嘉模阿波羅 與
香港走向智能製造現代化

Karmo Apollo +
Robotics Automation +
Government

Content

Company Introduction

Company Background

▷ Established in **Year 1972**

▷ Previous developing automation in plastic industry is the core business

▷ Currently focused in developing 3 Businesses:
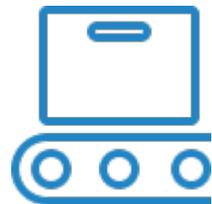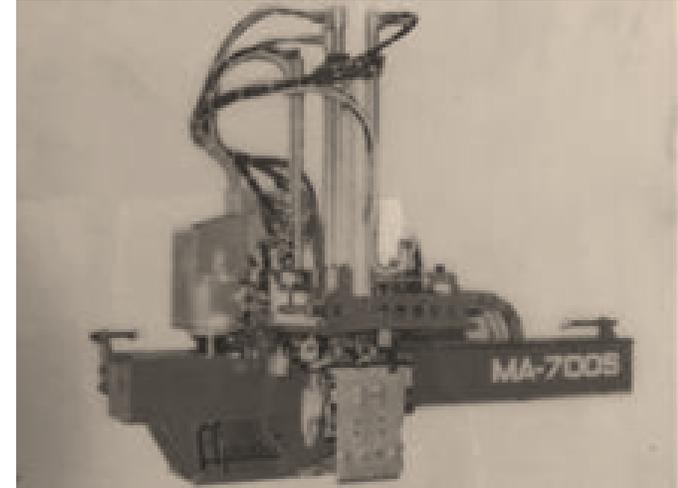
▷ Robotics Solution

▷ Industrial Machinery Solution

▷ Product Development &

▷ Product Adaptation

Recent Projects – Printing Automation (2014 - 2017)

▷ Project Aim :
   ▷ To increase the quality of printing, feeding & transportation
   ▷ To increase the stability of product quality and quantity
   ▷ To integrate into ERP (Industrial 4.0)

Recent Projects – The Billie Upcycling (2018)

▷ Project Aim :
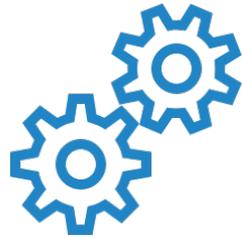 ▷ To Reindustrialize Hong Kong
  ▷ To Promote Recycling

Smart Warehouse

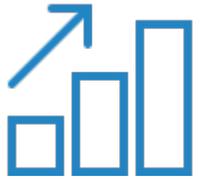# What is a Smart Warehouse System ?

Automated Pick &
Place Cargo System

Inventory database
with management
system

Automatic Ground
Vehicle for heavy
loading cargo
distribution

Advantages of Smart Warehouse System

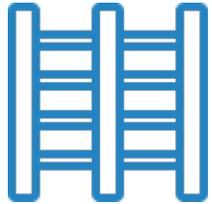▷ **Increase in productivity** by transferring repetitive procedure to automated machine

▷ **Reduce risk of injury** from different hazards in loading/unloading heavy cargo

▷ **Increase in efficiency** by utilizing machine use

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Components of Smart Warehouse System

Warehouse

Cargo Storing Unit

Pick & Place System

Mechanical system for transferring cargo

Control Unit

Main coordination & control unit, could be interact by GUI

Database Server

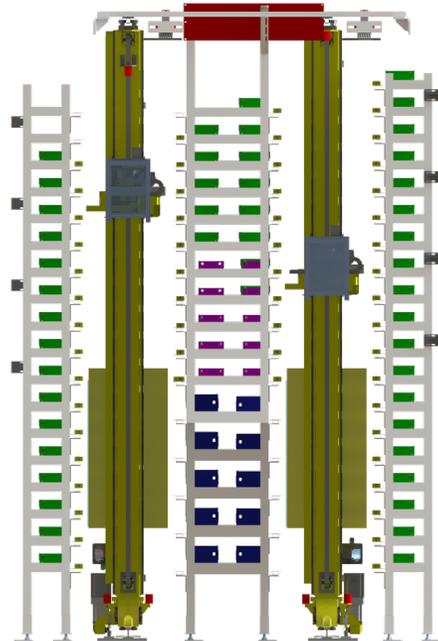Server that stored inventory data and transaction logging

Cargo

Stored object with unique tags to digitize information

Pick & Place System

- Robotics Arm
  - Suited for highly stacked warehouse
  - Agile in reaching difficult storage location
  - Cargo would be retrieved or stored at a fixed location

- Automatic Guided Vehicle
  - Suited for manoeuvring of racks of cargo
  - Flexible in pick & place cargo in different location
  - Easier in adapting expansion and reduction

Transportation Robot

▷ Automatic Guided Vehicle to follow predetermined path

▷ Carrying payload ranging from 50 – 1200 kg

▷ Equipped with different path following technique

▷ Safety network to enhance safety with auto resume feature

Control Unit

▷ **Inventory Management**

  ▷ Reading / Writing of the database according to inventory changes

  ▷ Retrieving inventory from rack according to order

  ▷ Statistic of change for inventory

▷ **Coordination**

  ▷ Coordinate of components to achieve management option

  ▷ Monitoring system status for safety and inventory management

  ▷ Equipped with simple to use Graphical User Interface to access and control
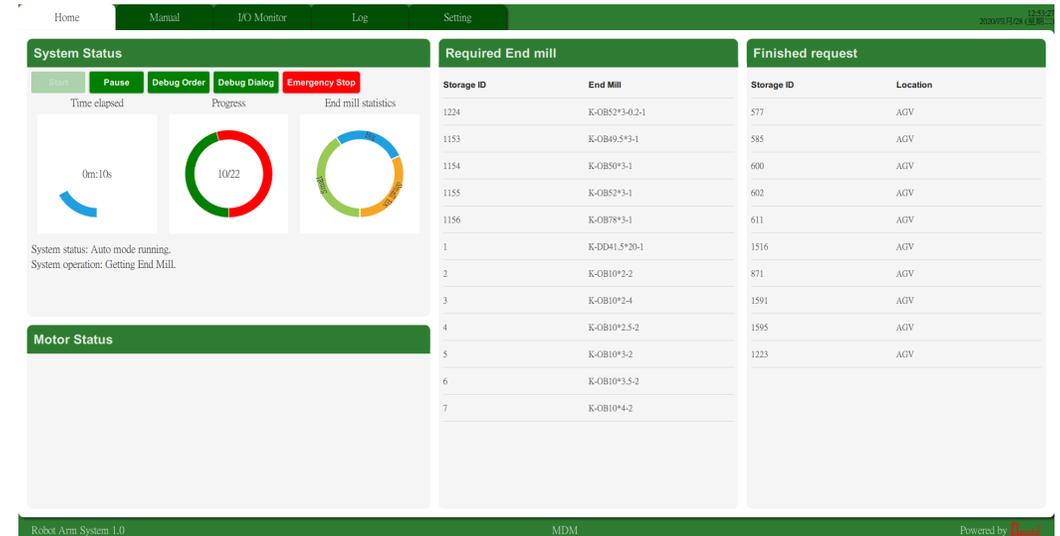
Reference Projects : The Billie Upcycling (2018)

Managing

Maneuvering

Managing

> 1 yr

of development
time

> 40

types Textiles
simultaneously

100 kg

of inventories
between points

> 10

orders at the
same time

Reference Projects : CNC Punching & 3D Projects (2020 - Current)

DELIVER

tools to destinated

Managing

> 160

tools & dies at a time

Carry up to

50 sets

of inventories between points

Control Unit

SHOW

Order list &

Advanced Robotics Solution

What is Advanced Robotics Solution?

Collaboration between Human & Robots

A platform for installing maneuvering different terrain

Customized tools/applicator designed for dedicated purpose
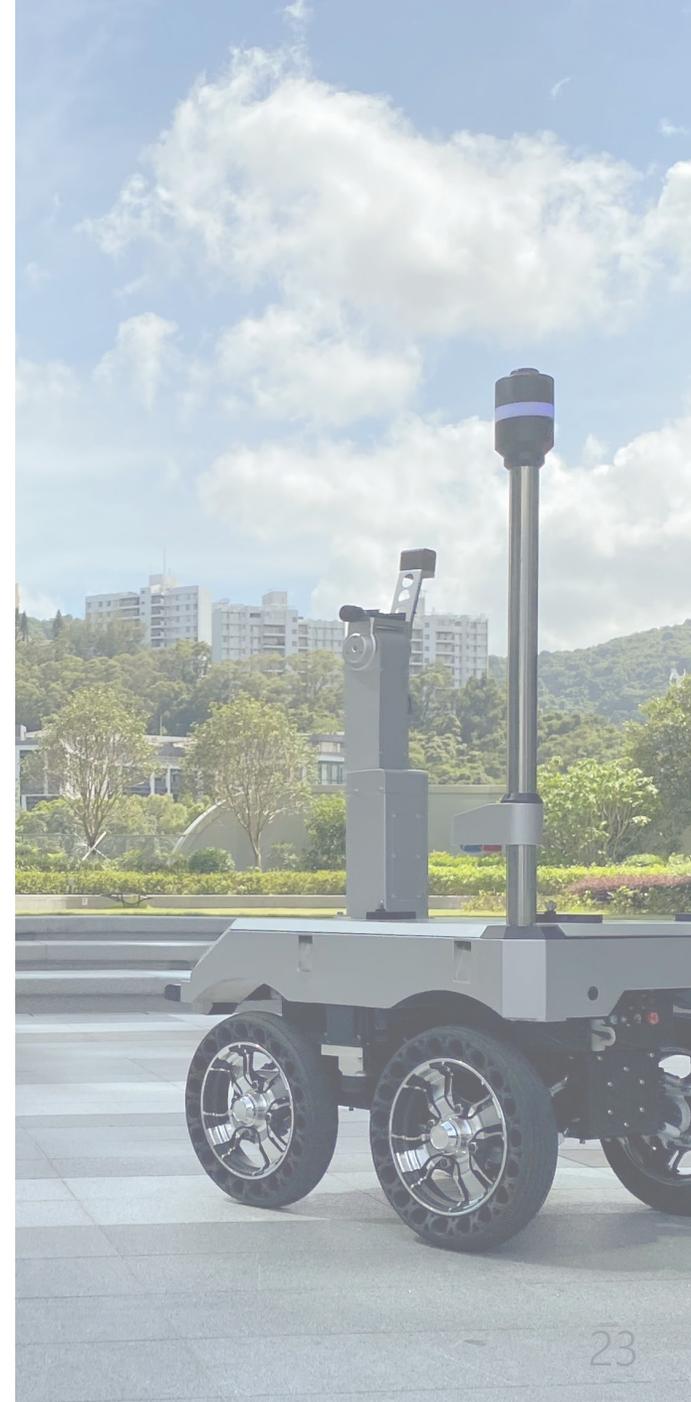
Advantages of Robotics Automation Solution

▷ Allowing the robot to access **hazardous area or hard to reach area**

▷ **Perform repetitive/scheduled work** with less margin of error/ better consistency

▷ **Promote better use of manpower** on simple / labor intensive work

Apollo®

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Components of Robotics System

Control Unit

Perform analyzing of
signal received to
output desired action

Safety Sensor

Network of sensors
will be included to
allow safe interaction
between human and
the robot

Remote Control

Wireless / Wired /
Autonomous control
can be achieved

Chassis

Stationary/Moving
platform to carry load
and perform task
under the command

Chassis

▷ **Wheeled Chassis**

 ▷ Relatively Agile in movement

 ▷ Best suited for flat and smooth terrain

 ▷ Allows for better longevity for travelling long distance
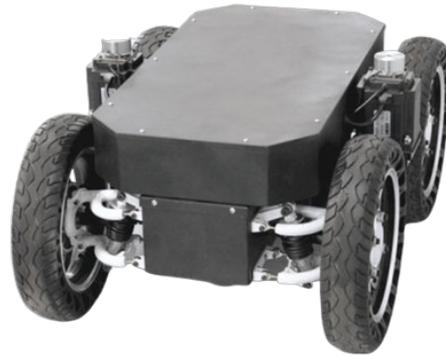
▷ **Tracked Chassis**

 ▷ Better weight distribution for carry high load

 ▷ Best suited for wide variety of terrain, from smooth to rough

 ▷ Able to move in soft surface such as mud / shallow water

Patrol / Surveillance
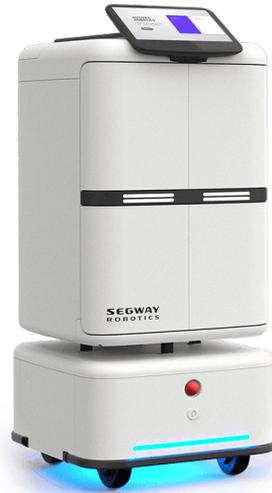
▷ Equip with :

Surveillance Camera

Thermal Camera

▷ Enables :
- ▷ 24/7 Monitoring
- ▷ Autonomous Operation with less manpower
- ▷ Enable monitoring wide range of parameter
- ▷ Easy Monitoring of High-Risk Area

Customizable Solution

▷ Mobile Pick & Place Station

▷ Heavy-Duty Delivering Robot

▷ Indoor Mapping Robots

Recent Projects - Robotics-Enabled Automatic Fogger for Mosquito Control (2020 - Current)

Could Deploy in

CITY / COUNTRY

Parks

Perform in

MANUAL / AUTO

mode

Adapts to

MULTIPLE

fogger technology

Allows

VARIED

chassis for different terrain

Robotics in Construction Industry

How Robots involve in Construction Industry ?

Enables uniform quality with higher accuracy

Replace human operators from tasks involve intensive physical work or work that exposed to dangerous environment

Make task that are beyond human capabilities easier

GoGo Trolley

- ▷ Designed by In-House designer team
- ▷ Awarded CITF's Pre-Approved Product
- ▷ Improve workers health & safety
- ▷ Provide large customizability

CITF 建造業
創科基金
CITF Pre-approved Product
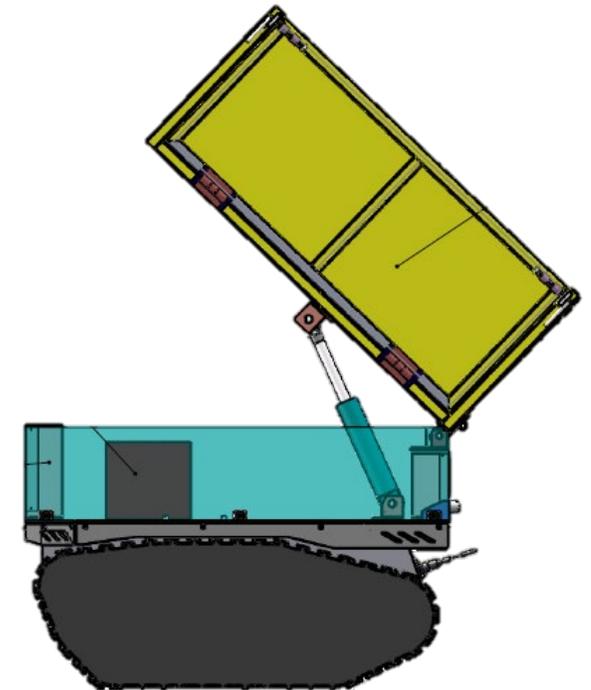
Features of GoGo Trolley

Responsive Remote Control

Up to 300kg of loading

Extensive Customizability

Environmentally Friendly Power Source

Tracked Chassis for Rough Terrain

Comprehensive Safety Network

QuicaBot

▷ Develop & Designed by **Transforma Robotics** with Singapore's Nanyang Technological University

▷ Designed as a solution for **housing quality inspection & assessment**

▷ With different advanced sensors, quantify different parameters of **housing inspection**

TRANSFORMA

NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

Features of QuicaBot

Multi-Operating Mode – **Autonomous** / Following / Remote Control

Realtime Upload to Private / Public Cloud

Ease in **Expanding Sensor Network** for different function

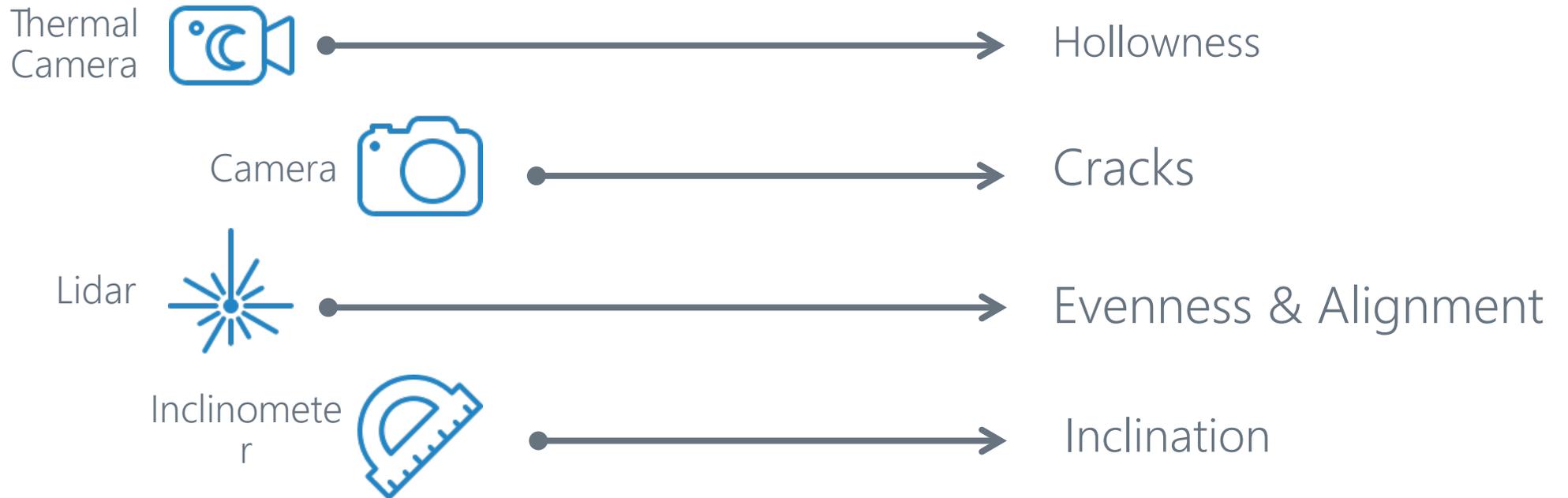Up to **4hrs of Battery Life** with Interchangeable Battery

-50%

Promote efficiency in manpower, saving up to 50%

-50%

Reduce Inspection time up to 50%

Technology of QuicaBot

▷ QuicaBot is equipped with multiple advanced sensors for detecting different defects and performing different functions

Thermal Camera → Hollowness

Camera → Cracks

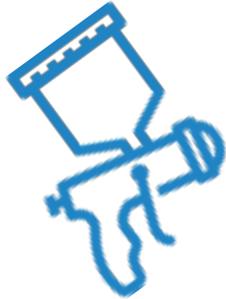Lidar → Evenness & Alignment

Inclinometer → Inclination

PictoBot

▷ Develop & Designed by Transforma Robotics with Singapore's Nanyang Technological University

▷ Designed for easy maneuvering in indoor area, such as going though corridors & doors

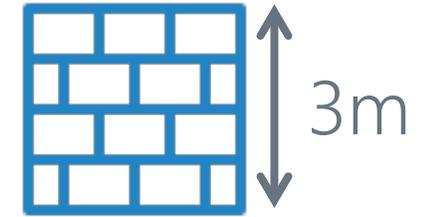▷ Developed with intelligent model for high efficiency and the best quality

Features of PictoBot
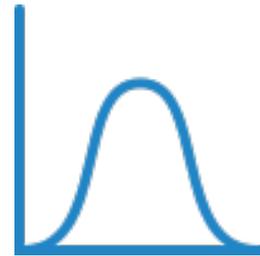
High Spraying Efficiency

Up to **4 times** faster than conventional painting method
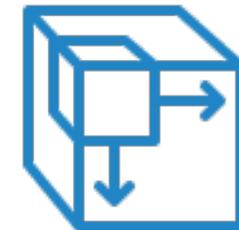
Able to paint walls up to **3m tall**

3m

Able to operate at night, with up to **4hrs battery life**

Quantitative Painting process model for planning process

In-situ Optical Scanning & **3D Model Building**

Conclusion

K armo A pollo +

R obotics A utomation +

G overnment

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The End