



# SPIDER-GO

INTELLIGENT INVENTORY AUTOMATION SYSTEM

# Market Trend



## Rapid growth of Ecommerce

Sudden increase of cargo & parcel of goods



## Sharp Increase and diversification of Inventory

Increase and diversification of Inventory data



## Cutthroat competition among distributors

Life-or-death for logistics cost



## Enlargement of warehouse and store

Gradual rise of fire & safety accident



## Wage increase and shortage of labor

Rising demand of warehouse automation

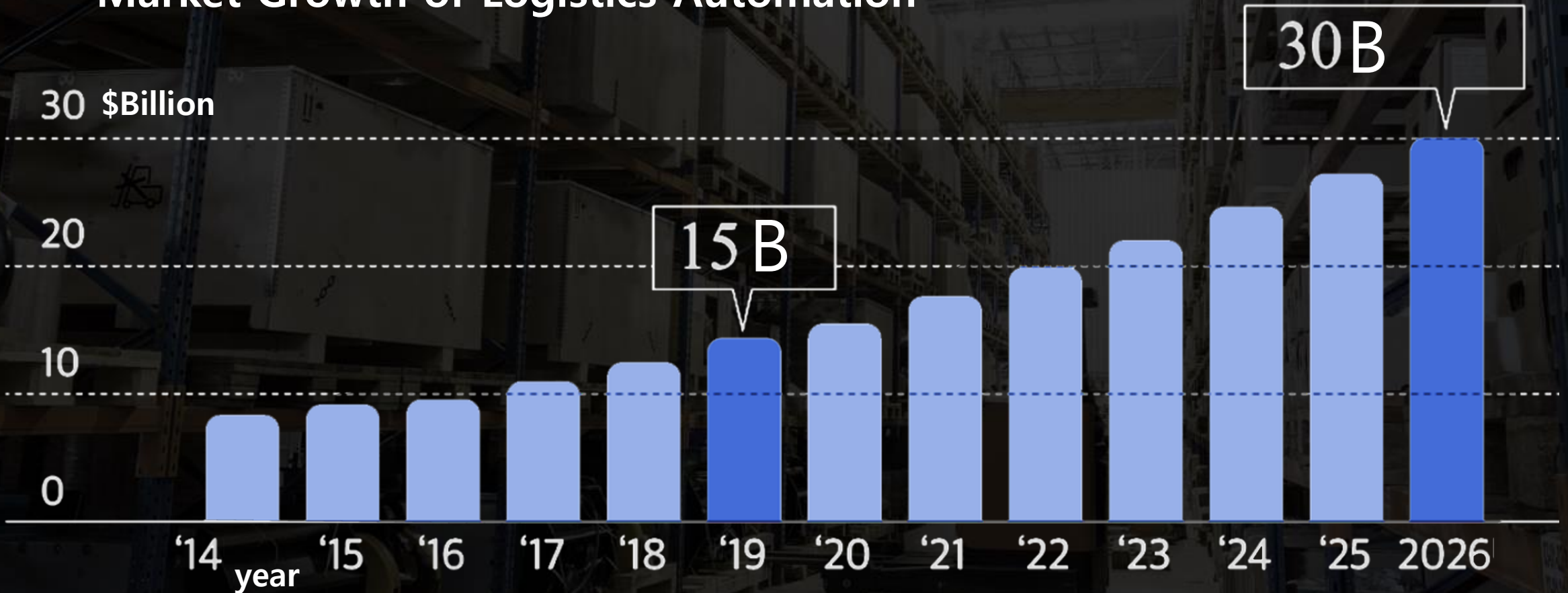


## Labor-dependent inventory process

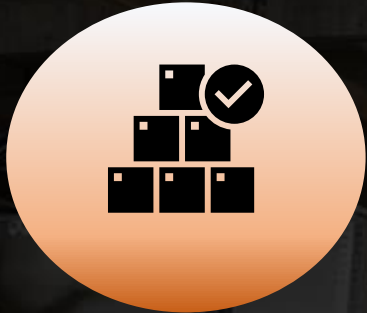
Needs of Innovative Inventory solution

# Market Analysis

## \*\*\* Market Growth of Logistics Automation



# Analysis of Inventory Issues



**Improper inventory management**



**Mismatch b/w physical inventory and system data**



**Frequent mistakes on Putaway and picking**



**Industrial accident during inventory check**

Annual lost per warehouse on average  
**\$ 250,000**

Annual Global Loss  
**\$ 5Trillion**

# Conventional Inventory Check



# Solution

## SPIDER-GO Inventory Automation System

Warehouse version



Store version



Regular Inventory Scan

Barcode/OCR/RFID

Loading/picking check

Check out-of-stock/Quantity

AI Customer Kiosk

Stock status sharing w/ suppliers

3D Inventory Search

Remote Ad-hoc Inventory

Fire/worker safety Monitor

Plays Video ads

Video calls w/ CSC

Store guidance & events

Solution

# Device Structure

\*\*\* Internation Patent Registered

SPIDER-Nest

LiDAR Approach Detection Sensor

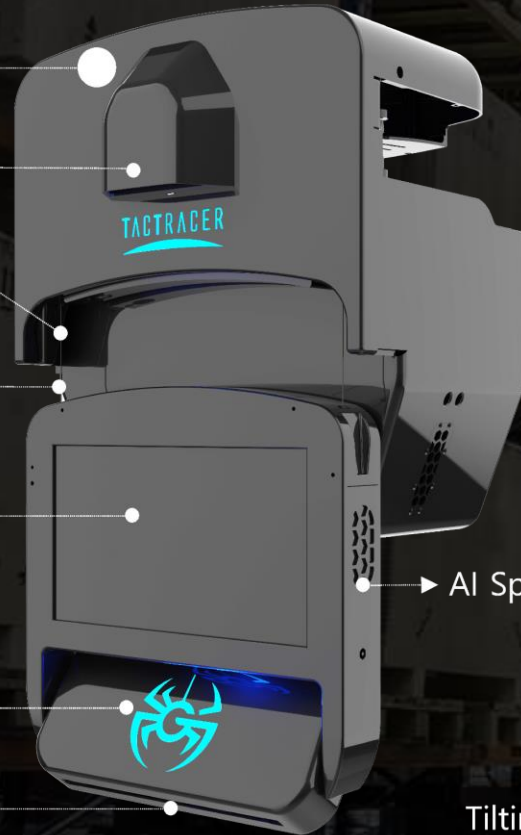
Charging Terminal (inward)

SPIDER-Web

13.3" Touch display

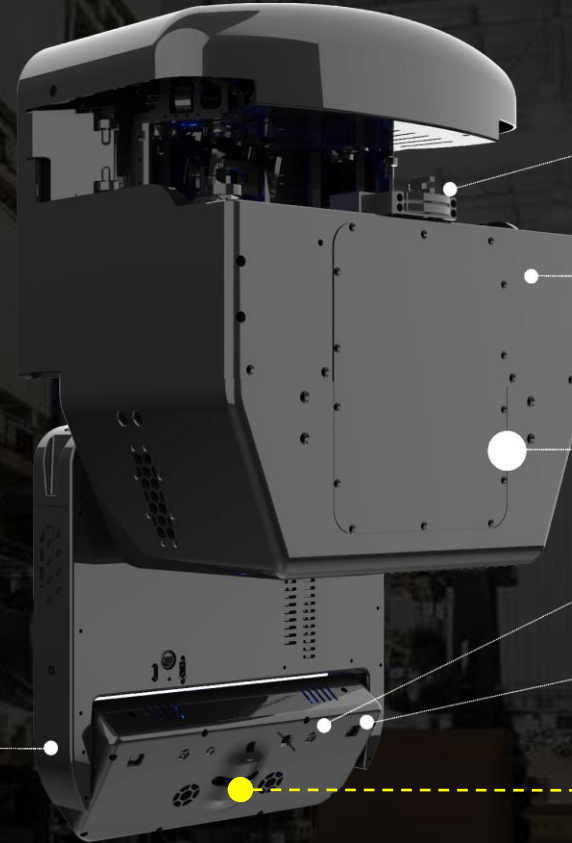
Logo Status LED

Object Detection Sensor



AI Speaker

Tilting Motor (180°)



Charging Terminal (outward)

Fire Detection Sensor  
Temperature-Humidity Sensor

SPIDER

Rear Stereo Camera

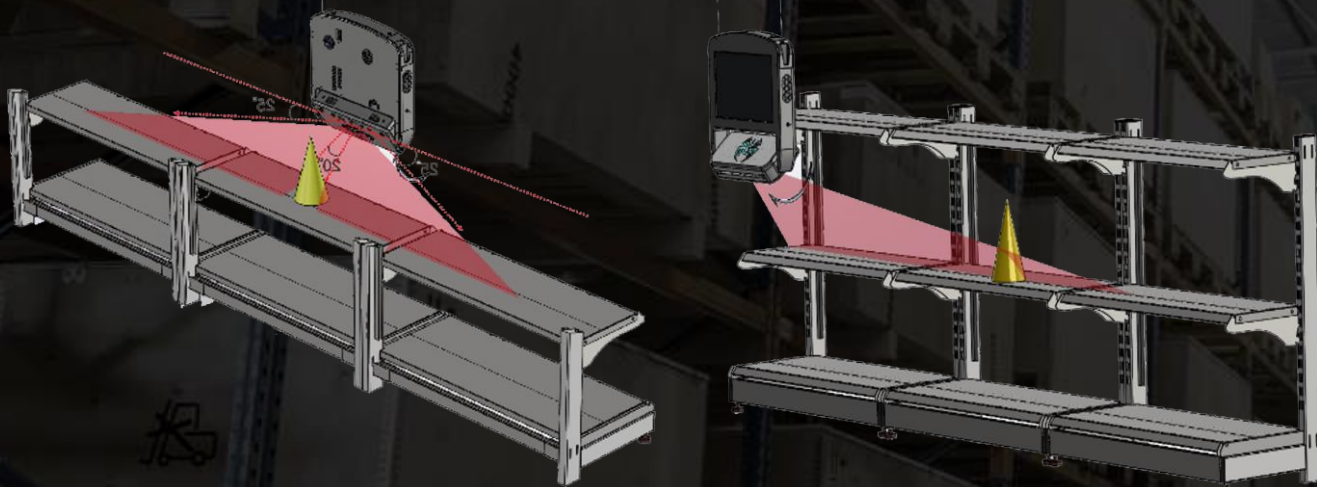
High-Intensity LED

(Rotary) 2D LiDAR Scanner

Barcode+OCR+RFID+Image capture + 3D Shape scan

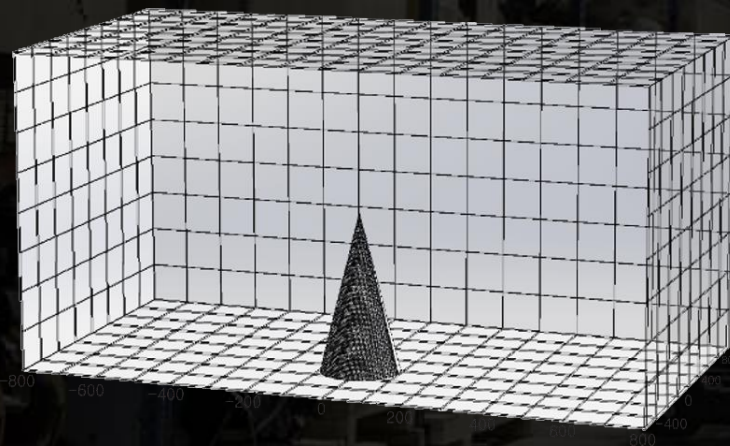
Solution

# Core Tech ; LIDAR 3D Processing



Robot-controlled Lidar Scanning

Calculating Loading volume & Quantity



Rapid 3D shape data processing

Solution

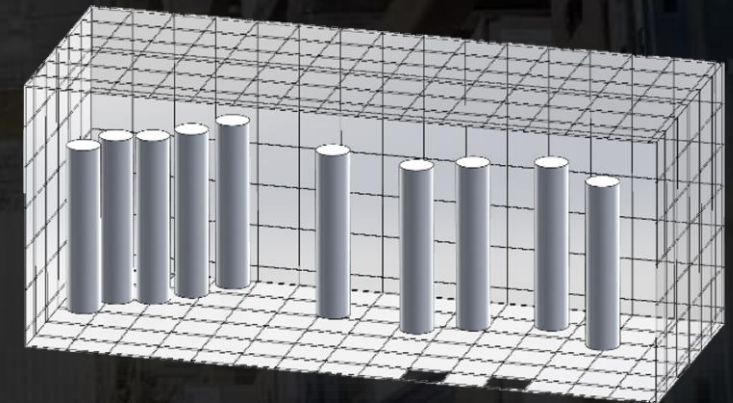
# Core Tech ; LIDAR 3D Processing



Thickness of fabric, film,  
steel roll, etc



Filling ratio & Quantity of  
Components



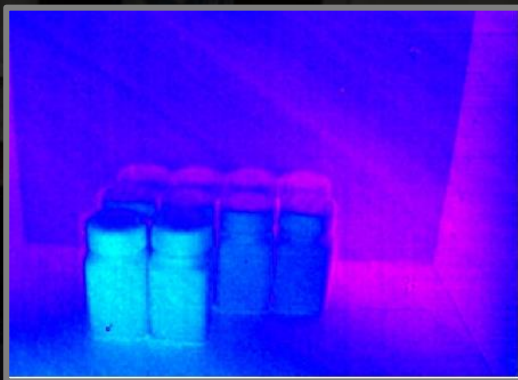
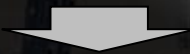
Total volume divided by  
individual volume =  
No. of Goods

Solution

# Unit Test Result

» 3D Shape Processing and Filling Ratio/Quantity Calculation Technology «

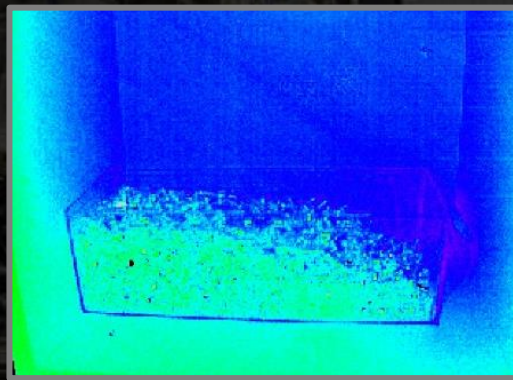
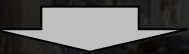
플라스틱류



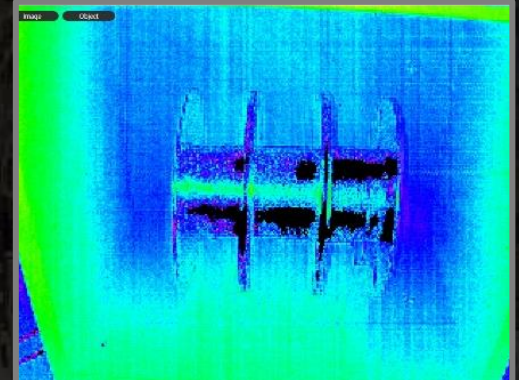
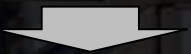
액체류



금속류



롤형태



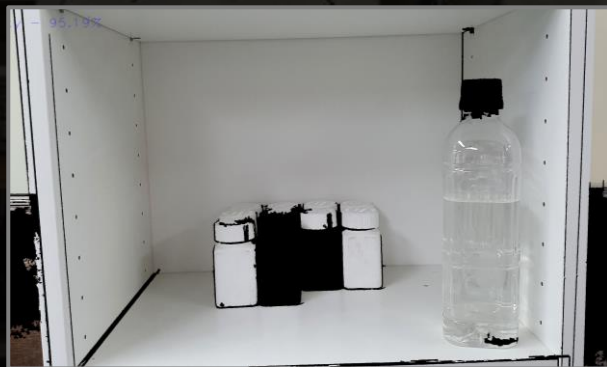
Filling ratio Error falls within 2%, which enables quantity calculation

Solution

# Comparison Test

» Vision-based AI image Processing «

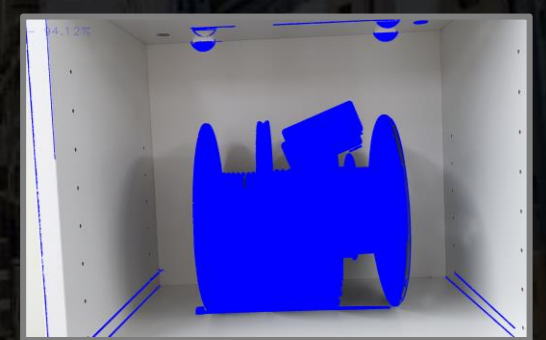
플라스틱류



액체류



금속류



롤형태

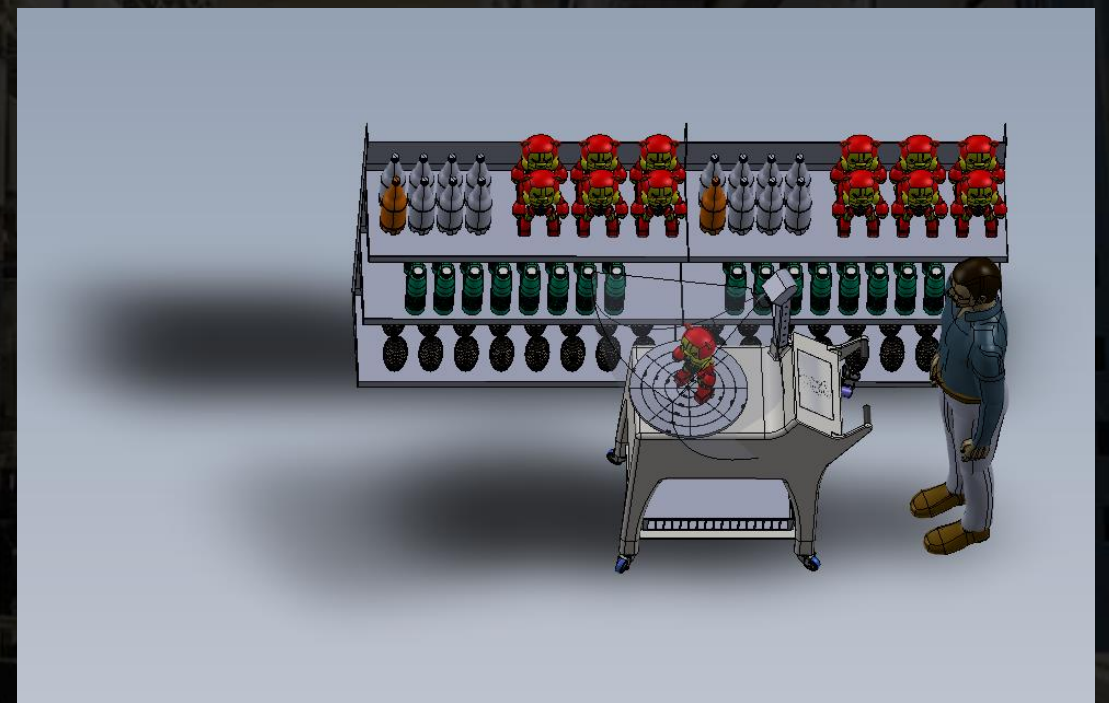
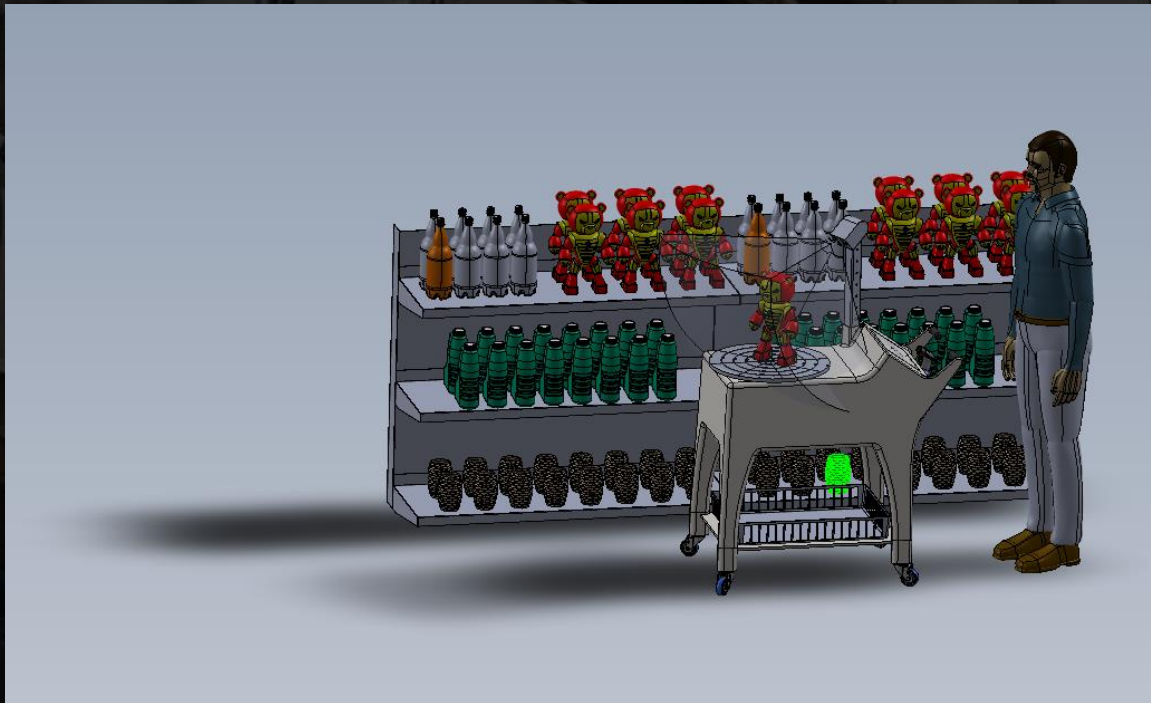
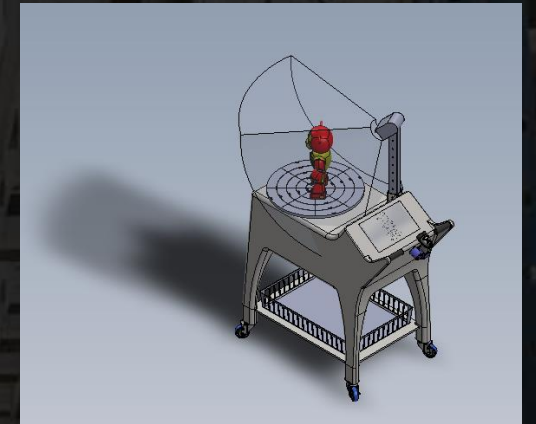


Filling Ratio Error exceeds 30% , No quantity calculation

Solution

# Measurement of Individual Volume

» How to collect the volume data of individual item «



Solution

# Introduction Effect

Inventory Loss  
decreased by **90%**

Annually  
Save **\$230,000**  
(based on 6,000 m<sup>2</sup>)





Industrial Accident  
decreased by **70%**

Annually  
Save **\$50,000**  
(based on 6,000 m<sup>2</sup>)

Management Cost  
decreased by **50%**

Annually  
Save **\$200,000**  
(based on 6,000 m<sup>2</sup>)

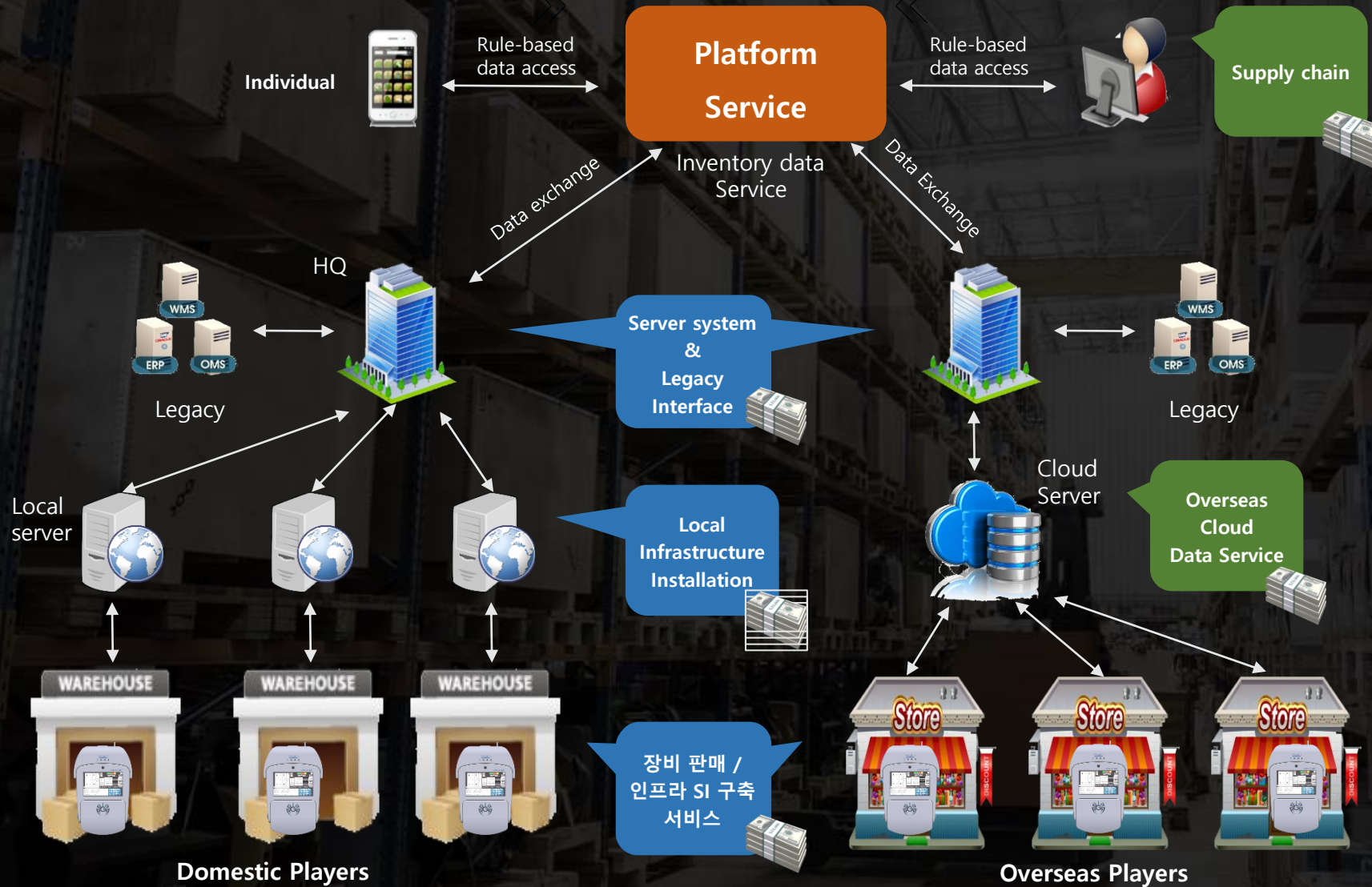
# Technology Comparison

Category		Feature	Cost & Effect (based on 6,000 m <sup>2</sup> )	Pros	Cons
Autonomous Flight (Drone)		<ul style="list-style-type: none"> <li>Barcode scan only</li> <li>Large warehouse only</li> </ul>	<ul style="list-style-type: none"> <li>Monthly rental cost: 5,000 USD (10 units installation)</li> <li>Intro. Effect: Reduce cost by 6,000 USD monthly</li> </ul>	<ul style="list-style-type: none"> <li>No driving rail</li> </ul>	<ul style="list-style-type: none"> <li>Short duration &lt; 30min</li> <li>Freq. falls/Maintenance</li> <li>Battery charging issue</li> <li>Wireless communication Fail</li> </ul>
Autonomous Driving (BossaNova Robot)		<ul style="list-style-type: none"> <li>Store only</li> <li>Barcode scan</li> <li>2D stockout ratio</li> </ul>	<ul style="list-style-type: none"> <li>Monthly rental cost: 8,000 USD (2 units installation)</li> <li>Intro. Effect: Reduce cost by 10,000 USD yearly</li> </ul>	<ul style="list-style-type: none"> <li>No driving rail</li> </ul>	<ul style="list-style-type: none"> <li>Limited functions</li> <li>Limited height</li> <li>Obstructs Shoppers</li> <li>Frq. Errors/Maintenance</li> </ul>
Fixed Camera (TRAX)		<ul style="list-style-type: none"> <li>2D Out-of-stock ratio</li> </ul>	<ul style="list-style-type: none"> <li>Installation Fee: 300,000~500,000 USD</li> <li>Intro. Effect: 20,000 USD yearly</li> </ul>	<ul style="list-style-type: none"> <li>Real-time basis</li> </ul>	<ul style="list-style-type: none"> <li>Freq. damage</li> <li>Battery exchange issue</li> <li>High cost</li> <li>Maintenance</li> </ul>
SPIDER-GO using Driving Rail & Wire		<ul style="list-style-type: none"> <li>Barcode &amp; OCR</li> <li>3D stockout ratio</li> <li>Goods Quantity</li> <li>3D stock search</li> <li>Fire/accident monitor</li> </ul>	<ul style="list-style-type: none"> <li>Rail installation: 50,000 USD</li> <li>Monthly rental Cost: 5,000 USD (10 unit)</li> <li>Intro. Effect: &gt; 300,000 USD yearly</li> </ul>	<ul style="list-style-type: none"> <li>Realtime/Precise</li> <li>Multifunctional</li> <li>Cost effective</li> <li>Install anywhere</li> </ul>	<ul style="list-style-type: none"> <li>Rail installation (40 USD per meter)</li> </ul>

# Business Model

구 분	Leasing Business	Sales Business
<b>Warehouse</b> (6000 m <sup>2</sup> )	<ul style="list-style-type: none"> <li>• SPIDER-GO 10 units &amp; Driving Rail installation</li> <li>• Initial Installation Fee: 50,000 USD</li> <li>• Free-of-charge maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• 15,000 USD per 1 unit of SPIDER-GO</li> <li>• Driving Rail Installation: 50 USD per meter</li> <li>• Single year Warranty</li> </ul>
	<ul style="list-style-type: none"> <li>• Monthly 5,000 USD (300 USD for adding each unit)</li> </ul>	<ul style="list-style-type: none"> <li>• 250,000 USD for 10 units installation</li> </ul>
<b>Superstore</b> (6000 m <sup>2</sup> )	<ul style="list-style-type: none"> <li>• SPIDER-GO 50 units &amp; Driving Rail installation</li> <li>• Initial Installation Fee: 200,000 USD</li> <li>• Free-of-charge maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• 15,000 USD per 1 unit of SPIDER-GO</li> <li>• Driving Rail Installation: 50 USD per meter</li> <li>• Single year Warranty</li> </ul>
	<ul style="list-style-type: none"> <li>• Monthly 10,000 USD (300 USD for adding each unit)</li> </ul>	<ul style="list-style-type: none"> <li>• 600,000 USD for 50 units installation</li> </ul>

# Inventory Data Sharing Platform service



# Target Market



Military Supplies



Parts & Tools



Cargo mgmt.



Cold Chain



Apparel & Fabric



Food & Beverage



Document & Tape



Medical Devices



Aviation Parts



Jewelry



Liquoros



Steels

**TAM** | 5 trillion USD  
Entire Industries  
Data sharing Platform Service

**SAM** | 1 trillion USD  
Small & mid-scale stores

**SOM** | 300 billion USD  
Warehouse  
smart factories worldwide

# Free POC Strategy



## Related Videos

- Warehouse version: <https://youtu.be/IO3fPgkMIOQ>
- Store version: <https://youtu.be/uNMb0rh0a24>
- Store version Pilot Application: <https://youtu.be/yT3ZuJcG218>
- CES 2022: <https://youtu.be/evX8IVK1Ak4>

Thank you.

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# SPIDER-GO

## Unmanned Store Management System



### Product Summary



Warehouse automation system, SPIDER-GO warehouse version is the product that, moving vertically or horizontally autonomously on the driving rail that is installed on the loading rack of the large warehouse or rear side warehouse and can be operated more than 5 hours if fully recharged. System moves up immediately and avoid collision accident if it detects the movement of the forklifts or operators in the paths of movement. Deficiency rate can be investigated by not only the recognition of barcode or string OCR but also by the sensor visionbased 3D scanning function through the installed vision camera. In the meantime, RFID can be recognized if RF antenna is installed selectively. It is the basic operational function of the system to detect the operation error by tracking down the loaded cargo or picking operation of the fork-lift on a real time basis during daytime and total quantity inspection during night time. There is no limit of height of application using wire type operation and also, theoretically, system can be expanded unlimitedly by connecting the driving rails unlimitedly. Scanned cargo information will be transmitted to the server and the arrangement status will be displayed on the 3D map. Operator can monitor the cargo loading status on a real time basis without visiting the site through the remote-control function. Fire detection and temperature / humidity including theft and safety accident can be monitored as well through the CCTV function.

Youtube Search : "spider-go warehouse" 🔍

### Market Problem



- ☑ Cargo & door-to-door services are increased rapidly by the rapid growth of the ecommerce business.
- ☑ Reduction of cost becomes the core issue due to the loss bearing logistics competition.
- ☑ Demand of the warehouse automation is increased rapidly by the wage rise and labor shortage
- ☑ Inconsistency between actual inventory and computerized inventory is getting worse due to the rapid increase of traffic volume in warehouse
- ☑ Frequent erroneous loading and picking of cargo by the mistake of operators
- ☑ Falling accidents of operators due to the frequent actual investigation
- ☑ Lack of practicality and efficiency of existing competing technology
- ☑ Importance of full-time monitoring of the fire and safety accident is getting increased with the enlargement of large warehouse

### Product Structure



### Product Feature



#### Inventory Checking Function

- Scanning of barcode, string and RFID at the same time. 3D scan to calculate the out-of-stock rate
- Real-time transmission of scan results to server
- Real-time error tracking for cargo loading and picking operation during daytime
- Full inventory checking at night



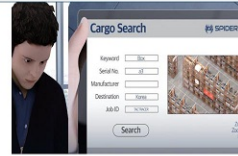
#### Automatic Generation of Location Coordinates

- Generating location coordinates when making horizontal and vertical movements, and matching inventory data to location coordinate values
- Automatic control of wobbling through inertia-controlling technology



#### Real-Time Inventory Checking

- Searching stocks on a 3-D layout and determining inventory status
- Taking real-time inventory on specific stacking racks through remote controls
- Investigating loading environment from various angles by utilizing tilting function



#### Detecting Obstacles

- Preventing safety accidents by checking for the existence of forklifts or workers while moving vertically
- Avoiding obstacles on the moving path when checked before reporting to the manager



#### Working Environment Monitoring

- Monitoring CCTVs, thefts, fires and temperature/humidity while autonomously operating all day and night



#### Driving Rail Track

- Assembling and installing straight or curved rails.
- In theory, possible to link an infinite number of rails.

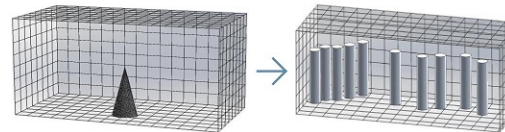


# SPIDER-GO

## Warehouse Inventory Automation System



Loading rate and quantity calculating technology through the 3D scanning technique



Total volume / individual volume = # of individual quantity



Example) Load rate of components and quantity calculation



Example) Fabric / Film roll quantity and thickness calculation



### Key Feature



### Field Application



Unmanned store management system SPIDER-GO version is the product that moving vertically or horizontally autonomously on the driving rail that is installed along the ceiling or display shelves of the distribution market or small retail stores or convenience stores, and it can be operated more than 5 hours with 20 minutes of fast recharging operation. This system can detect the errors of the price labels attached on the shelves through the vision camera and investigate the deficiency rate through the LIDAR sensor-based 3D scanning function. In the meantime, RFID can be recognized if RF antenna is installed selectively. In addition to the inventory management function, product search, product information, discount event inquiry and remote communication with the customer center through the voice and display touch recognition function, and the product advertisement and discount event video can be transmitted as well during the movement of the system. System also can move up rapidly while it is moving down vertically and avoid the collision accident when it detects the approach of shopping cart or persons. Collected inventory information can be shared with the supplier company on a real time basis through the server which makes the suitable inventory management available as well.

Youtube Search : "spider-go store"

### Store Management for OWNERS

- Real-time stockout monitoring
- Checks shelf label errors
- Analyzes customers' shopping moving line
- Fire detection and monitoring of temperature, humidity, etc
- Selectively RFID scanning



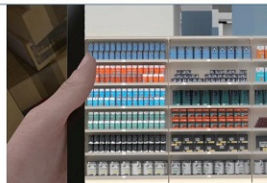
### Kiosk for CUSTOMERS

- Product search in 3D
- Retrieval of product information
- Finds discount events and store information
- Video call with a customer center
- Online Shopping cart and payment



### Inventory information for SUPPLIERS

- Periodic check for inventory status
- Understands sales trends of new products
- Streaming of new product PR videos
- Support for inventory/products with a video call
- Finds out customers' buying preference
- Automatic ordering when stock runs out



### Product Summary



### Product Feature



## Warehouse version



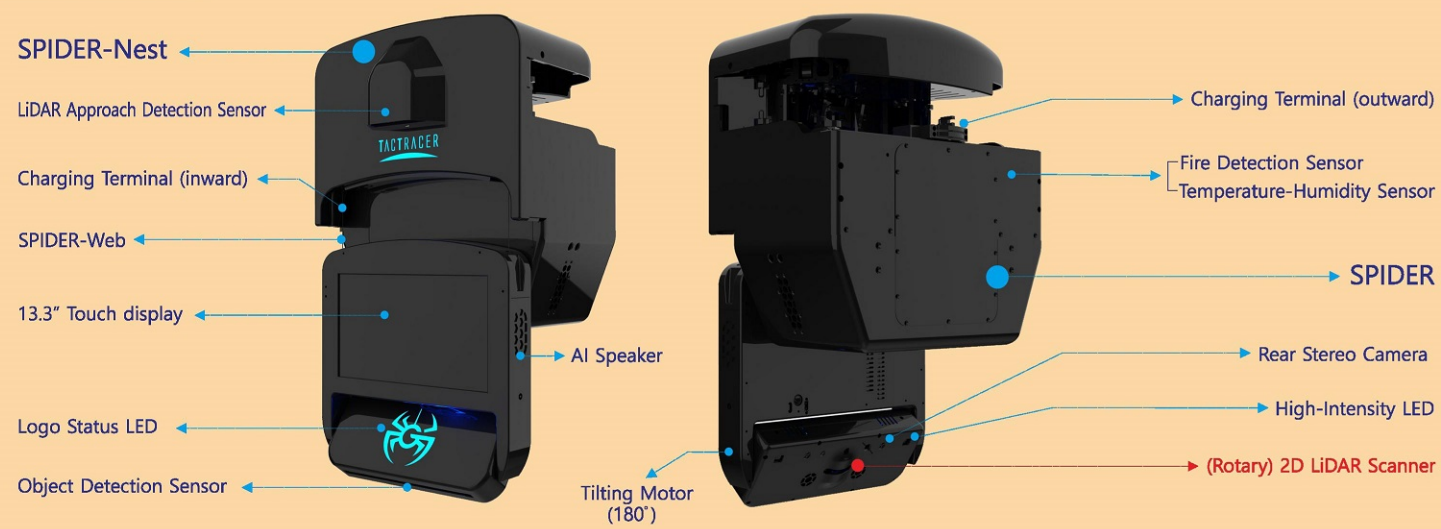
- Regular Inventory Scan
- Barcode/OCR/Rfid
- Checks Loading/Picking Errors
- 3D Inventory Search
- Remote Ad-hoc Inventory
- Fire/Worker safety Monitor

## Store version

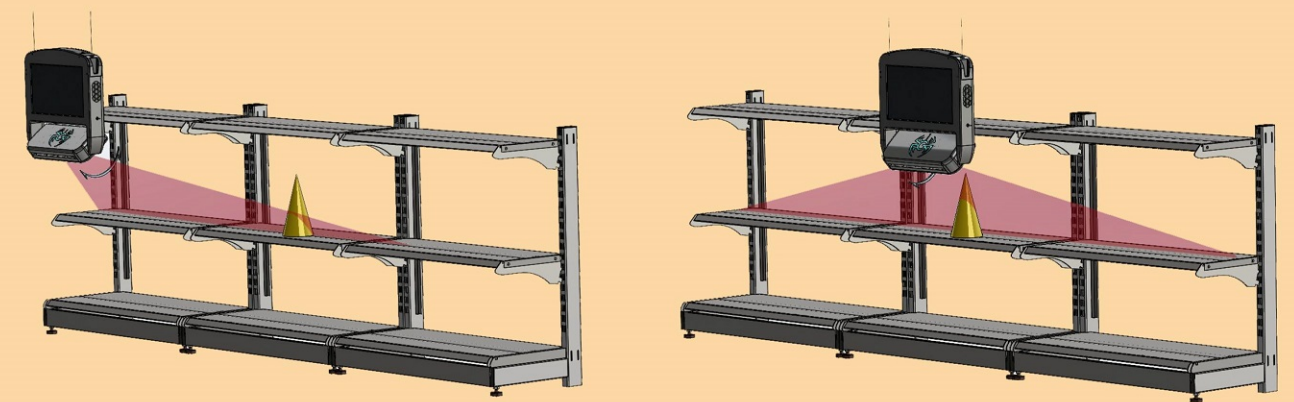


- Check Out-of-stock / Quantity
- AI-based Customer Kiosk
- Stock status sharing w/ suppliers
- Video Advertisement
- Video calls with CSC
- Store Guidance/Store Events

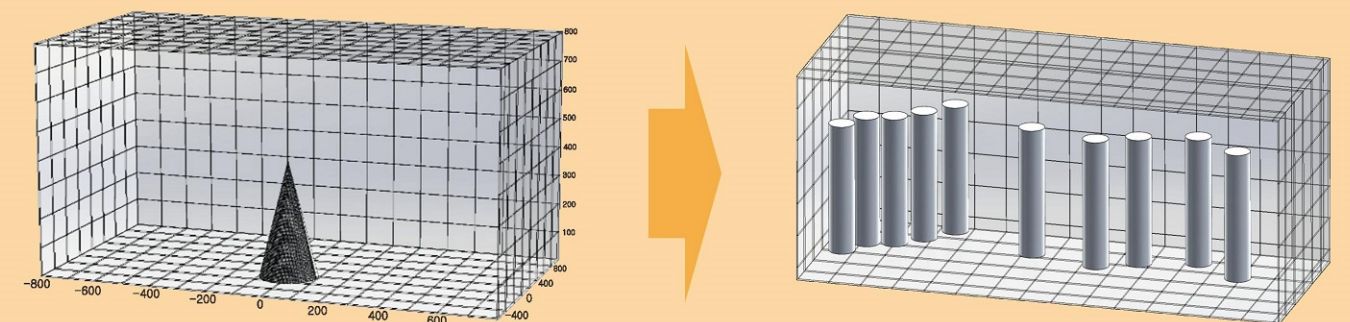
## Structure



## Core Technology 3D scanning technique calculating "Loading rate and Quantity" of goods



Robot-Controlled 2D LiDAR Scanning



High-speed 3D Shape Data Processing

Total volume/Individual volume=No. of goods

## Applying Fields



Military Supplies



Components



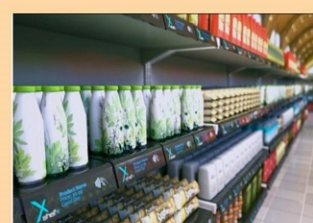
Logistics



Cold Chain



Apparel/Fabrics



Foods



Data Tape



Medical Devices



Aviation Parts



Jewelry



Liquors



Steels



Filling ratio & Quantity of Components



Thickness of Fabric, Film, Steel roll, etc