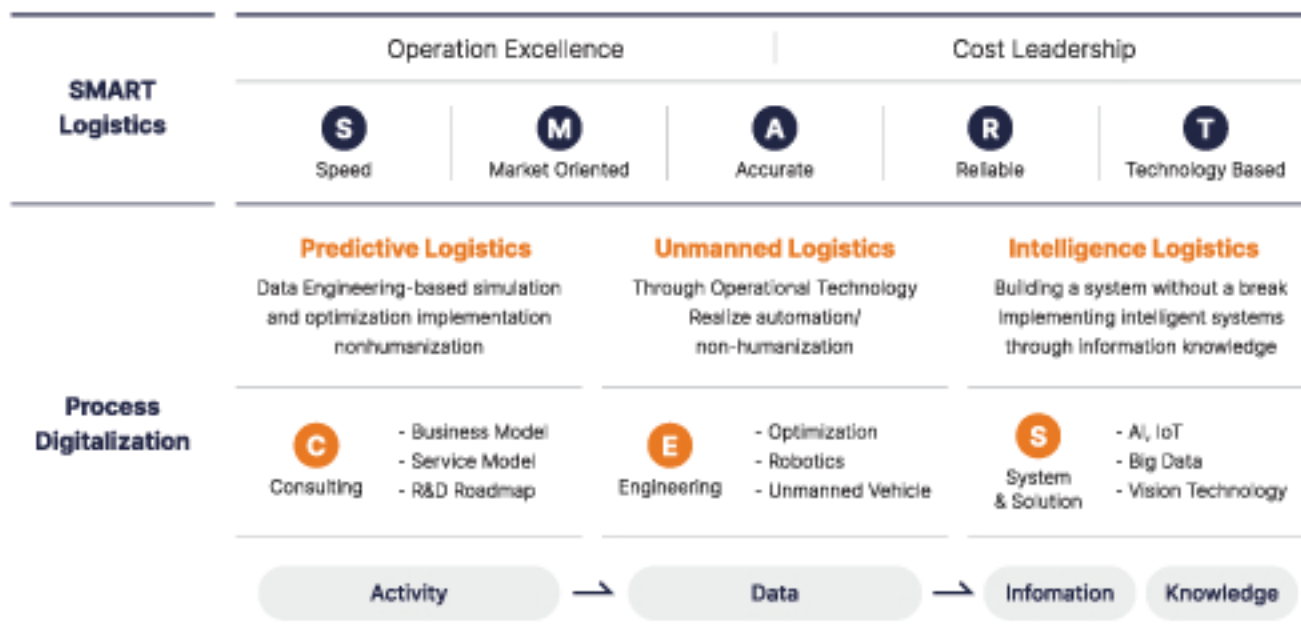
To do so, we will apply CES-type methodologies to apply such technologies as Logistics Robot, Drone, AI and Big Data to various industrial sites.

Hills Engineering Co.ltd

CEO Mueng-gyu, Park

THE GLOBAL SCM INNOVATOR

	Operation Excellence			Cost Leadership	
SMART Logistics	**S** Speed	**M** Market Oriented	**A** Accurate	**R** Reliable	**T** Technology Based

	Predictive Logistics	**Unmanned Logistics**	**Intelligence Logistics**
Process Digitalization	Data Engineering-based simulation and optimization implementation nonhumanization	Through Operational Technology Realize automation/ non-humanization	Building a system without a break implementing intelligent systems through information knowledge
	C Consulting — Business Model — Service Model — R&D Roadmap	**E** Engineering — Optimization — Robotics — Unmanned Vehicle	**S** System & Solution — AI, IoT — Big Data — Vision Technology

Activity → Data → Information   Knowledge

Hills Engineering Co,Ltd Business Domain Robot & Mobility

Lo-Robot®

Co-Robot®

Multi-H Co-Robot

Multi-V Co-Robot

WPC

Drone

Coro-bot®(Corona-Robot)

Mode	Coro-Bot®(Corona-Robot)		Side disinfection arm stroke	Min 1.9m, Max 2.4m
Length	1200 mm		Disinfection method	Disinfectant spraying (side)
Width	600~800 mm			UV disinfection (ceiling and floor)
Height	1 m		Robot speed	Max 1.2m/s
Weight	400kg		Vertical disinfection Height	2.7m
	(Disinfectant tank volume 60 Liter)		Guidance method	Slam method (Lidar+Vision Camera)

● Multi Disinfection Function

Category	Description	Note
Disinfection area	3D spatial disinfection	
Disinfection method	Disinfectant spraying, UV disinfection	See *1)
AI feature	Disinfection customized to each condition 3D spatial obstacle detection and collision avoidance	See *2)
Management efficiency	An integrated control system manages multiple robots efficiently	

*) Universal robot measures the distance with the target and autonomously adjusts injection pressure and the amount of disinfectant.

*) By introducing RMS, real-time location checks and displays are available allowing it to select the best disinfection route.
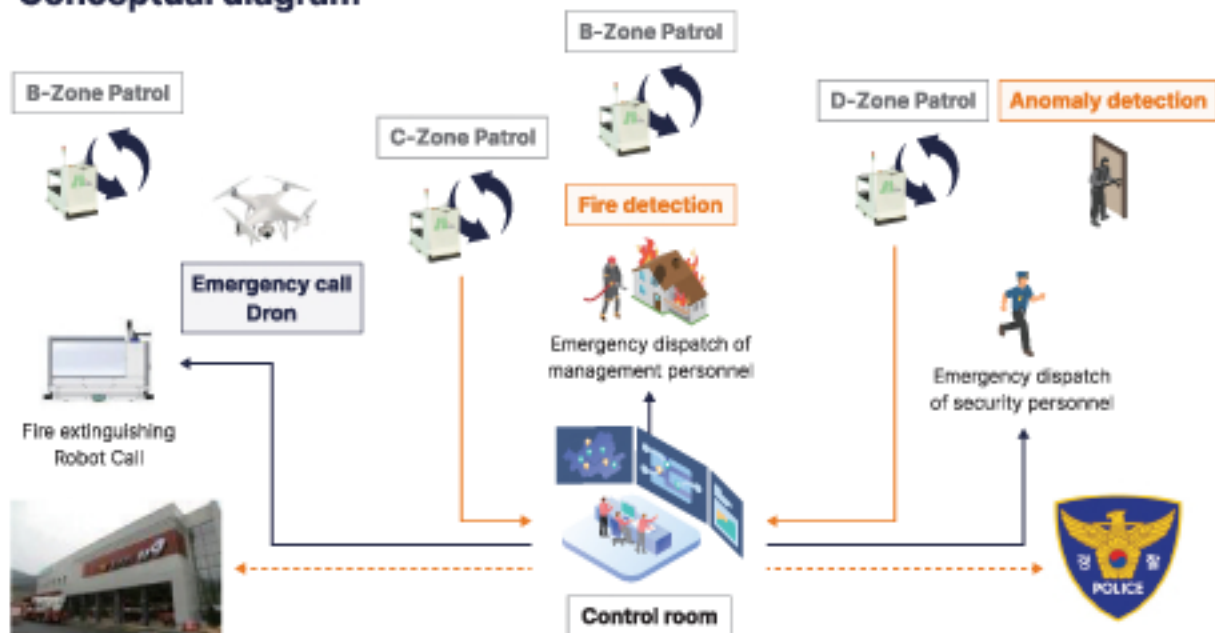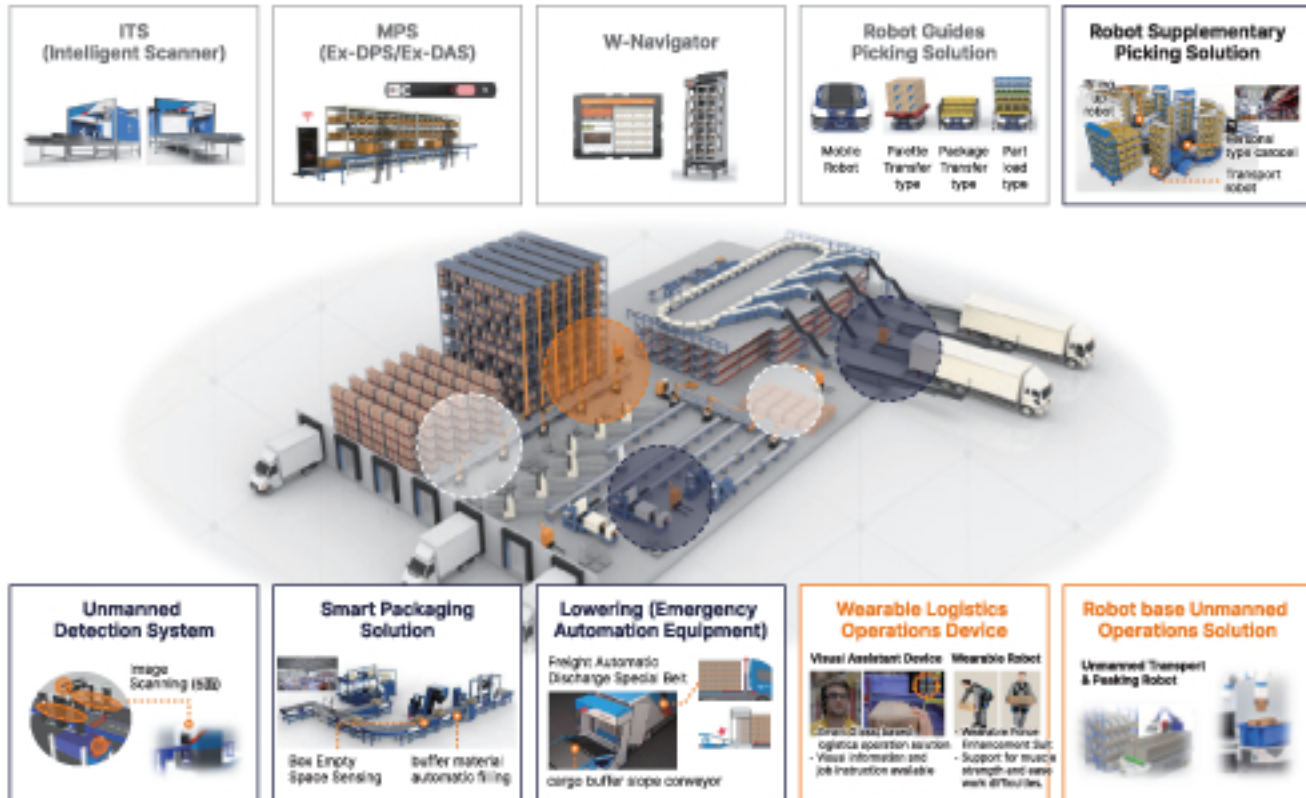
Lo-robot®(Logis-Robot)

Mode	Lo-Robot® (Logis-Robot)
Guidance method	Lidar + Vision image contrast
Driving method	Autonomous driving and Picker following driving
Speed	1.2 m/s or less
Loading	100kg
Operation time	8 Hrs (for normal operation)
Charging	All-in-one type (port charging)
Dimension	600(W) x 1200(L) x 800(H)

- **Risk monitoring (Fire, Security) & Disaster response Robot system Conceptual diagram**

Warehousing

ITS (Intelligent Scanner)

MPS (Ex-DPS/Ex-DAS)

W-Navigator

Robot Guides Picking Solution
- Mobile Robot
- Pallette Transfer type
- Package Transfer type
- Part load type

Robot Supplementary Picking Solution
- Articulated type robot
- Additional type canopei
- Transport robot

Unmanned Detection System
- Image Scanning (3D)

Smart Packaging Solution
- Box Empty Space Sensing
- buffer material automatic filling

Lowering (Emergency Automation Equipment)
- Freight Automatic Discharge Special Belt
- cargo buffer slope conveyor

Wearable Logistics Operations Device
- Visual Assistant Device
- Wearable Robot
- Camera(2 axis) based logistics operation solution
- Visual information and job instruction available
- Wearable Power Enhancement Suit
- Support for muscle strength and ease work difficulties

Robot base Unmanned Operations Solution
- Unmanned Transport & Peaking Robot

Expectation for the Fulfillment Center Operation

Time spent per process within the logistics center

50% Moving time in the center

- 10%
- 10%
- 15%
- 15%

- Moving time in the center
- Product Lookup Time
- Picking Time
- Packing time
- Etc

Time spent in labor by logistics center job

53% Picking products

- 21%
- 2%
- 8%

- Picking Products
- Packing of goods
- Loading of warehousing
- Receiving goods
- Replenishment of goods
- Inventory adjustment

KPI

- Shortening logistics lines 50%
- Reduction of logistics operation costs 20%
- Reducing the Labor Cost 30%
- Increasing utilization efficiency 25%

<FSS's application>

<FSS's application>

● RMS (Robot Management System)

- RMS divides the orders received from WMS into appropriate unit tasks and assigns them to multiple operating robots using AI technology. Then, it selects a robot in the best position to perform the task.
- It manages robots by transmitting data (via 5G) with each robot in real time. Feedbacks are stored in WMS and our own database (creating big data)
- RMS data base improves operation efficiency by identifying the ultimate solution through a E-learning method and providing feedbacks.
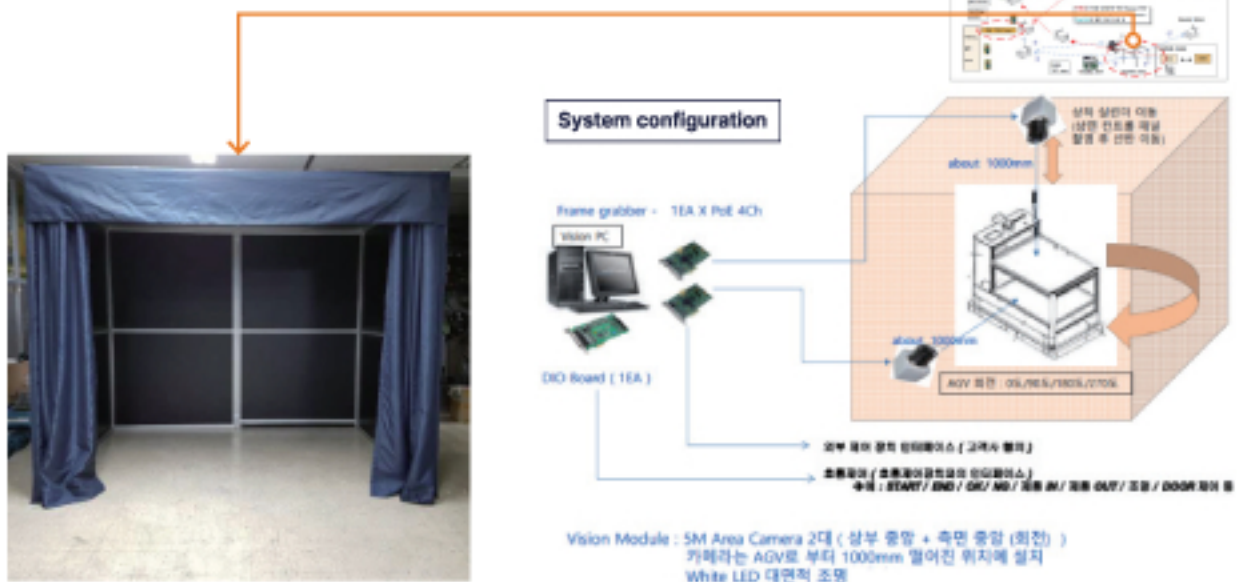
● SCS (Smart Care System)

- MTBF is used for preventive maintenance jobs including main component replacement and a regular maintenance check (examination and maintenance).
- Inspect external damage of a robot using image sensors
- When a maintenance issue arises, the RMS automatically notifies the system in real time using 5G networks
- The SCS will remotely check the situation and take a follow-up measure.

● DIS (Damage Inspection System)

- Before charging the battery, the robot enters the blackout station of the inspection zone. A vision camera will inspect outer infection or damages and take measures by imaging the outside of the robot and comparing with the previous image (also, **during the test, the UVC LED lamp disinfects the robot**)

System configuration

● Reference

● Patent Status

Category	Registration number	Applicant	Patent Title
Patent Registration	2043801	Hills Engineering Co. Ltd.	Intelligent logistics robot
Patent Registration	1816562	Hills Engineering Co. Ltd.	Power hand cart
Patent Application	10-2020-0026772	Hills Engineering Co. Ltd.	Logistics robot control system
Patent Application	10-2020-0029473	Hills Engineering Co. Ltd.	Robot care system
Patent Application	10-2020-0046257	Hills Engineering Co. Ltd.	Self-driving disinfection robot and disinfection robot control system
International PCT	PCT/KR2020/013410	Hills Engineering Co. Ltd.	Self-Driving Disinfection Device
International PCT	Preparing for application	Hills Engineering Co. Ltd.	Aircraft Autonomous disinfection Robot
Patent Registration	0827088	Samsung Electronic	Software robotic device
Patent Registration	1510902	Samsung Electronic	Method of transmitting routing information in wireless network
License	0820740	Samsung Electronic	Automatic driving vacuum cleaner and its control method
License	10-1493385	Samsung Electronic	Robot and its walking control device and its walking control method
License	10-0612858	Samsung Electronic	Method and apparatus for tracking a person using a robot
License	10-0834761	Samsung Electronic	Mobile robot's own location recognition method and device
License	10-0791381	Samsung Electronic	Collision prevention system, apparatus and method for remote control of mobile robot