



Total Solution Provider for Autonomous Mobility

2021 Company Profile



01 Introduction

02 AMS Business Overview

03 Products

1. YUJIN LiDAR, YRL Series

2. SLAM & Navigation Solution

1) AMS-SLAM-1000, 1001

3. Mobile Platform

1) GoCart180 & GoCart250

2) AMS-FMS

4. Robotization(SI)

5. Appendix

INNOVATION FOR A BETTER WORLD

YUJIN ROBOT Co., Ltd.



CEO	Park Sung Joo
Foundation	1988. 03
Company status	Listed on the KOSDAQ in Oct 2005
Employees	160 (80 in R&D)
Head Office / R&D Center	Song-do Incheon, South Korea
Homepage	www.yujinrobot.com

Building on over three decades of experience in developing robots of all types and functions, our vision is to provide robotization capabilities to the world; sensors, and robotics solutions that give manual machines the power to see, think, and interact with the environment around them. We're bringing Yujin Robot technologies to the world's most forward-thinking companies, starting with businesses that manufacture, transport and store in the physical world.

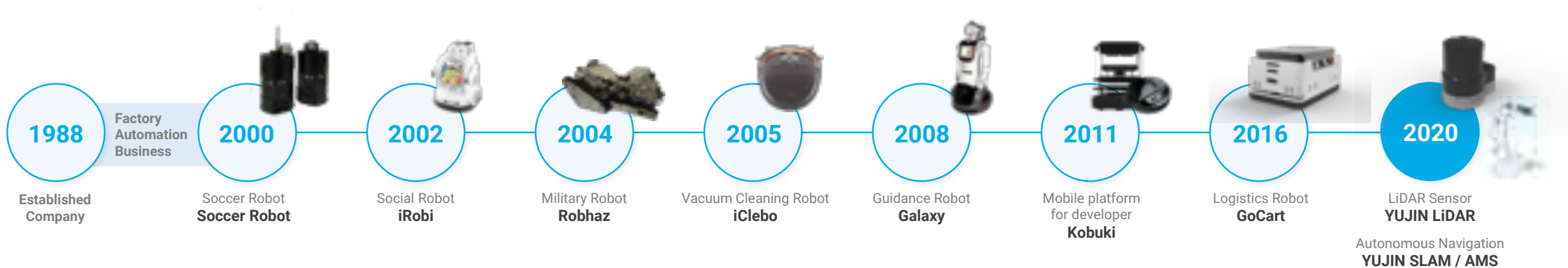


Company History



YUJIN ROBOT has more than 30 years experience in the field of robotics.

- ✓ No.1 in Korea service robotics sector for more than 10 years.
- ✓ Ranked #1 for service robot export and performance in Korea .
- ✓ World-class R&D infrastructure.
- ✓ Global standard mass production facility and quality control system.
- ✓ Beneficiary of the Korean government's Robot Growth Policy.



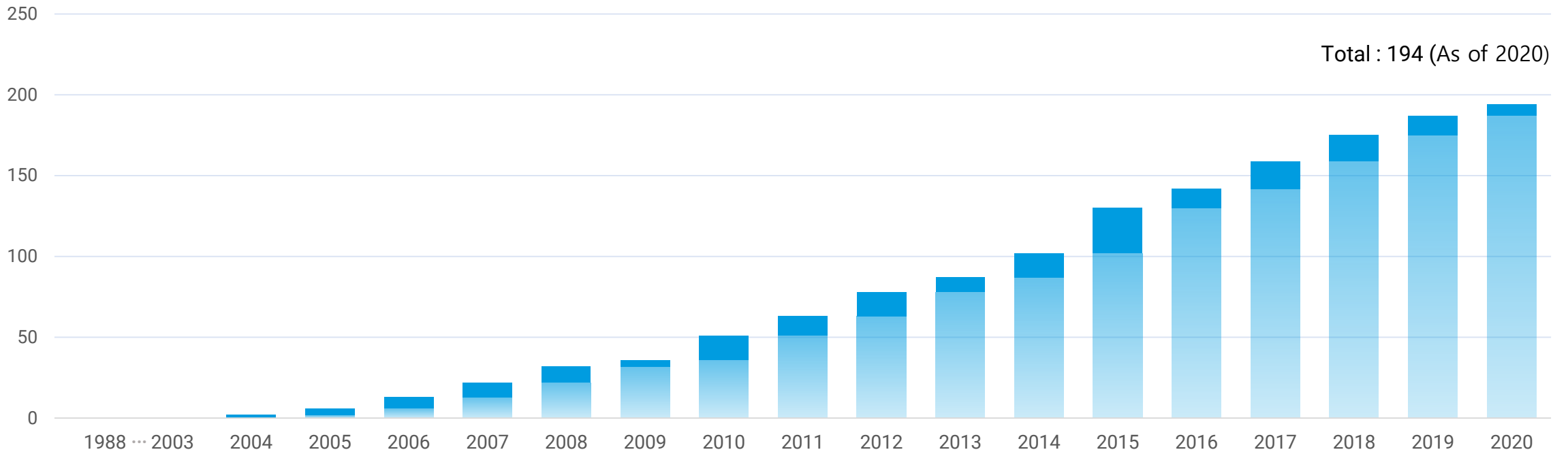
Innovation-driven Culture

Our innovation-driven culture is what fuels the continuous development of next-generation robotics technologies.

R&D Technology

More than 15% of sales revenues is invested in R&D and more than 60% of the total workforce are R&D engineers.

Patent Status



We provide innovative robotics solutions that enhance the quality of life by improving overall productivity and thereby optimize cost efficiency.

**Autonomous
Mobility
Solution**



**Smart
Automation
System**



**Vacuum
Cleaning
Robot**



02 **AMS** Business Overview

Business Portfolio

Autonomous Mobility Solution (AMS)



<https://youtu.be/cefJXQ10Nr0>

Autonomous Mobility Solution (AMS)



YUJIN Robotization(SI)

One-stop end to end solution for transforming your manual machine into an autonomous mobility robot

YUJIN AMS supports customized solutions for autonomous mobility including LiDAR, SLAM, navigation software and a globally accredited ISO standard safety system.

YUJIN's engineering services provide robotics to create tailored robotics solutions for your unique requirements.

Software

- **SLAM**
 - Mapping and Localization
- **Navigation**
 - Path Tracking and Planning
 - Obstacle Detection and Avoidance
- **FMS**
 - Site Configuration
 - Scheduling
 - Monitoring and Reporting
 - Traffic Control and Resource Management
 - Communication with Other Systems
 - Interface with Elevators and Automatic Doors

Hardware

- **Sensors**
 - 2D/3D LiDAR
 - Single and Stereo Camera
 - Ultrasonic Sensor
 - Safety Sensor
- **Controller**
 - AMS-SLAM-1000 Series
 - AMS-Navi-1000 Series
 - Navigation Controller
- **Safety**
 - Safety Controller

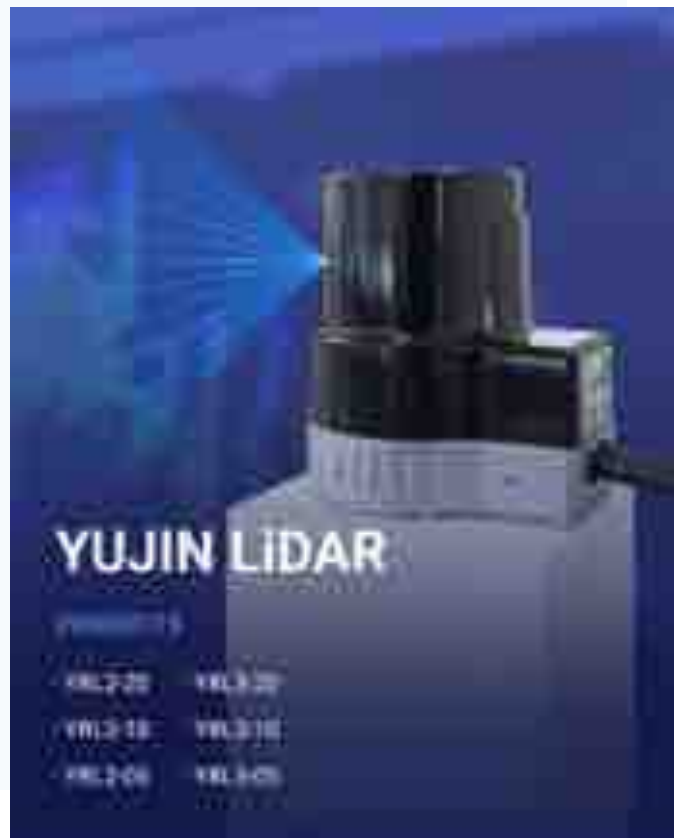
Consulting

- **Project Analysis**
- **Proposal for Project Scope and Duration**

System Integration

- **Drive Unit Development**
- **Custom Hardware and Software Development**

Autonomous Mobility Solution (AMS)



03 Products

1. YUJIN LiDAR, YRL Series

2D LiDAR : YRL2-05, 10, 20

3D LiDAR : YRL3-05, 10, 20

1. YUJIN LiDAR, YRL Series

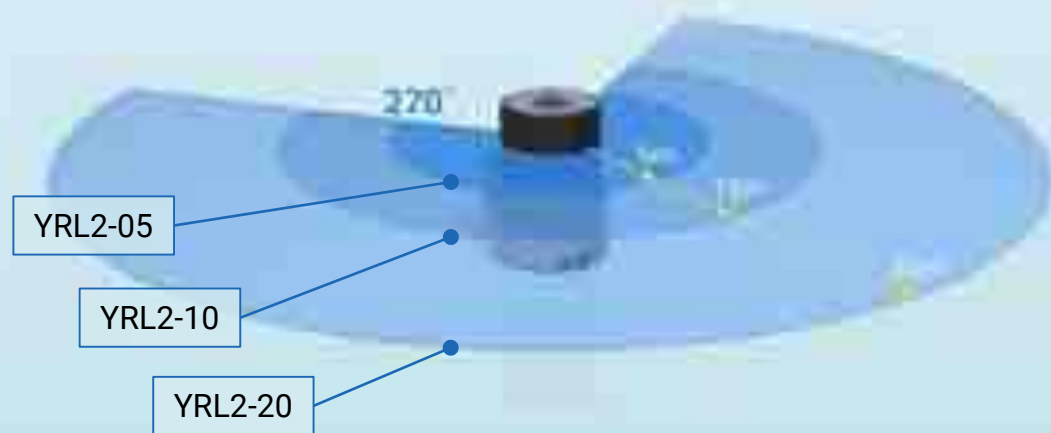
Yujin's 2D/3D scanning LiDAR (Light Detection and Ranging) products are optimal solutions for indoor applications with wide field of view. The Yujin LiDAR products are based on direct ToF (Time of Flight) technology and are designed to measure distances from its surroundings and collect point cloud data.



- **Wide FoV, compact size, low cost, and user-friendly viewer**
- **ROS compatible**
- **ToF (Time of Flight) Single Channel LiDAR**
- **Real-time adjustable vertical angle (3D LiDAR)**
- **Powerful S/W package support for autonomous devices**
- **Optimal performance with Yujin AMS-SLAM & Navigation Controllers**

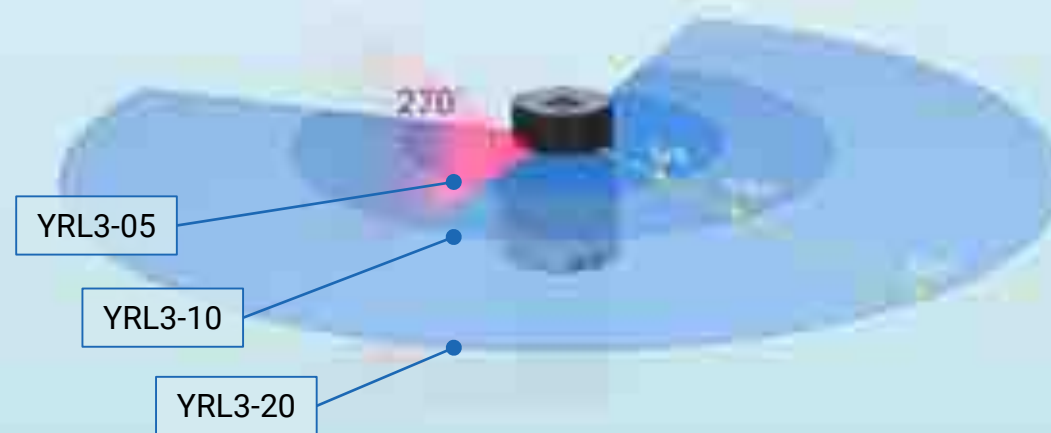
1. YUJIN LiDAR, YRL Series

YUJIN 2D LiDAR YRL2 Series



Horizontal : 270°

YUJIN 3D LiDAR YRL3 Series



Horizontal : 270° × vertical : 90°(±45°)

1. YUJIN LiDAR, YRL Series



• Specifications

YRL series	Environment		Indoor					
	Type		2D LiDAR		3D LiDAR			
	Model name		YRL2-05	YRL2-10	YRL2-20	YRL3-05	YRL3-10	YRL3-20
Basic	Measurement range		0.1 m~5 m	0.1 m~10 m	0.1 m~20 m	0.1 m~5 m	0.1 m~10 m	0.1 m~20 m
	Collection angle	Horizontal	270°					
		Vertical	-			90° (-45° ~ +45°)		
	Laser class		Class 1, eye safety (IEC 60825-1:2014)					
	Laser wavelength		905 nm					
	Scanning Frequency	Horizontal	20 Hz					
		Vertical	-			0.57 Hz (1scan 1.76 sec. If vertical 90°)		
	Range resolution		<10 mm					
	Angular resolution	Horizontal	0.55°					
		Vertical	0.35° (257 steps)					
Performance	Sampling rate		130,000					
	Data packet rate		9,750					
	Response time		>50 ms			>50 ms per layer		
Interface	Communication interface		100 Mbps Ethernet			100 Mbps Ethernet		
	Optical indicators		1 x LED (Green : Available, Red: Error)			1 x LED (Green : Available, Red: Error)		
	Output data		Horizontal Angle, Range, Intensity, Cartesian coordinates (x,y)			Horizontal Angle, Vertical Angle, Range, Intensity, Cartesian coordinates (x,y,z)		
Mechanics/ Electronics	Electrical connection		1 x M8 for Power, 1 x M12 for Data Round Connector					
	Supply voltage		DC 12 V					
	Power consumption		5W			6W		
	Material		Top window cover (PC), Bottom cover (AL)					
	Enclosure rating(IP)		IP 67					
	Temperature resistance		-10° ~ 50°					
	Weight		400 g					
	Dimensions (W x D x H)		65 mm x 85 mm x 91.40 mm					
Certificates and compliance		CE, KC, RoHS						

1. YUJIN LiDAR, YRL Series



<https://youtu.be/oYCOYfK5QxE>

2. YUJIN SLAM & Navigation Solution

| 2-1) AMS-SLAM-1000, 1001

2-1) AMS-SLAM-1000/1001

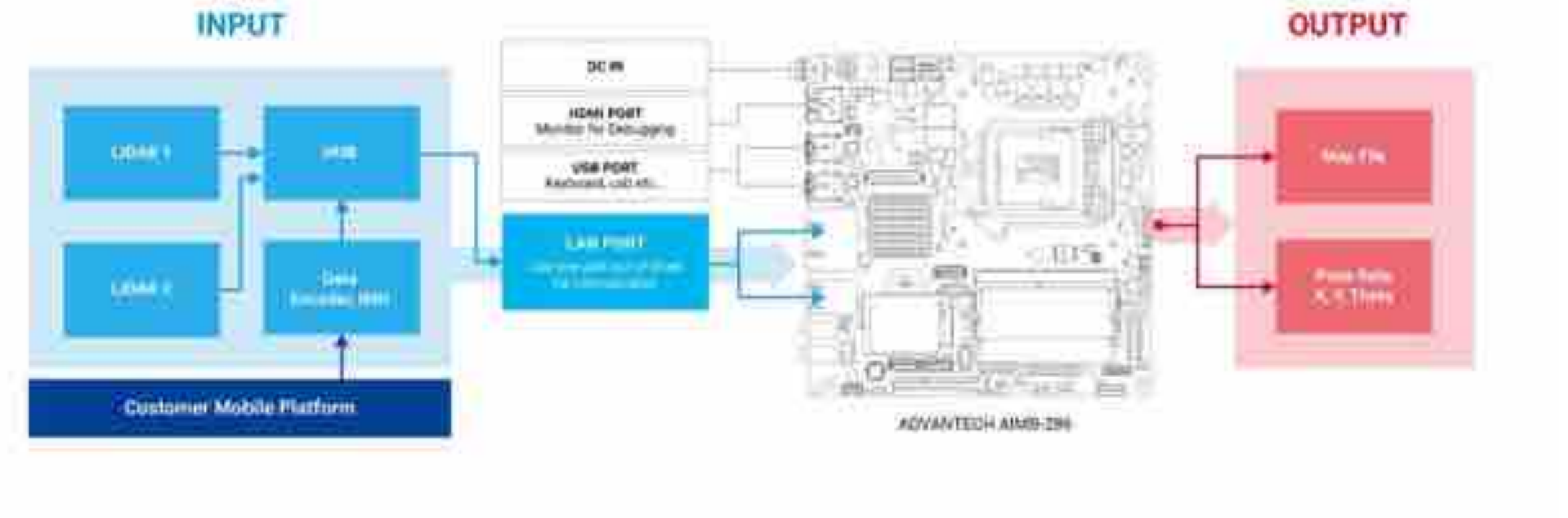
YUJIN's SLAM (Simultaneous Localization and Mapping) is a proprietary solution that is integrated on a board and allows robots to create accurate maps in various environments and simultaneously extract reliable robot locations inside the map.



- **Proven SLAM technology operating in various environments and fields**
- **Compatible with YUJIN & other LiDAR sensors**
- **Simple and rapid map building**
- **Reliable SLAM with precise and flexible mapping and localization**

2-1) AMS-SLAM-1000, 1001

- Product Configuration



2-1) AMS-SLAM-1000, 1001



• Specifications

AMS-SLAM Performance	Maximum mobile platform speed in Mapping (SLAM) mode	0.6 m/s	
	Maximum mobile platform speed in Localization mode	1.5 m/s	
	Localization rate	5 Hz	
	SLAM/Localization accuracy	+/- 30 mm, +/- 0.5 degree	
	Mapping coverage	225 m x 225 m	
	Docking accuracy	+/- 10 mm	
	Supported drive type	Differential (2 wheels), Mecanum (Omni, 4 wheels), Steering	
	Verified sensor	Structured Light Depth Camera (Orbec Asta Mini/Mini S Intel Realsense 450D) LiDAR (YUJIN YRL3-Series, SiCK TiM 510, 571, S300 mini, RPLIDAR-A2, Ouster OS1, BPearl Robosense,), Stereo Camera (YUJIN YSV3), Ultrasonic sensor, IMU	Compatible sensors may vary

AMS-SLAM Hardware			AMS-SLAM-1000	AMS-SLAM-1001
	General	CPU	Intel i7-7700	Intel i7-8700
		Memory	DDR4 8GB	DDR4 8GB
		Ports	2 x HDMI, 2 x USB 3.0, 2 x USB 2.0, 2 x Ethernet	1 x HDMI, 1x Display Port 1.2, 4 x USB 3.0, 3 x Ethernet
		Power	12V/10A (19V/6A)	12V/11A
	Communication	Input data	LiDAR Data (Angle, Range), Odom Data (Encoder, IMU)	LiDAR Data (Angle, Range), Odom Data (Encoder, IMU)
		Output data	Map (PNG file, Key frame), Adjusted pose (x,y,z)	Map (PNG file, Key frame), Adjusted pose (x,y,z)
		Interface I/O	Ethernet RJ-45	Ethernet RJ-45
		Protocol	UDP (User Datagram Protocol)	UDP (User Datagram Protocol)

3. YUJIN Mobile Platform

3-1) GoCart180 & GoCart250

3-2) AMS-FMS

3-1) GoCart180 & GoCart250

GoCart is an autonomous transport system that can be used in various logistics environments. With its proprietary 3D ToF LiDAR based navigation, it supports high level safety navigation in various dynamic environments.



Autonomous Transport System for a variety of environments such as hospitals, factories, and warehouses

- Autonomous Mobile Platform with FMS
- 3D SLAM & Navigation based on YUJIN LiDAR
- Smart Interface with auto doors and elevators via FMS
- PL d level safety system (**EN ISO 13482:2014**)

3-1) GoCart180 & GoCart250



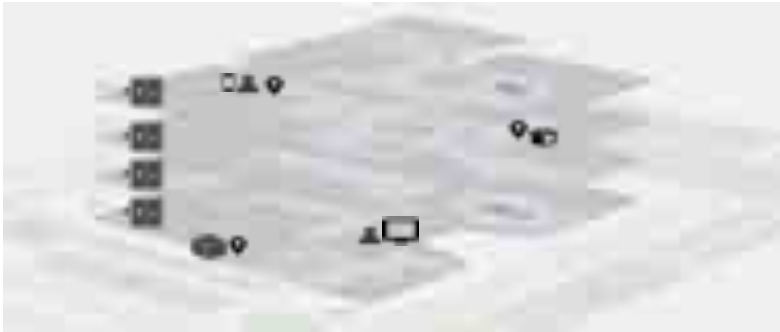
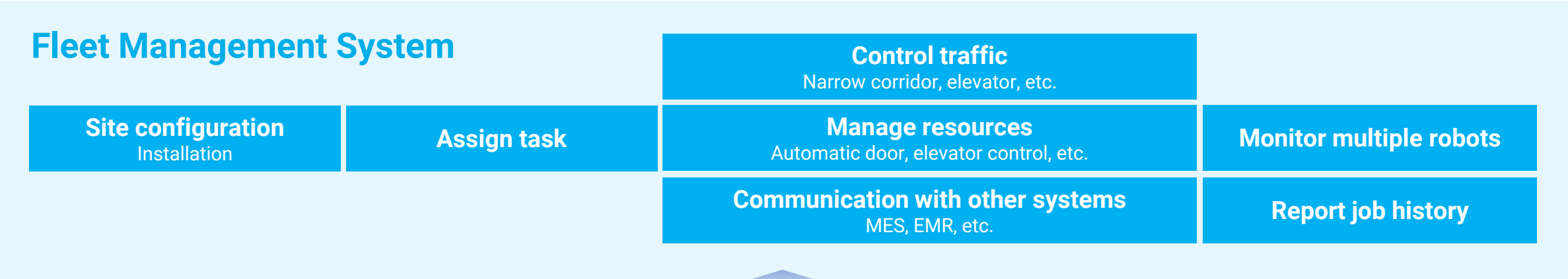
• Specifications

Model	GoCart180	GoCart250
Dimension (L x W x H)	730 x 530 x 430 (mm)	TBD
Container Dimension (L x W)	646 x 441 (mm)	TBD
Weight	around 120kg	TBD
Payload	4.76 degree slope (120 kg), on flat surface (up to 180 kg)	TBD
Max Speed	1 m/sec.	
Traversable Threshold	10 mm	
Traversable Gap	30 mm	
Climb Slope	4.76 degree	
Sensor for PL-D Safety	2D LiDAR x 3EA	
Sensor for Navigation	3D ToF LiDAR Sensor x 2EA	

3-2) AMS-FMS



The Fleet Management System (FMS) is a centralized decision maker solution running on a server which assigns tasks, controls traffic, manages resources and monitors multiple robots.



3-2) AMS-FMS

3D Mapping, reporting and real-time monitoring



- Site configuration
- Traffic control
- Scheduling
- Resource manage

- Communication with other systems
- Elevator, auto door control
- Monitoring
- Reporting

4. YUJIN Robotization(SI)

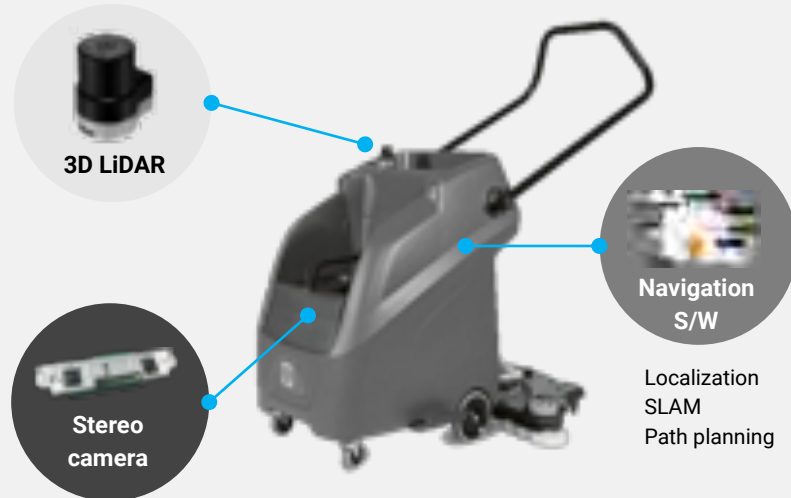
4. YUJIN Robotization(SI)

- Concept

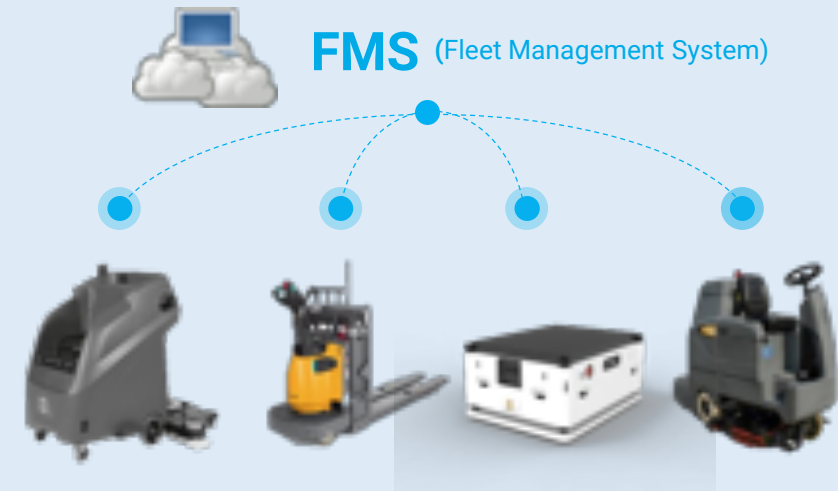


4. YUJIN Robotization(SI)

Manually operated machine



Autonomous mobility machines



4. YUJIN Robotization(SI)

One stop solution for transforming any machine to an autonomous robot that can navigate autonomously. Robotization(SI) supports customized hardware and software for robot navigation, including LiDAR, camera, SLAM and navigation software, FMS, driving unit development, and more...

Target applications



Cleaning machine



Forklift



Logistics robot



Food Trolley

Service

- Consulting
- System Integration

Hardware

- 2D/3D LiDAR
- Single/Stereo Camera
- Ultrasonic, Safety Sensor
- AMS-SLAM-1000, 1001
- AMS-Navi-1000, 1001
- Navi-Controller
- Safety-Controller

Software

- **SLAM** (Simultaneous Localization and Mapping)
- **Navigation**
- **FMS** (Fleet Management System)

5. Appendix

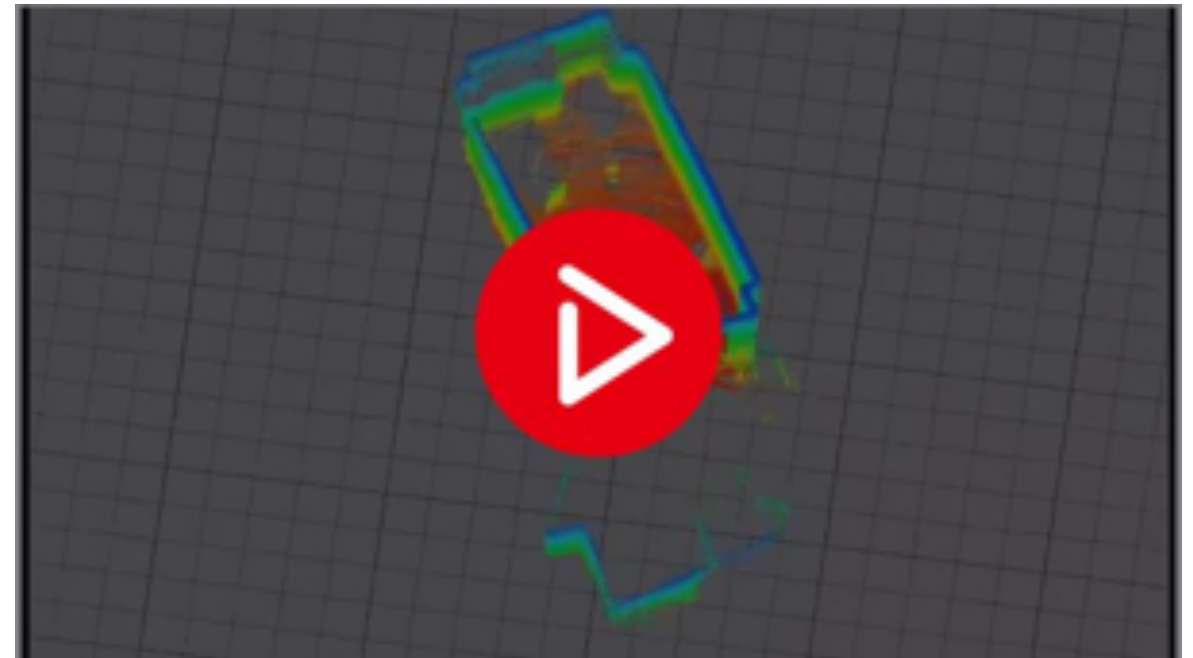
- 1. YUJIN LiDAR, YRL Series
- 2. YUJIN SLAM & Navigation Solution
- 3. YUJIN Mobile Platform
- 4. YUJIN Robotization(SI)

1. YUJIN LiDAR, YRL Series

- 3D point cloud reconstruction



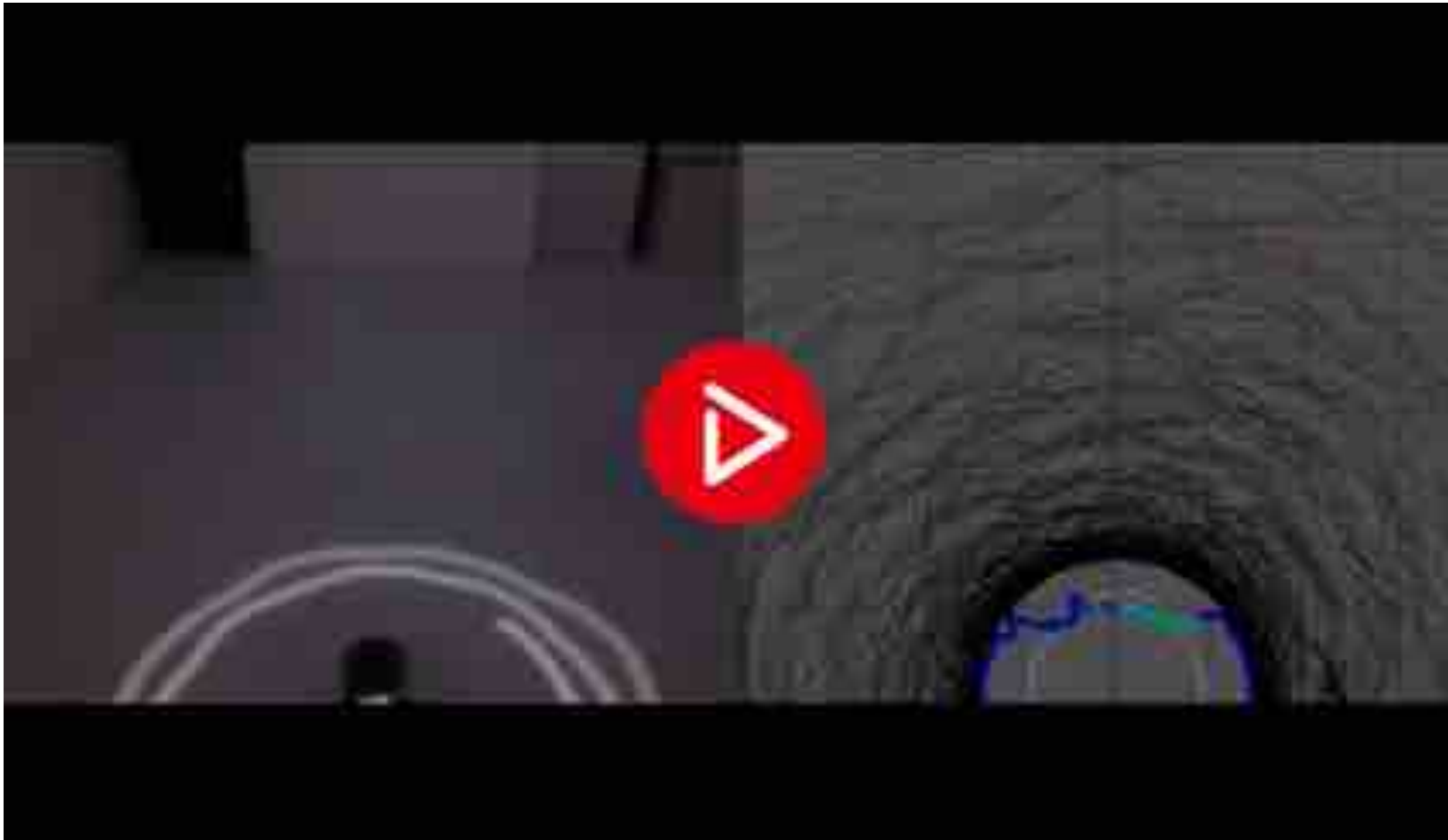
https://youtu.be/ZS_quMhB54U



<https://youtu.be/knJ2mqUsKVY>

1. YUJIN LiDAR, YRL Series

- Obstacle detection



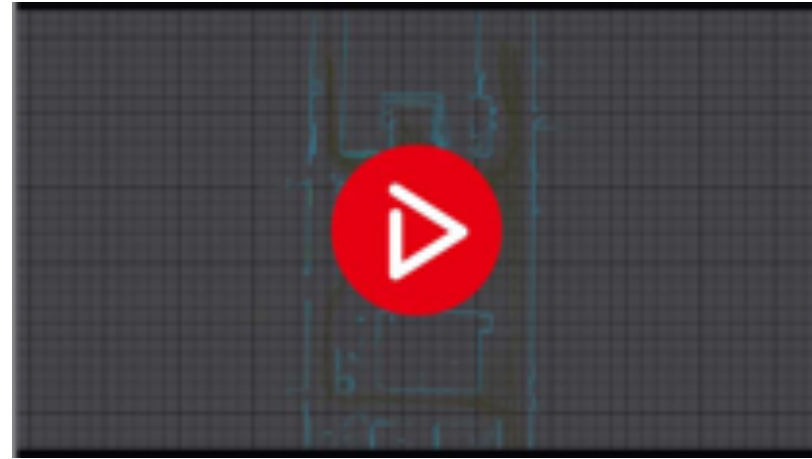
<https://youtu.be/jIAkFqOzdk>

2-1) AMS-SLAM-1000, 1001

- LiDAR SLAM for 3D map building



<https://youtu.be/s980An5zKZ4>



<https://youtu.be/izPAkh9NPhI>

2-1) AMS-SLAM-1000, 1001

- LiDAR SLAM for Café Deliveries



<https://youtu.be/xdsl4ducjjA>

3-1) AMS-DemoKit-100



Mapping

https://youtu.be/R_WdjAwucg4

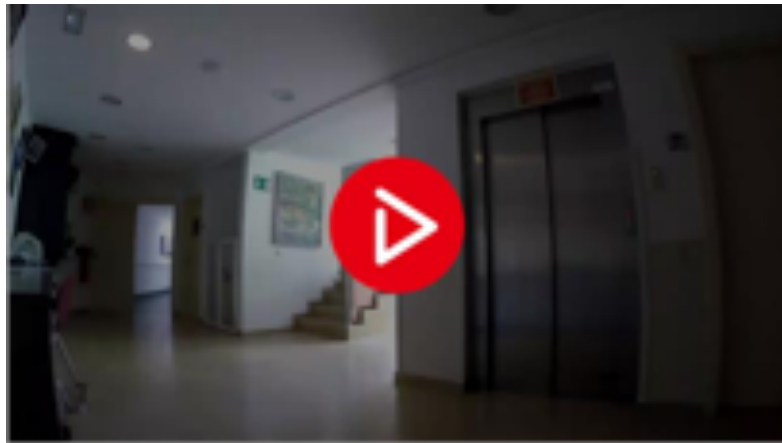


A to B Navigation and obstacle avoidance

<https://youtu.be/izPAkh9NPhI>

3-3) AMS-FMS

- Use Case : Elevator/Auto door management and traffic control



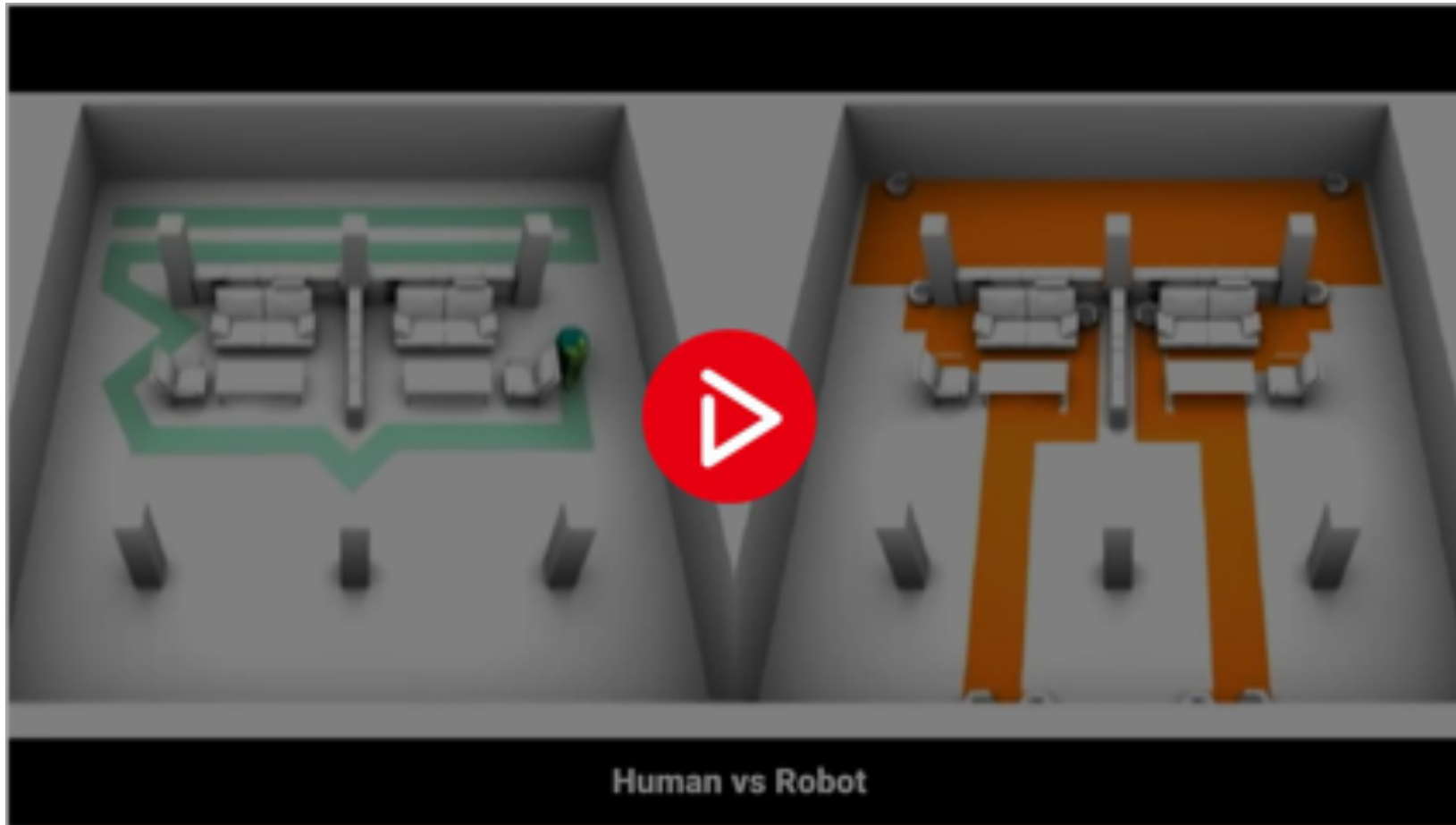
FMS (Fleet Management System)



<https://youtu.be/7ZmBKlfKxGI>

3-3) AMS-FMS

- Use Cases: Multi AMS vehicle job control



<https://youtu.be/9KToMjzkutk>

4. YUJIN Robotization(SI)

- Stereo Camera + 3D LiDAR



<https://youtu.be/STIBTwBtBis>

+



<https://youtu.be/izPAkh9NPhI>

4. YUJIN Robotization(SI)

- Use cases: Robot vacuum cleaner, Medical device, Omni-driving unit



Robot vacuum cleaner

<https://youtu.be/TG5PmQXygpY>



Medical device

<https://youtu.be/1NbxtXx3MfM>

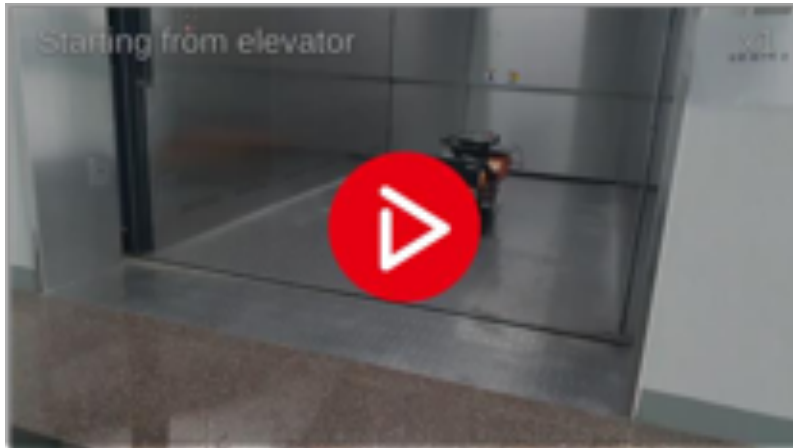


Omni-driving unit

<https://youtu.be/1NbxtXx3MfM>

4. YUJIN Robotization(SI)

- Use cases: Manual cleaning machine, Shopping carts, Warehouse pick and place cart



Manual cleaning machine



Shopping carts
<https://youtu.be/hhOeDwQEseY>



Warehouse pick and place cart
<https://youtu.be/Qvz1fIVFETA>

4. YUJIN Robotization(SI)

- Use cases: Mobile robots (AMRs)



Docking in a Factory



Orchard Hotel, Singapore

<https://youtu.be/0DxHJ63xURY>



Changi Airport, Singapore

<https://youtu.be/UZMGCymX0oc>

4. YUJIN Robotization(SI)

- Use cases: Logistics robots, Hospital logistics



National Library in Korea



Labtests, New Zealand

<https://youtu.be/hHyVrmLbBVA>



Eulji Medical Center

<https://youtu.be/rRFpsKqkZB4>

THANK YOU



+82-32-550-2300

sales@yujinrobot.com

33, Harmony-ro 187 beon-gil, Yeonsu-gu, Incheon, Republic of Korea



www.yujinrobot.com