Automated Guided Vehicle – Implementation and Best Practices

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Company Profile

Company Name	DF Automation & Robotics Sdn Bhd (1006594-V)
Incorporated	June 2012
Headquarter	Johor Malaysia
Number of employees	≈ 40
Present in *Through Partnership/Distributor	
Company Business	• Design, manufacture & supply Automated Guided Vehicle (AGV) total solution • Design & supply automation & robotics solution

Partners:

swisslog
Member of the KUKA Group

UNIVERSAL ROBOTS

MITRA OTOMASI SAMPOERNA

LE CHAMP
IN STEP WITH TECHNOLOGY

Ure-shii Technologies, Inc.

BIZIT Systems

UStone

modu

RK SOLUTIONS PTE LTD

df AUTOMATION & ROBOTICS

Customers

df AUTOMATION & ROBOTICS

A **manufacturing** plant can be as big as **20,000 square meter**.

Thousand of goods are being moved between locations in **a day**.

PROBLEM: Rely on physical workforce

weight up to
500kg

walk average
3000m

- **Low skill job**: labour intensive, tiring and dangerous.
- **Human factors:** inefficient, foreigner workers' issues, theft, etc.
- **Cost**: minimum wages increased.

How to **automate** material handling **without using conveyor** that is more **flexible** and yet can **reduce labour reliance**?

Products

User Interface Panel

Control Panel

Safety sensors 1:
Laser scanner

Safety sensors 2:
Bumper switch

Software:

NavWiz

Auto Charge

Differential Driving
wheels

ZALPHA

Navigation Method Options

MG : Magnetic

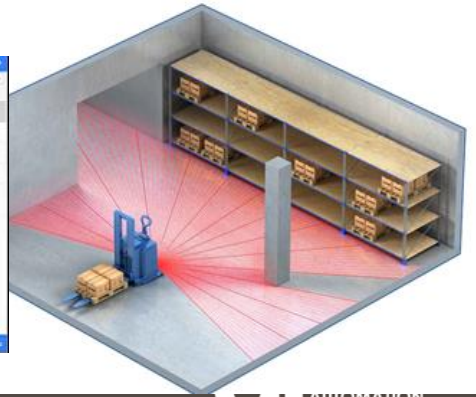
Magnetic Tape specs:

- Self-Adhesive with 3M tape
- Width: 50mm
- Thickness: 1.5mm
- Length: 25m/roll
- Color: Black
- Polarity: N Top S bottom

TS : Trackless / Natural Features

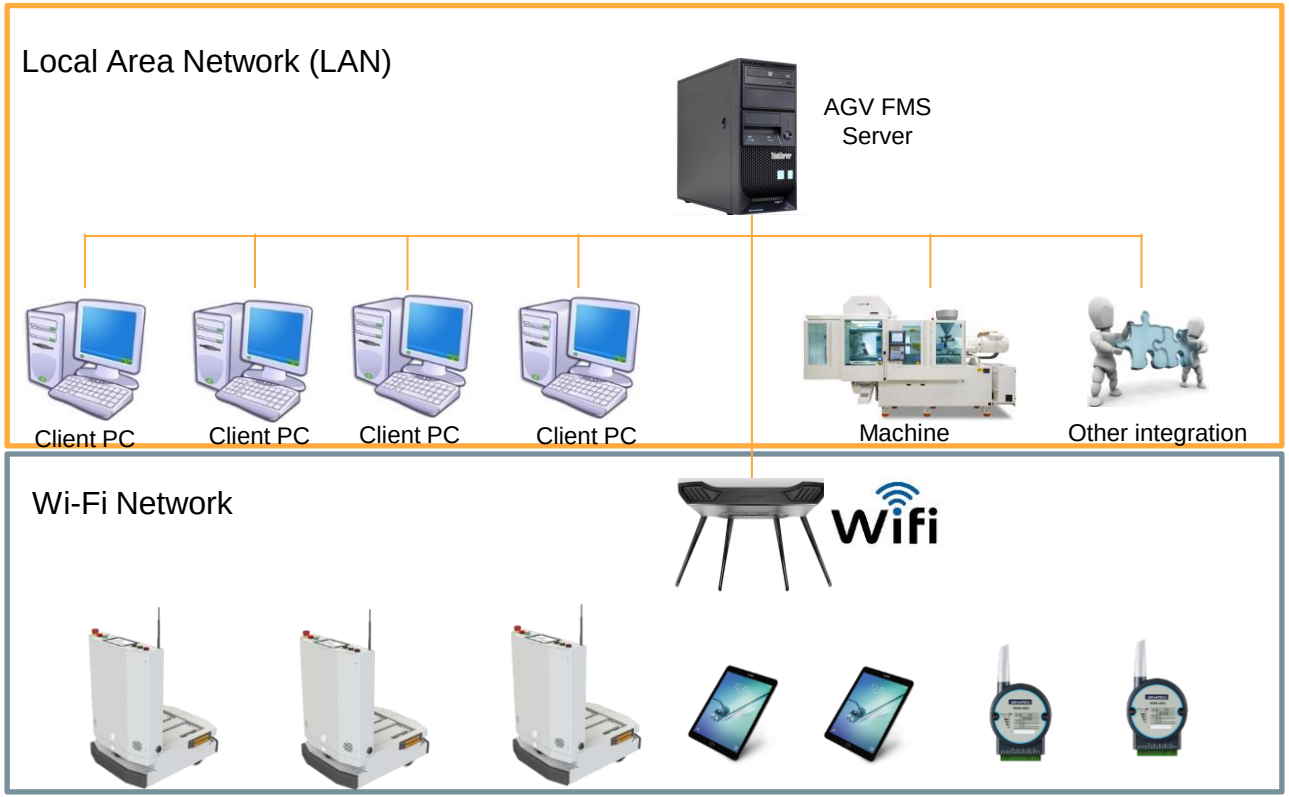
DF Trackless Features:

- Can be switch between Natural feature navigation & magnetic navigation



Accessories for AGV Total Solution:
1. AGV Fleet Management System (FMS)

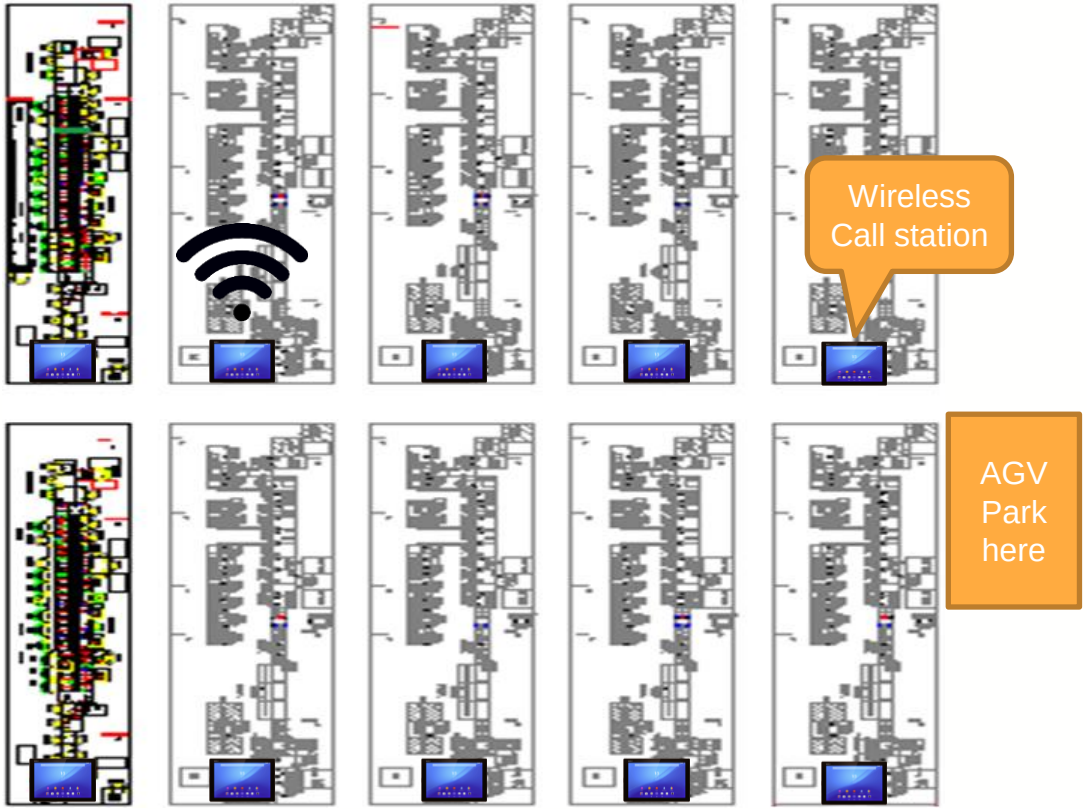
FMS Architecture



FMS usage:

- AGVs traffic control
- Task management
- Scheduling control
- Centralized monitoring of AGVs information Eg: Location, battery level, status and etc
- Centralized AGVs control Eg: Map change, sequence change, setting change and etc
- Data logging and reporting

Accessories for AGV Total Solution:
2. Call System



Call System Usage:

- Used to summon AGV wirelessly to specific location
- Monitor AGV current task list/task que
- Monitor AGV status
- Remotely control AGV/AGVs

Accessories for AGV Total Solution:
3. Wireless remote I/O Module

AGV

Wifi

FMS Server

Alarm & acknowledgement Light

Buttons

Cargo Lift

Many More

Wireless remote I/O Module

I/O Interface

Machine

PLC

Conveyor

Accessories for AGV Total Solution:
4. Others

Custom software development service

Additional Monitor for display

Trolley Position guide/platform

Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Implementation and Best Practices (Case studies)

1. **Special trolleys**
2. Customised handler
3. Karakuri
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Requirements:
- Need to use users' existing trolleys

Implementation and Best Practices (Case studies)

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2. **Customised handler**
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Requirements:

- To automate a flexible production line that manufacture motorcycle

Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. **Karakuri**
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
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9. Warehouse with handling

Requirements:

- The AGV needs to be integrated with the factory lean manufacturing philosophy.

Implementation and Best Practices (Case studies)

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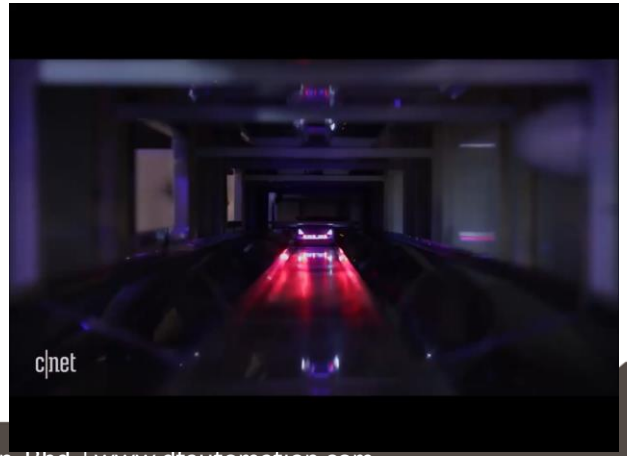

Requirements:

- Smaller AGV with full functions and yet able to carry foods to 50 tables.

Implementation and Best Practices (Case studies)

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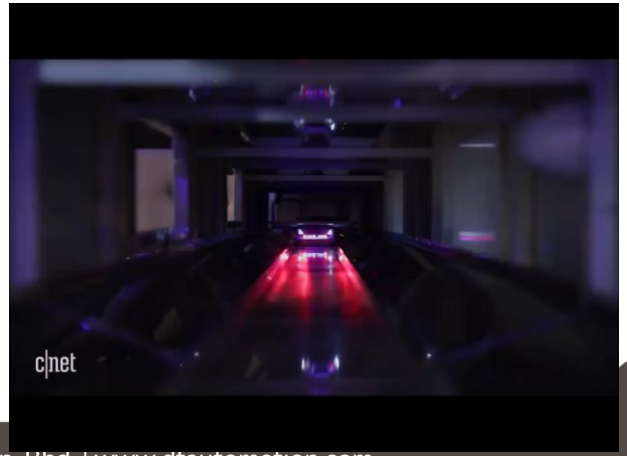

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Implementation and Best Practices (Case studies)

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5. **1 tonne Pallet Jack**
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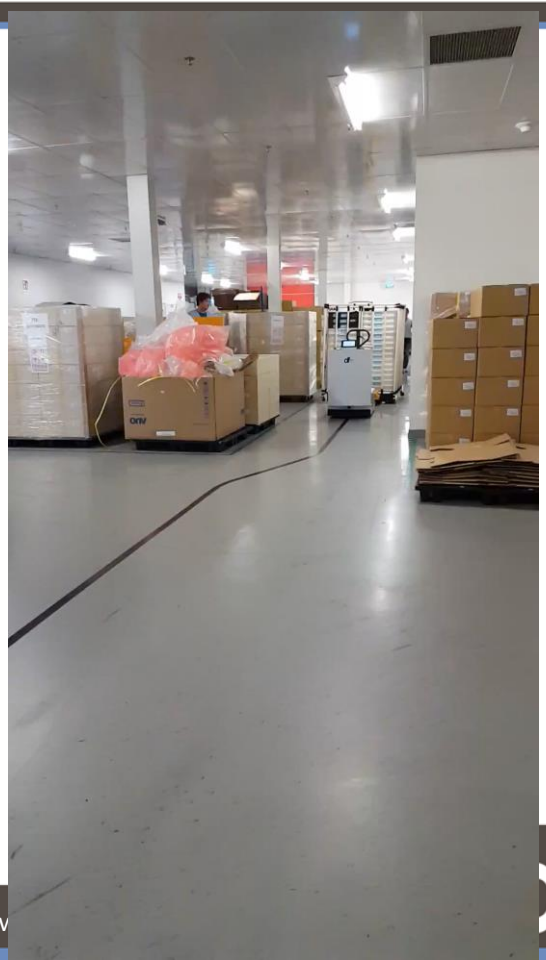
Requirements:

- 30 mins point-to-point delivery of 1 tonne pallet. Need to carry the pallet jack also.



Implementation and Best Practices (Case studies)

1. Special trolleys
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6. **Pallet only**
7. Forklift
8. Continuous production flow
9. Warehouse with handling

Requirements:

- To transfer pallets only fully autonomous without interference from human.

Implementation and Best Practices (Case studies)

1. Special trolleys
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3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. **Forklift**
8. Continuous production flow
9. Warehouse with handling

Requirements:

- To perform as a normal forklift up to 2 tonne but autonomously.

Implementation and Best Practices (Case studies)

1. Special trolleys
2. Customised handler
3. Karakuri
4. F&B
5. 1 tonne Pallet Jack
6. Pallet only
7. Forklift
8. **Continuous production flow**
9. Warehouse with handling

Requirements:

- Automate production flow with 20 AGVs
- Need to pick up cart automatically
- One way only

Implementation and Best Practices (Case studies)

1. Special trolleys
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5. 1 tonne Pallet Jack
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7. Forklift
8. Continuous production flow
9. **Warehouse with handling**

Requirements:

- AGV integrates with robotic arm and able do precise positioning and perform pick & place.

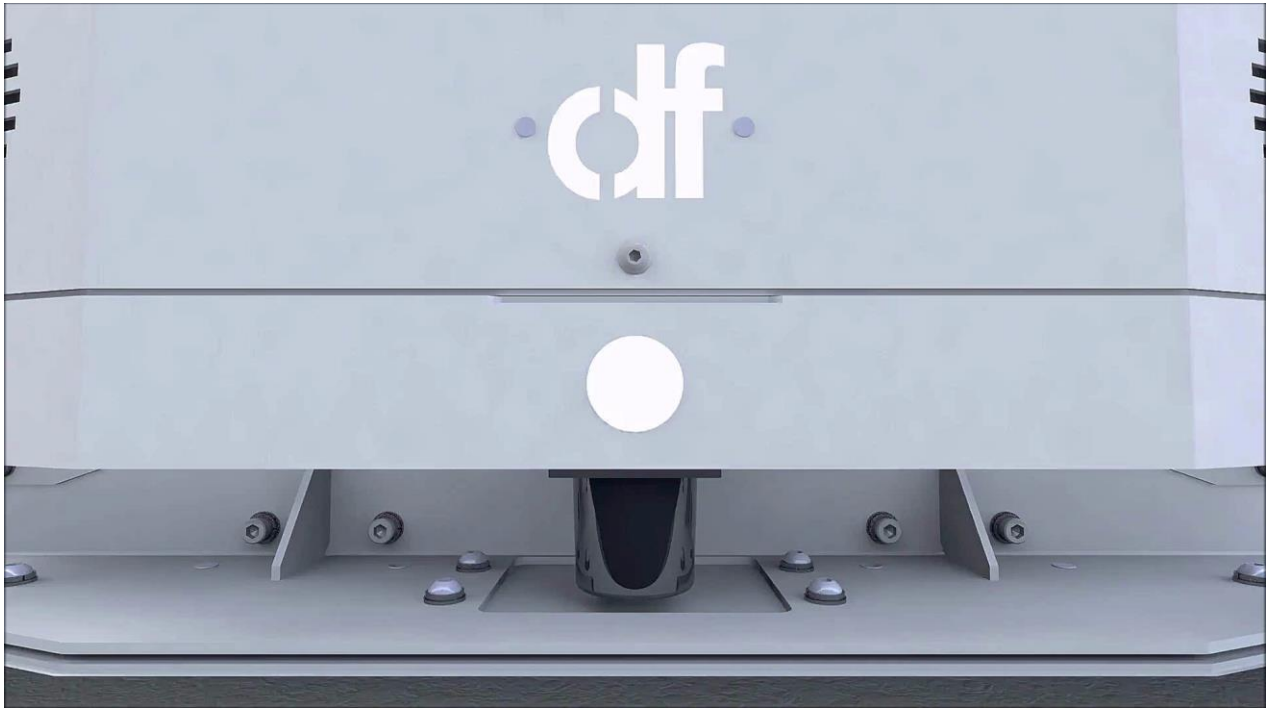
https://youtu.be/dsQsGGiojAI

Conclusion

AGV itself is not very useful, it has to be **Designed with a Total Solution** in mind.

Thank you very much,
cfyeong@dfautomation.com

Conclusion



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