



ABB ROBOTICS

Conveyor tracking module

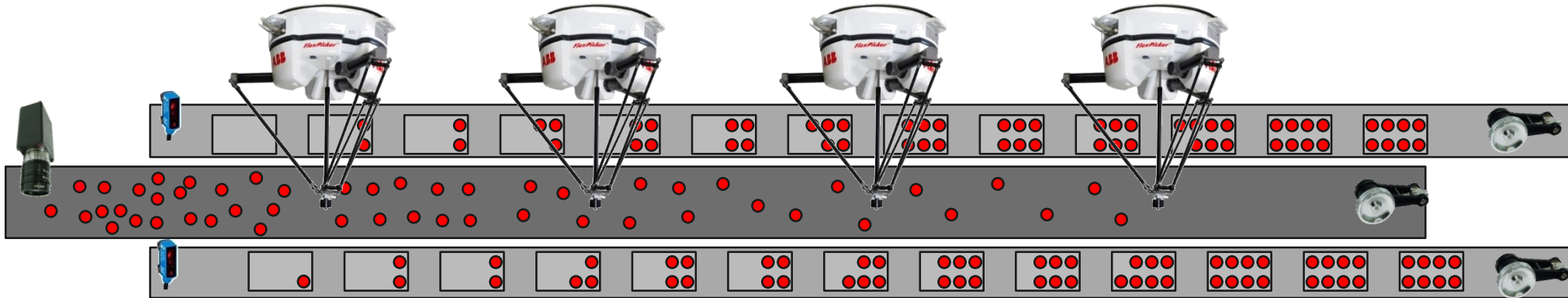
Product Management, ABB Robotics

September 2018



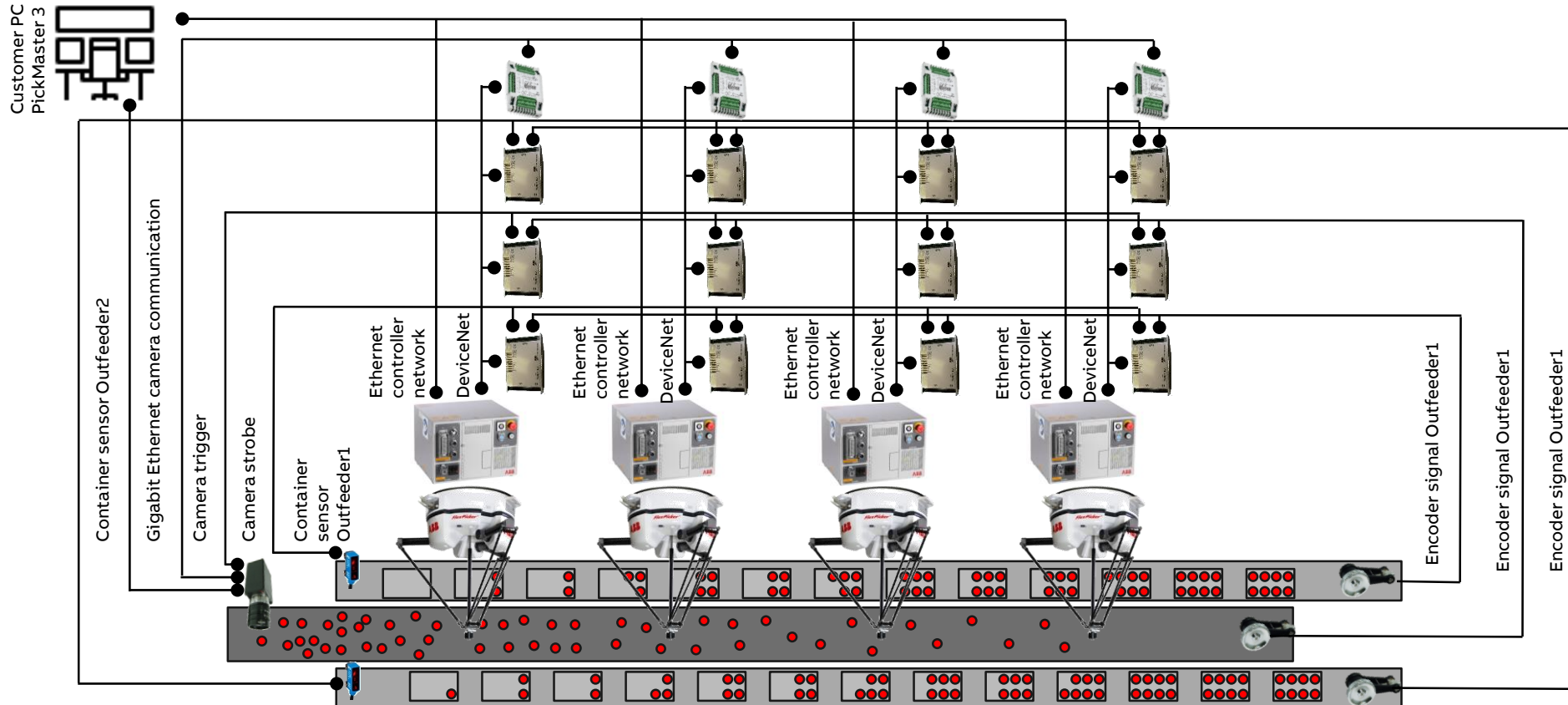
Conveyor tracking today

4 x IRB 360 Picking Cell Topology



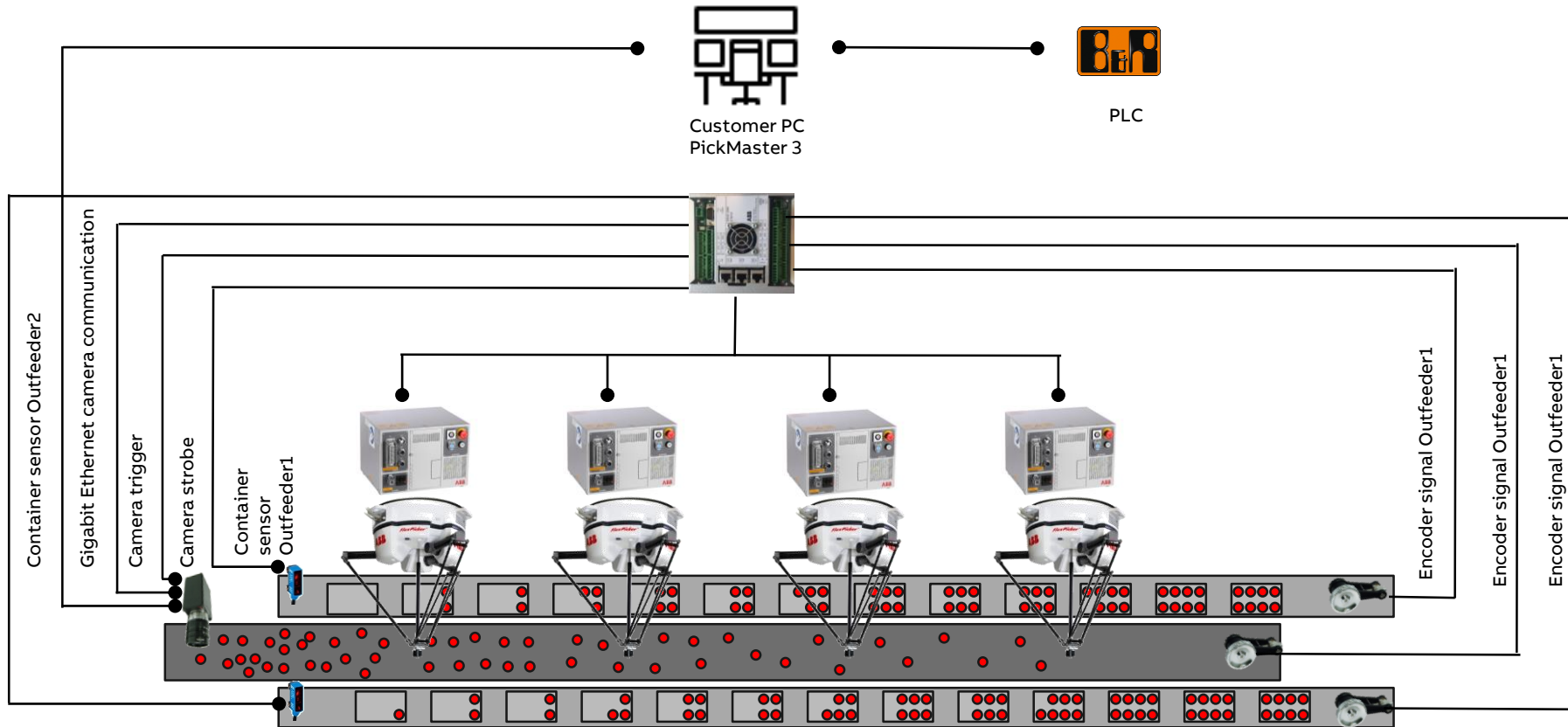
Conveyor tracking today

4 x IRB 360 Picking Cell Topology



Conveyor tracking – coming soon

4 x IRB 360 Picking Cell Future Topology



Dynamic conveyor tracking

Enter the “Performance Optimizers - Uptimers”

Customer Needs

- Customer Needs
 - PickMaster User
 - Wants trouble free integration
 - Wants to source from few suppliers
 - Needs simplified architecture
 - Requires easy fault finding
 - Needs to reduce TCO
 - Fast deployment and commissioning

Common Functionality

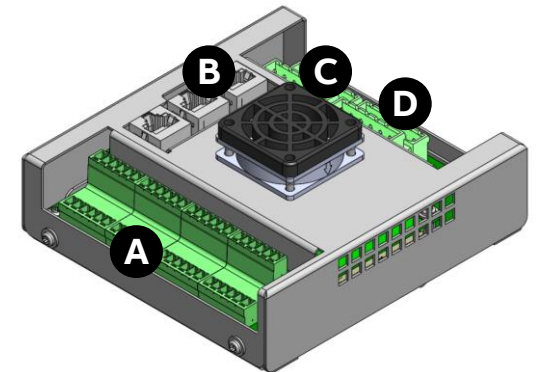
- Few interfaces defined and implemented by customer
 - Two robot application
 - 2 conveyors
 - 1 Camera signal
 - 1 sensor signal

Expanded Functionality

- Few interfaces defined and implemented by customer
 - 16 conveyors (4xCTM)
 - 4 Robots (scalable to 40)
 - Up to 16 Cameras
 - Up to 16 Sensor signals

Functions

- A. Connectors for up to 8 Cameras/Sensors
- B. Connector for Robot Network
- C. Fan to handle heat from CPU
- D. Connectors for Up to 4



CTM

Hardware specification

Specification

Network interface	3 x RJ45 (WAN + 2 x LAN)
Encoder interface	4 x (2-phase encoder inputs, power)
Sensor interface	8 x (sync input, trigger output, power)
Other features	Console port, reset button, discovery led
Power Supply	24V/0.6A
CPU	NXP/Freescale P1010
FPGA	Altera Cyclone
RAM	2 x 128MB DDR3
Flash	128MB
Encapsulation	IP20



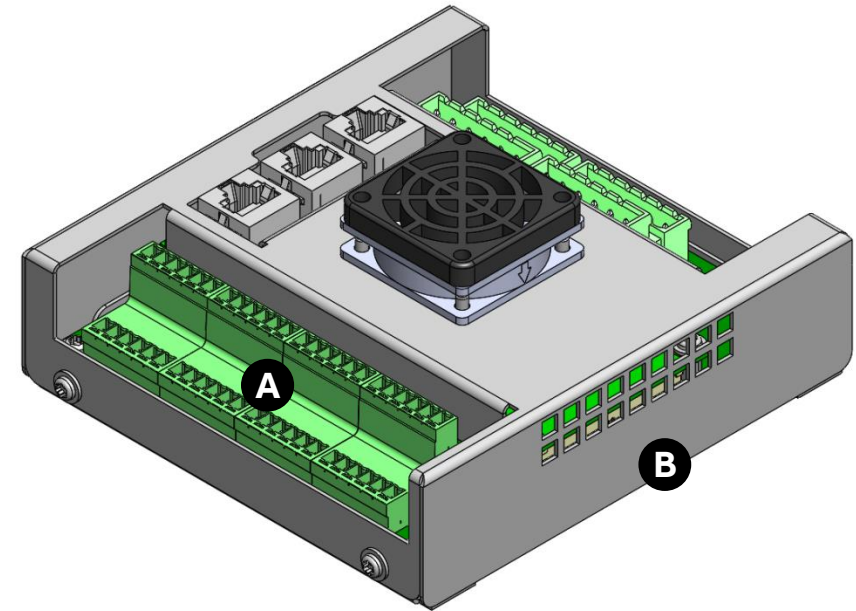
CTM

Software overview

A. CTM application

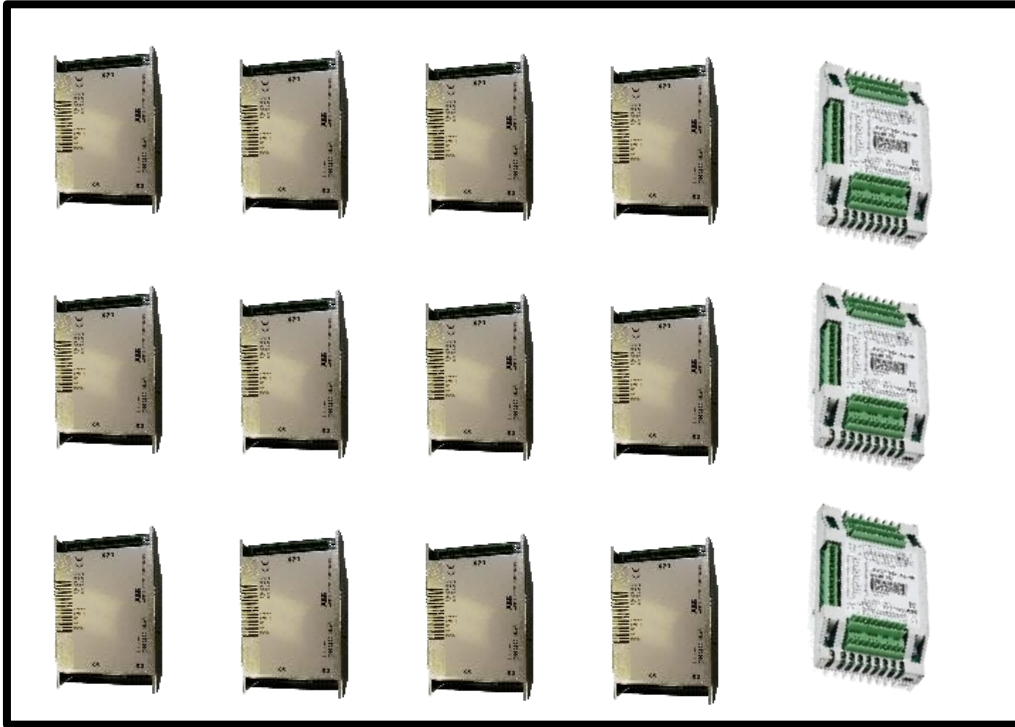
B. Linux OS

- Cyber security ready
- Supported interfaces: RobICI, SSH and PTP2
- Clients: RobotWare, Robot Studio



Dynamic conveyor tracking

New DSQ2000 CTM board



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Simplification: 16 to 1 part number reduction, Field wiring reduced by 60%

Dynamic conveyor tracking

New Tracking Features

High Speed

Highest Market Speed

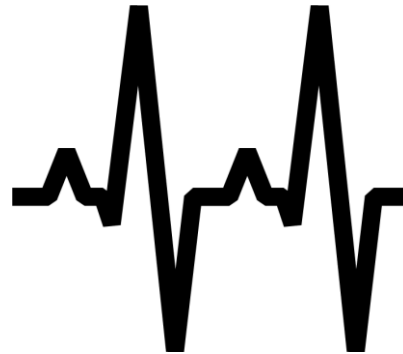
- 1.7 meters per second
- 100 meters per minute



Variable Speed

Indexing/Variable speed flow

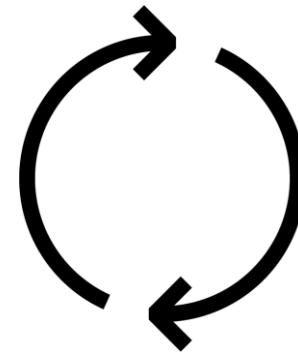
From variable to constant speed.
From constant to variable speed.



Circular

Tracking in Radians

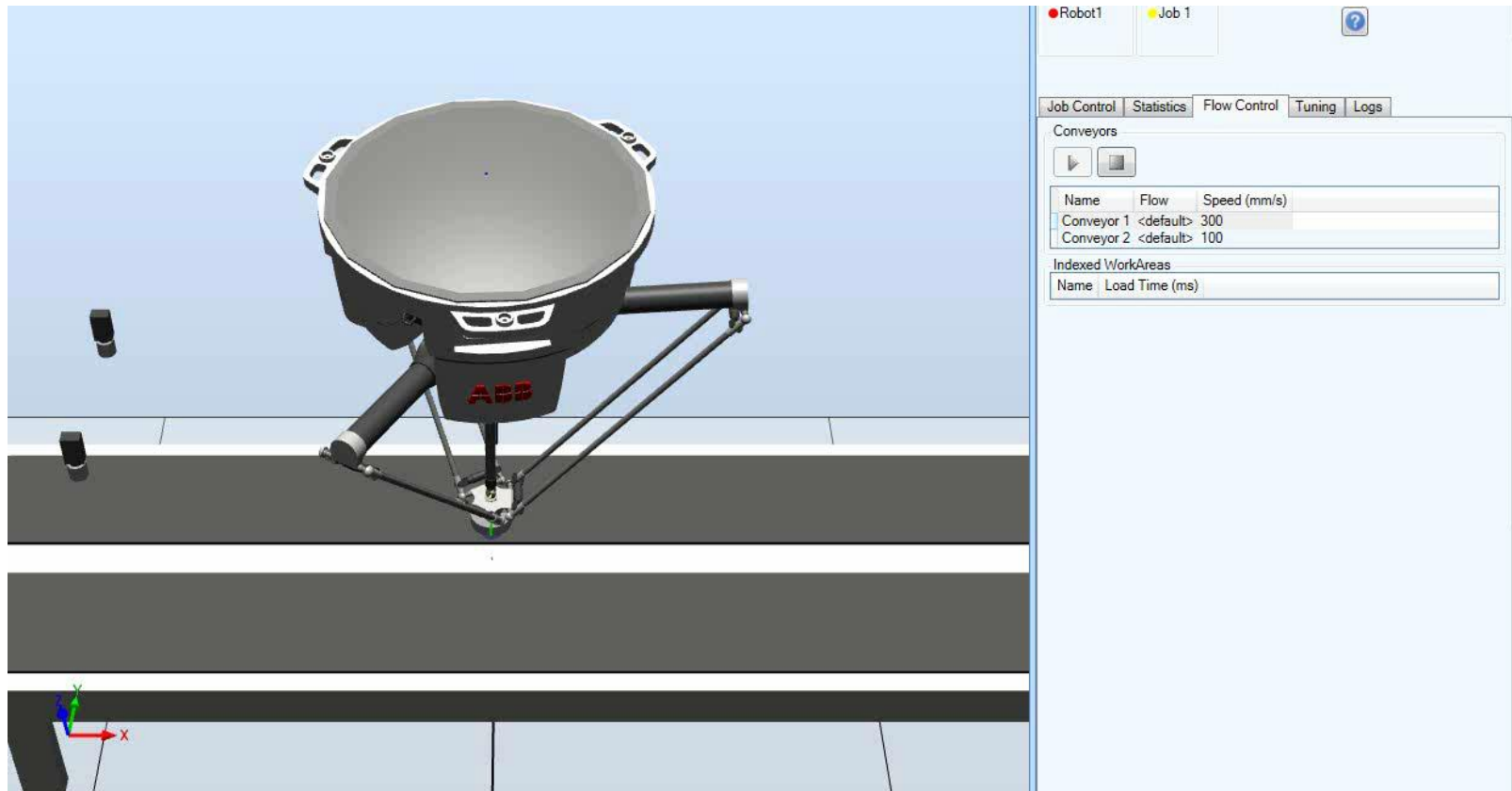
From circular flow to inline flow.
From inline flow to circular flow.



All Available in RobotWare 6.07

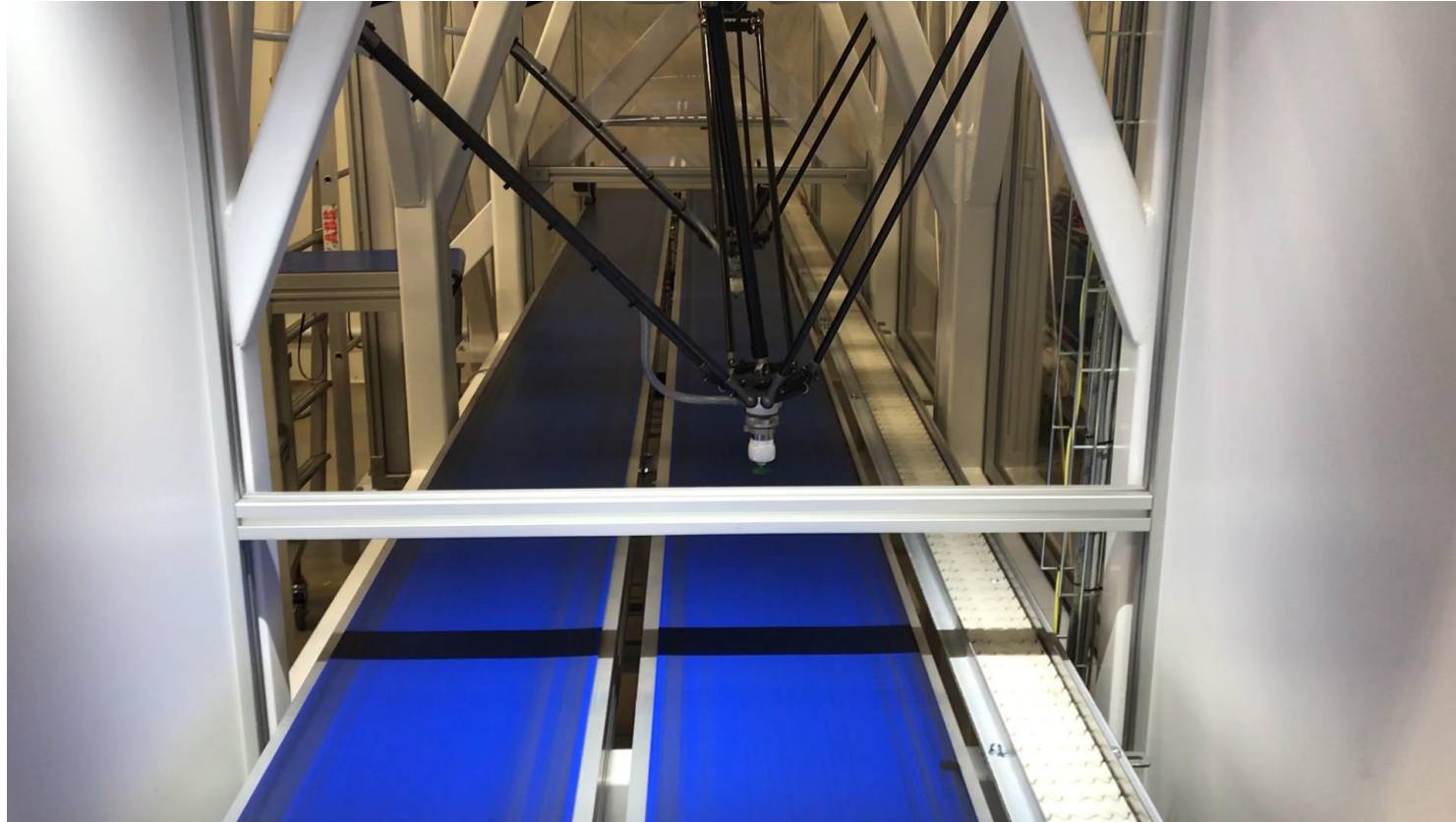
Dynamic conveyor tracking

Expanding your Application Capability – beating the Competition



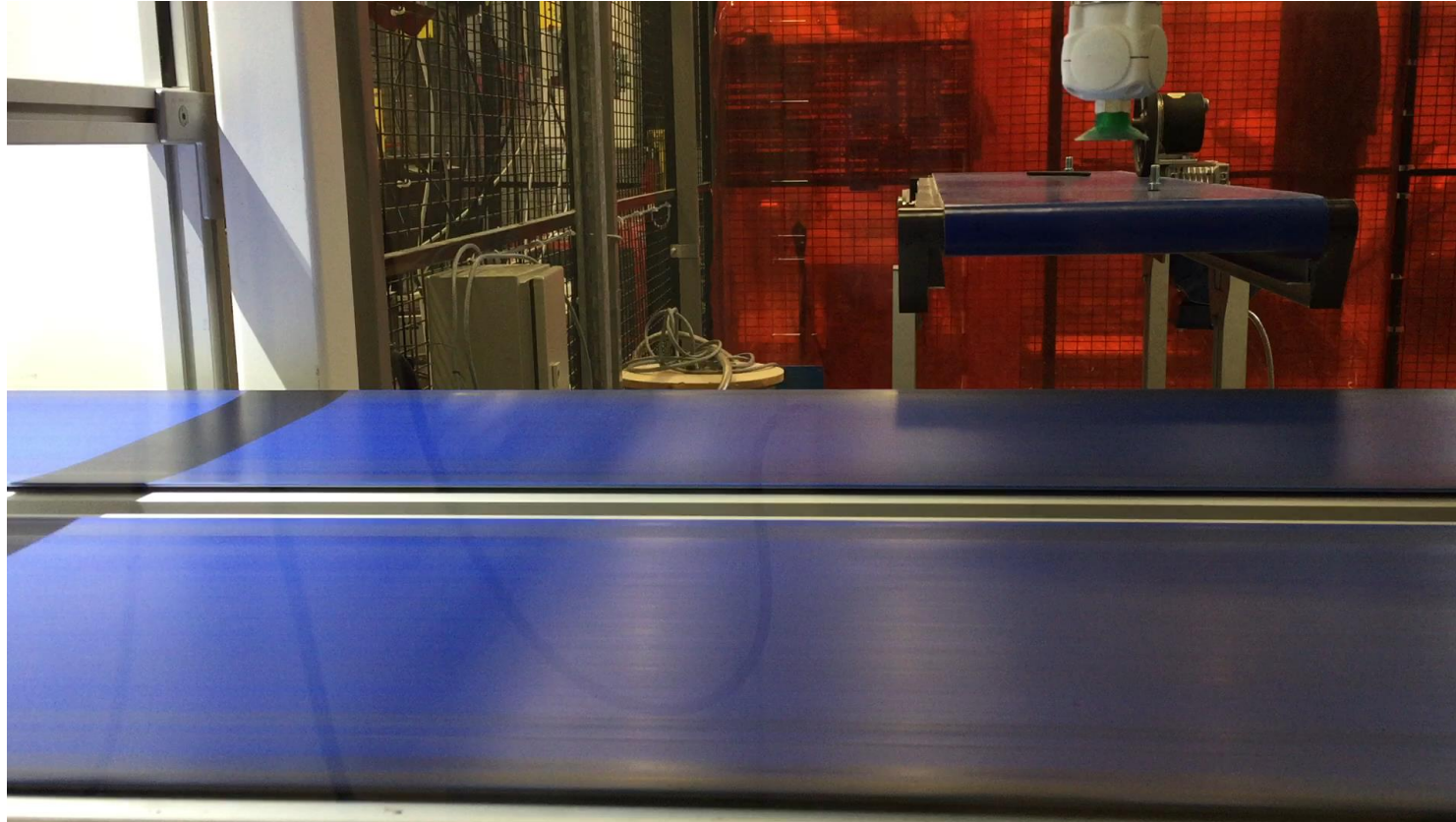
Dynamic conveyor tracking

Expanding your Application Capability – beating the Competition



Dynamic conveyor tracking

Expanding your Application Capability – beating the Competition



Dynamic conveyor tracking

Use reachable targets – new feature

Use Reachable Targets - new in Rw6.07

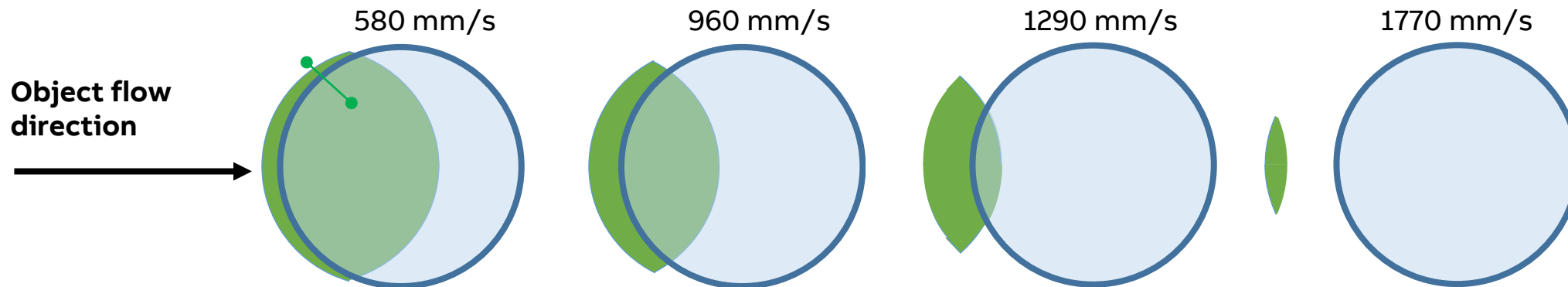
- Removes the need for tuning enter/exit limits of conveyor work areas.
- Instead, a "usage time" is estimated, i.e. how long time it will take to handle a target. Actual usage times can be measured from successful picks.
- Activates a floating target release zone that adapts to changes in conveyor speed.

Advantages

- More robust, eliminates sporadic reach errors.
- Enables picking at higher and more variable conveyor speeds.
- Bigger release zone, more targets available, higher pick rate.

Example

```
UseReachableTargets  
ItmSrcData{PlaceWorkArea{1}}.ItemSource, TRUE,  
0.7 \ReleaseTime:=0.1;
```



Dynamic conveyor tracking

User case 1

High speed tracking

- Products exit a flow-wrapper at 750 ppm
- Products are 100 mm long, 75 mm wide, inside each product is a stack of cookies 3 high (25 mm high total)
- There is a 35 mm gap between products, the infeed conveyor runs at 102 meters per minute 1.7 m/sec
- Each FlexPicker picks 3 products at one time and places the group of 3 products in a tray on the outfeed conveyor. 84 ppm per robot
- The tray is 400 mm long, 250 mm wide. 3 layers of 9 products are created in each tray, 27 products per tray
- 28 Trays per minute on the outfeed conveyor, outfeed runs at 11 meters per minute, 0.185 meters per second.

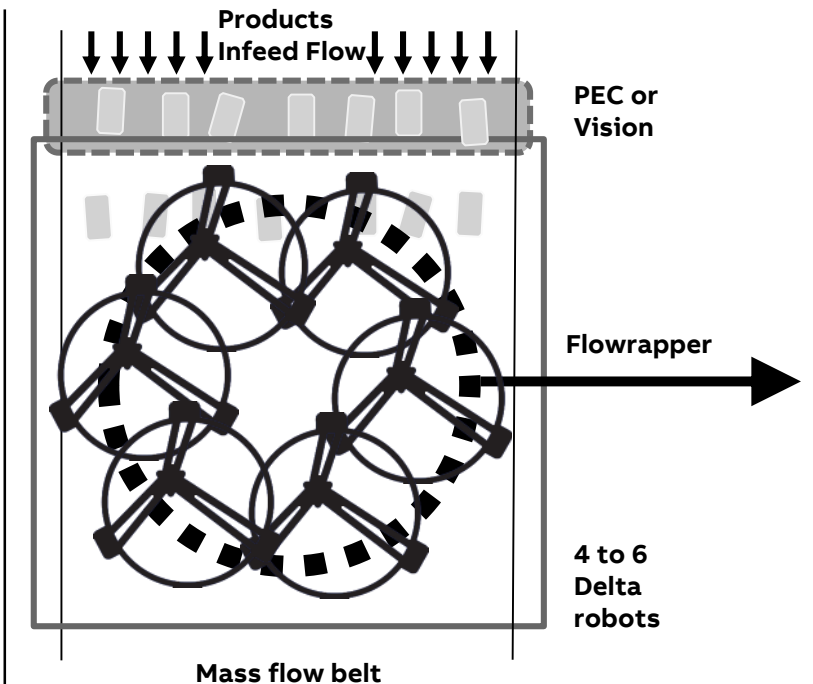


Dynamic conveyor tracking

User case 2

Circular conveyor tracking

- 1600 mm wide infeed belt, 4 meters per minute speed
- 50 mm dia cookies, 20 across the infeed belt, in rows. 50 rows per minute, 1,000 cookies per minute
- 2,000 mm dia ring conveyor mounted over the infeed, rotating clockwise. 85 placement positions evenly distributed around the ring with side walls as in the picture. 74 mm spacing
- 6 FlexPicker distributed evenly picking from the infeed and placing into the pockets on the ring conveyor. Target 100 ppm
- Stacks of 4 cookies are created on the ring conveyor in the pockets.
- The ring conveyor has a single point of outfeed with a pusher.

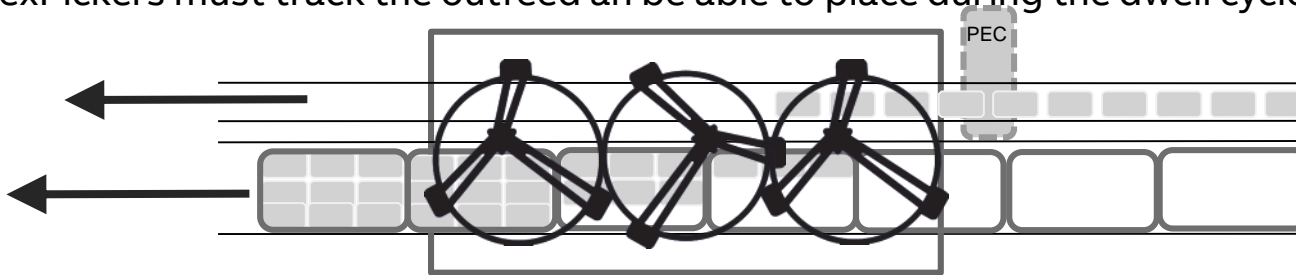


Dynamic conveyor tracking

User case 3

Tracking variable speed – thermoforming machines

- Products exit a slicing machine in stacks, 200 stacks per minute
- Product stacks are 100mm long, 75 mm wide, 25 mm high total
- There is a 35 mm gap between products, the infeed conveyor runs at 22 meters per minute 0.366 m/sec
- Each FlexPicker picks 1 stack of products at one time and places the stack into a pocket on the web of a thermo-former. There are nine pockets per section on the Thermo-former. 22 sections per minute.
- Each section on the web is 400 long, 250 mm wide
- Thermo-formers have a dwell cycle where they are static, during the section thermo-forming process for 2 seconds, then accelerating 400 mm in 0.5 s
- FlexPickers must track the outfeed and be able to place during the dwell cycle and during the acceleration cycle



Conveyor tracking markets

All ABB robots

Food and Beverage



Pharmaceutical



Consumer Packaged Goods



Automotive Parts Handling



3C - Assembly



Medical Devices



Picking, Packing, Palletizing

Target Applications



Dynamic conveyor tracking

Unique selling points - your competitive advantage

1. Speed

The fastest tracking speed

2. Flexibility

Variable and circular tracking

3. Simplified

Reduced number of tracking cards
easy installation

4. Cost

Reduced total integration cost

5. Unique

Patented features and design

6. Domain

Broadens your application offer

ABB