Getting Ahead of the Game:

What changes when you deploy robotic piece-picking

Presented by:

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Key Takeaways

- If you've been on the fence with regard to using robots for piece-picking (item level handling), there are compelling solutions to consider
- The transition from all manual to a mix of robot and manual processing requires managing through a punch list of considerations before deploying robotic piece-picking within a warehouse
- Robotic picking systems are becoming more plug and play, so your system integrators should be able to work with you to address overall needs
- As robots become part of the team, it's important to think about how you will operationalize their use to maximum benefit

the accuracy and timeliness of the supply chain is critical for a company's brand

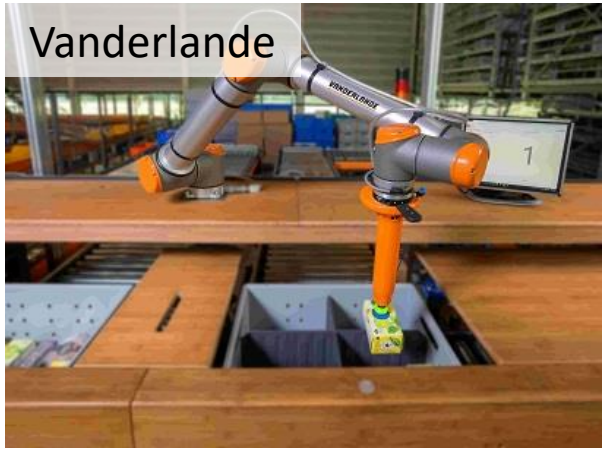
- items you need
- convenience of buying
- delivered at speed

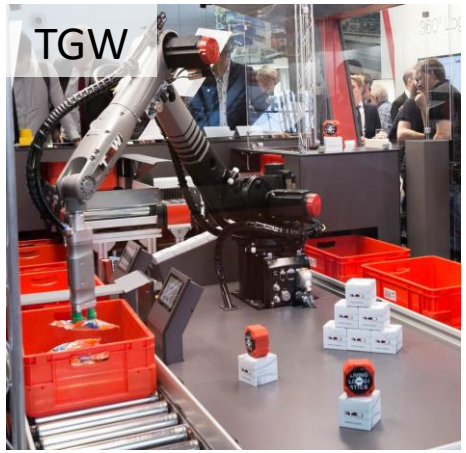
Pieces and people challenge

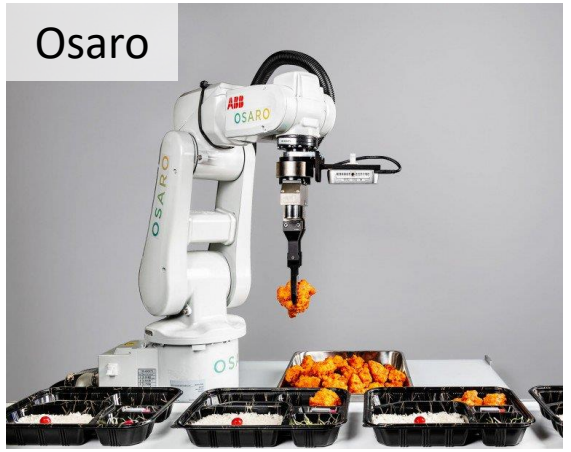
- Growth in online commerce means fewer lines and units per order
- Item handling is lower productivity than pallet or case picking
- Finding the required warehouse labor is already challenging
- Robotic automation provides an option to meet your customers' demand cost-effectively and reliably

A sampling of piece-picking bots

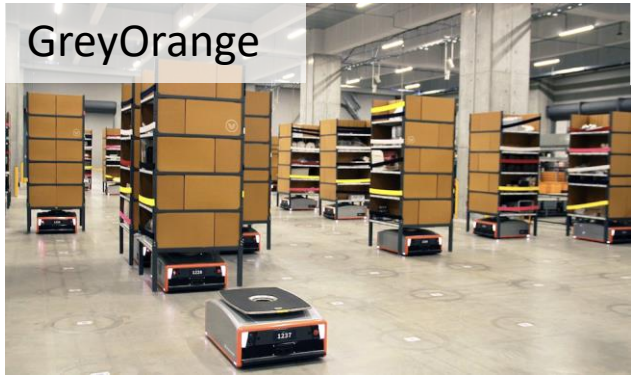
100s of millions of picks by EOY 2020

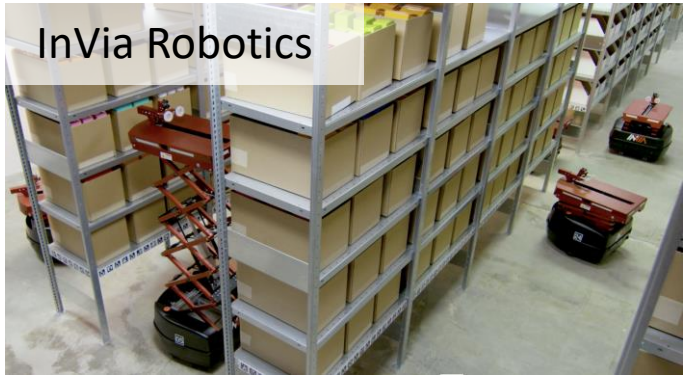




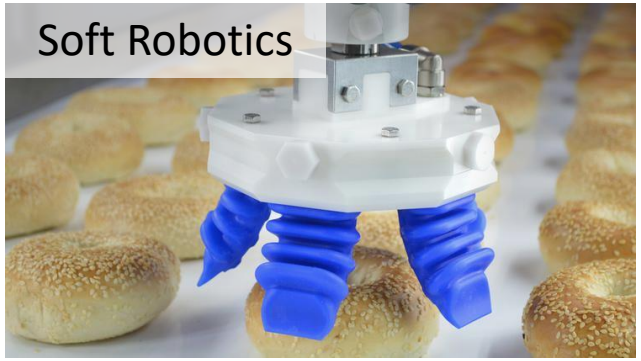


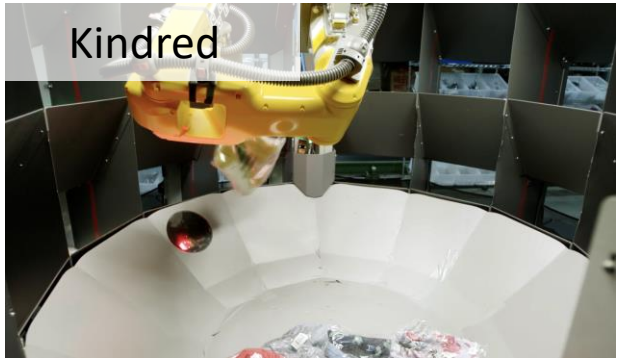
Still more piece-picking bots





- Range
- Rate
- Reliability





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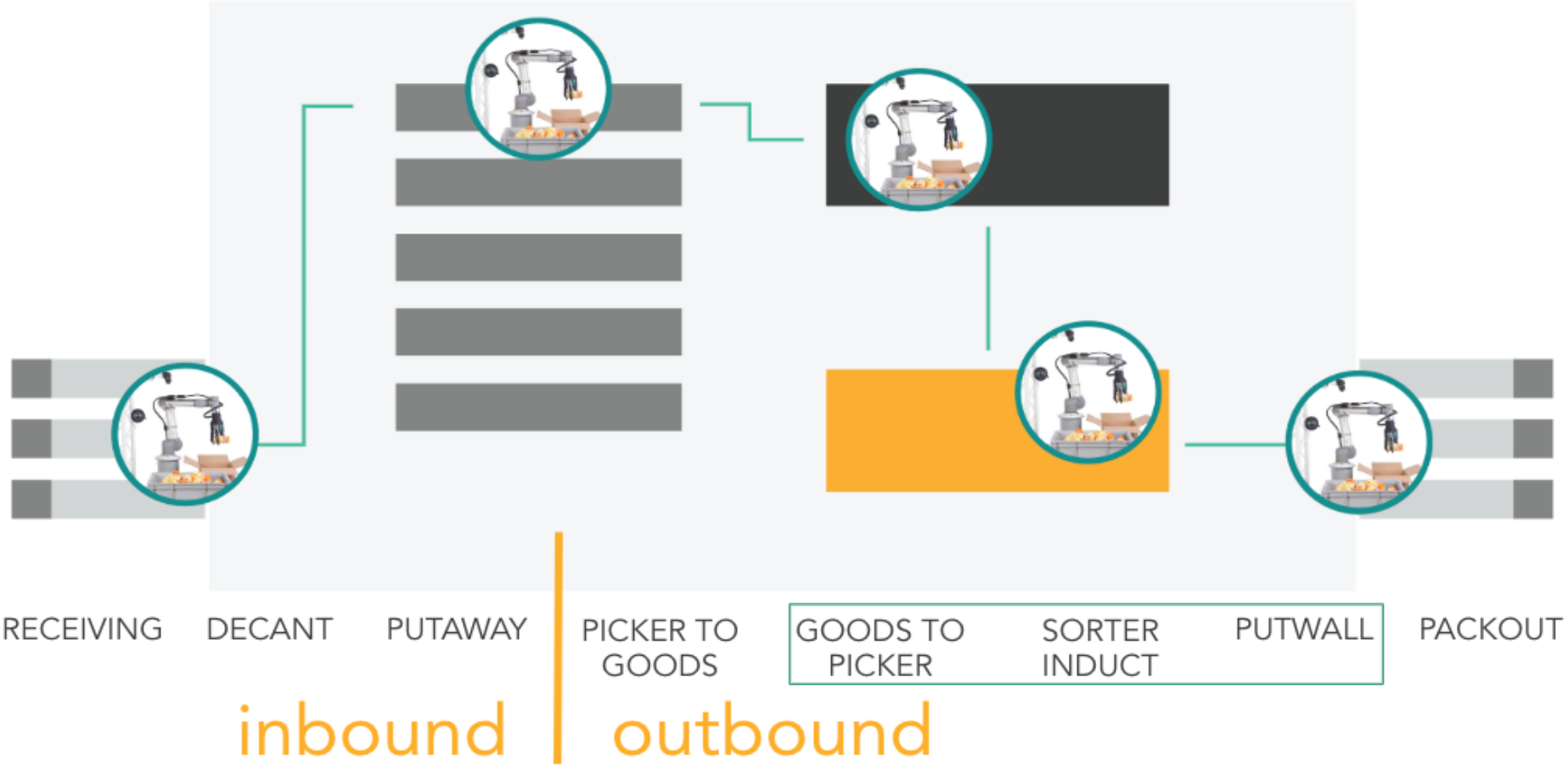
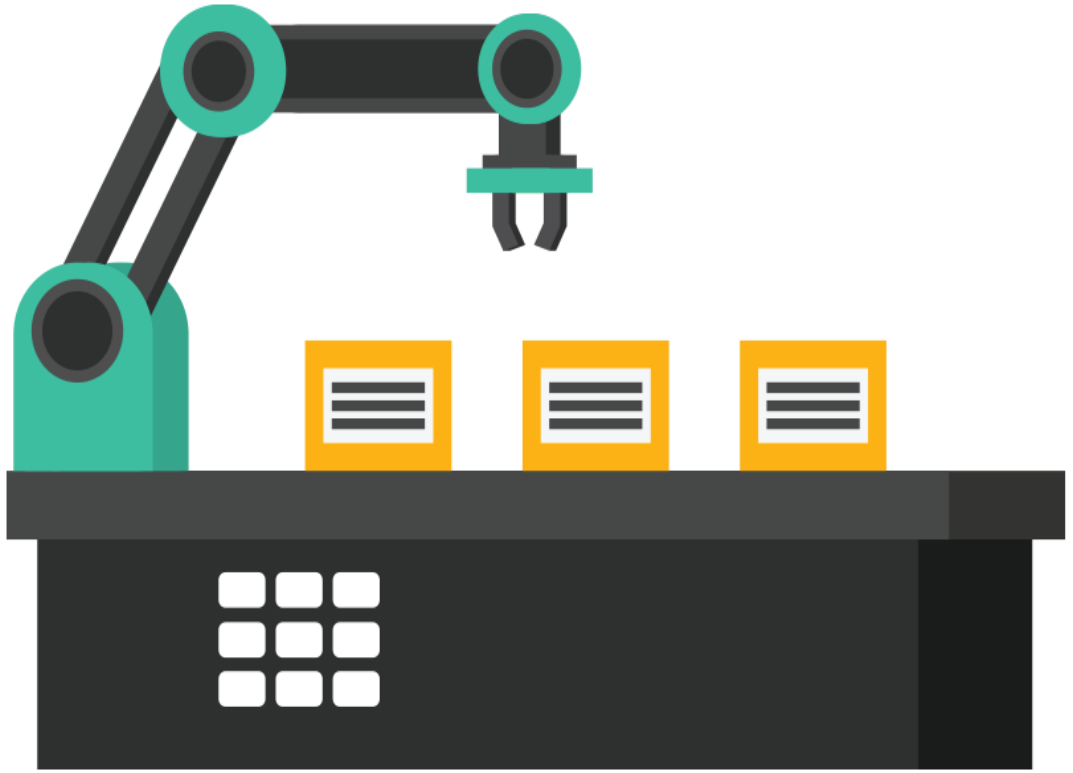
A vision for lights-out order fulfillment



Adopting robotic piece-picking systems

- With options to choose from, understand your picking needs:
  - strategic pillar or cost savings
  - range, rate, reliability (3Rs)
  - picking machine (Hand, Eye, Coordination) vs DIY
  - brownfield and / or greenfield designs
- Talk with your provider about
  - item set
  - operation model
  - workflow
  - physical workspace
  - software integration and routing



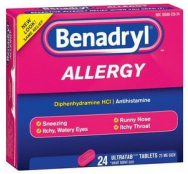
Item set

Many items are pickable

Grocery

Health & Beauty

Pharma



Electronics & Consumer

Apparel

Some are not

Items that Tangle
(should be packaged)

Items with packaging that opens
(should fix packaging)

Porous, Complex Items
(tend to multi-pick)

Guidelines for Robot Pickable Items

Parameter	Min	Max
Weight	0 kg	2 kg
Length	2 cm	40 cm
Width	2 cm	20 cm
Height	1 cm	30 cm

Bottles

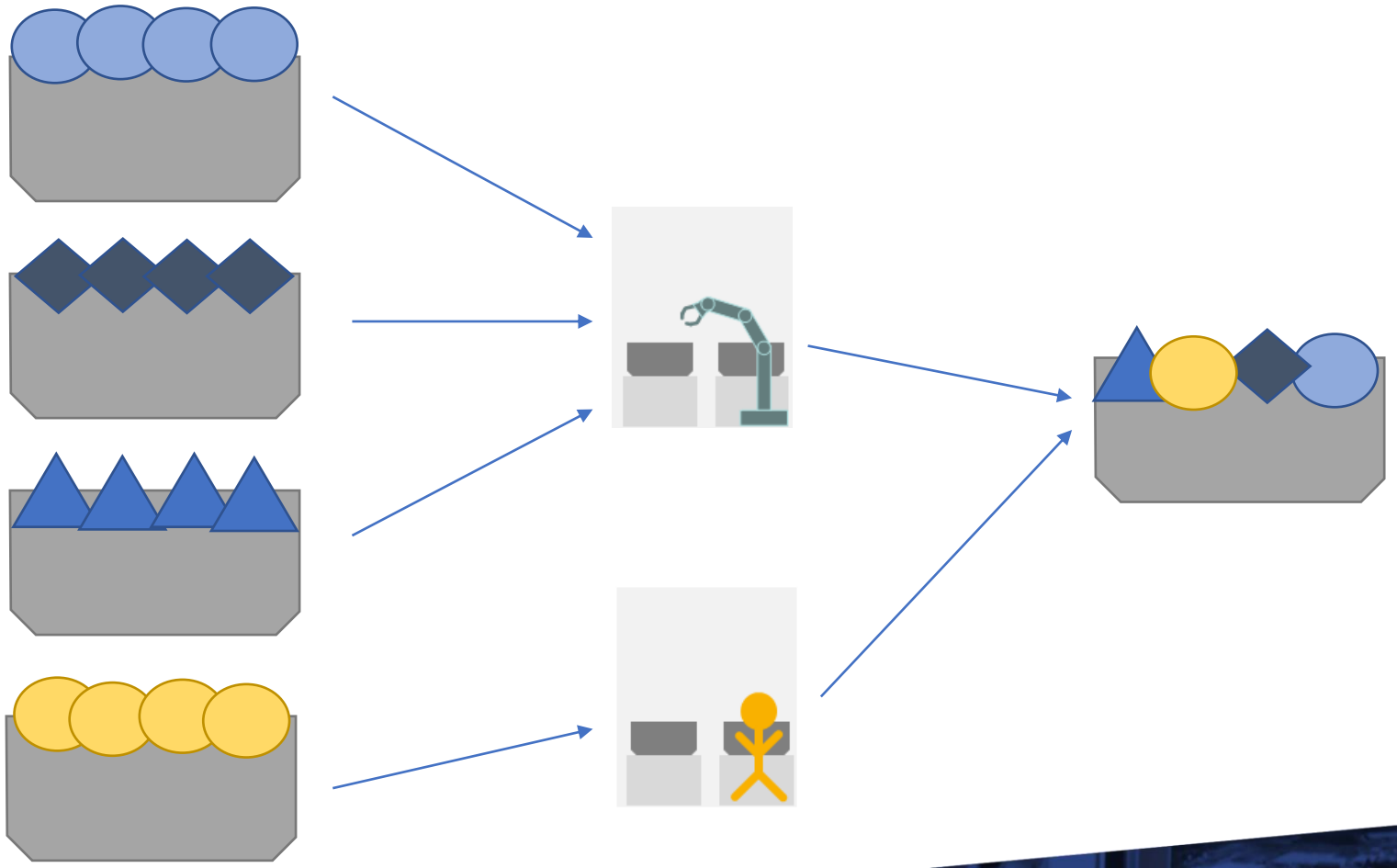
Boxes

Bags

Blister Packs

Operation model

Handling pickable and “non-pickables”



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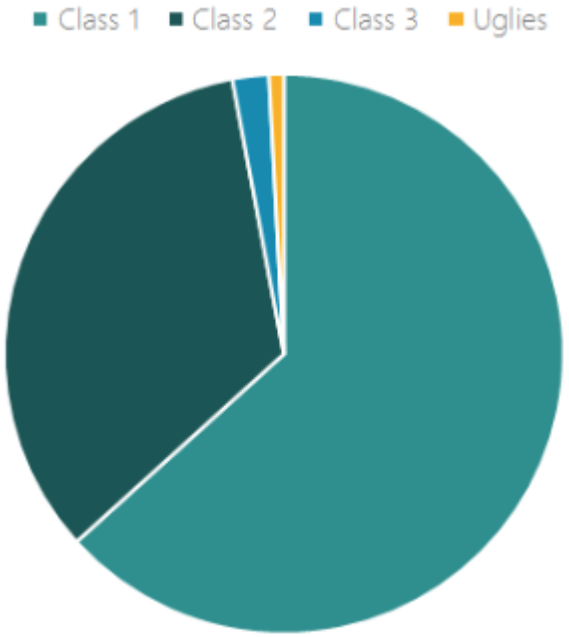
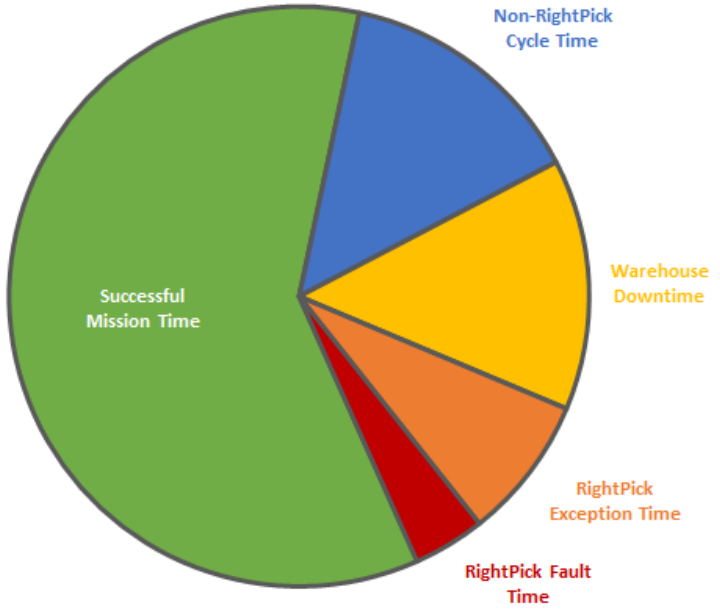
Performance – a tale of two pie charts

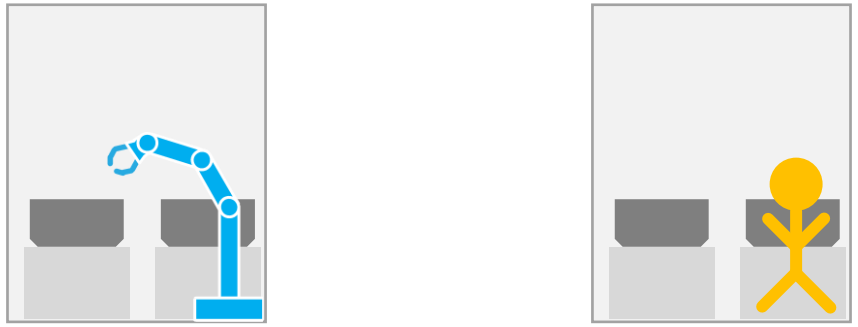


- Pickable Order Volume



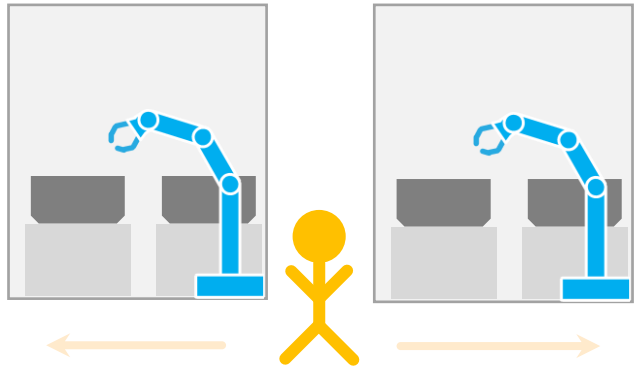
- Throughput (pieces/hr)

Handling unpickable and unclassified items



Robot Stations + Manual Stations

Robot items routed to robot
Manual items routed to person



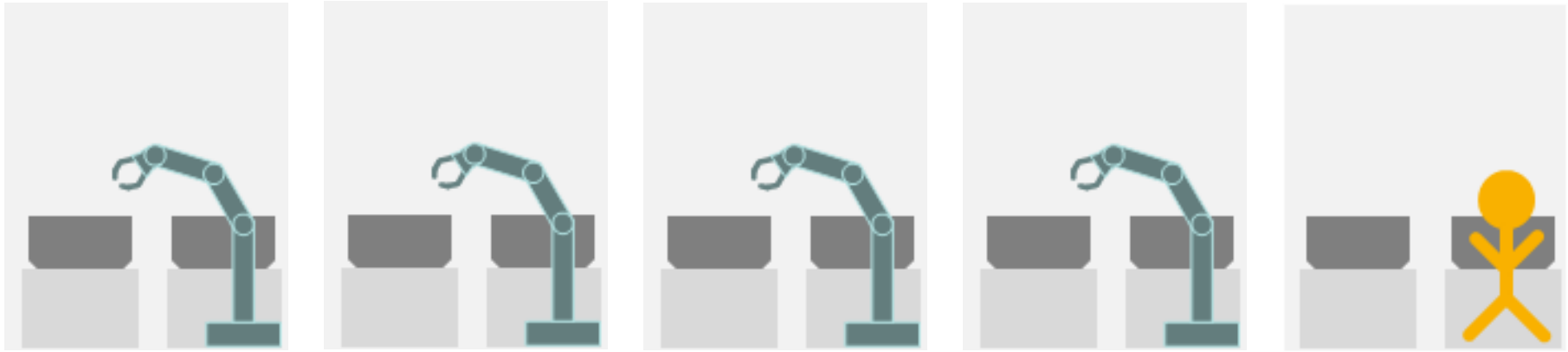
Robot Master

Most items picked by robot
Manual operator handles exceptions

Solution Design

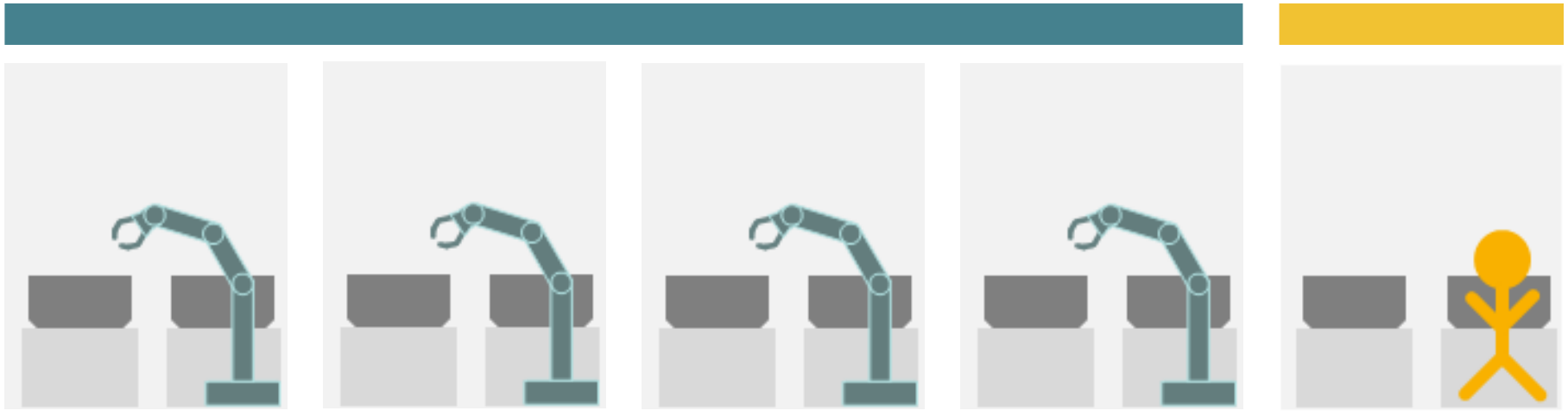
Promise: throughput, labor overhead, order integrity

Design: exception-handling (overseer, material flow, workstation features)



Solution Design

Number of stations



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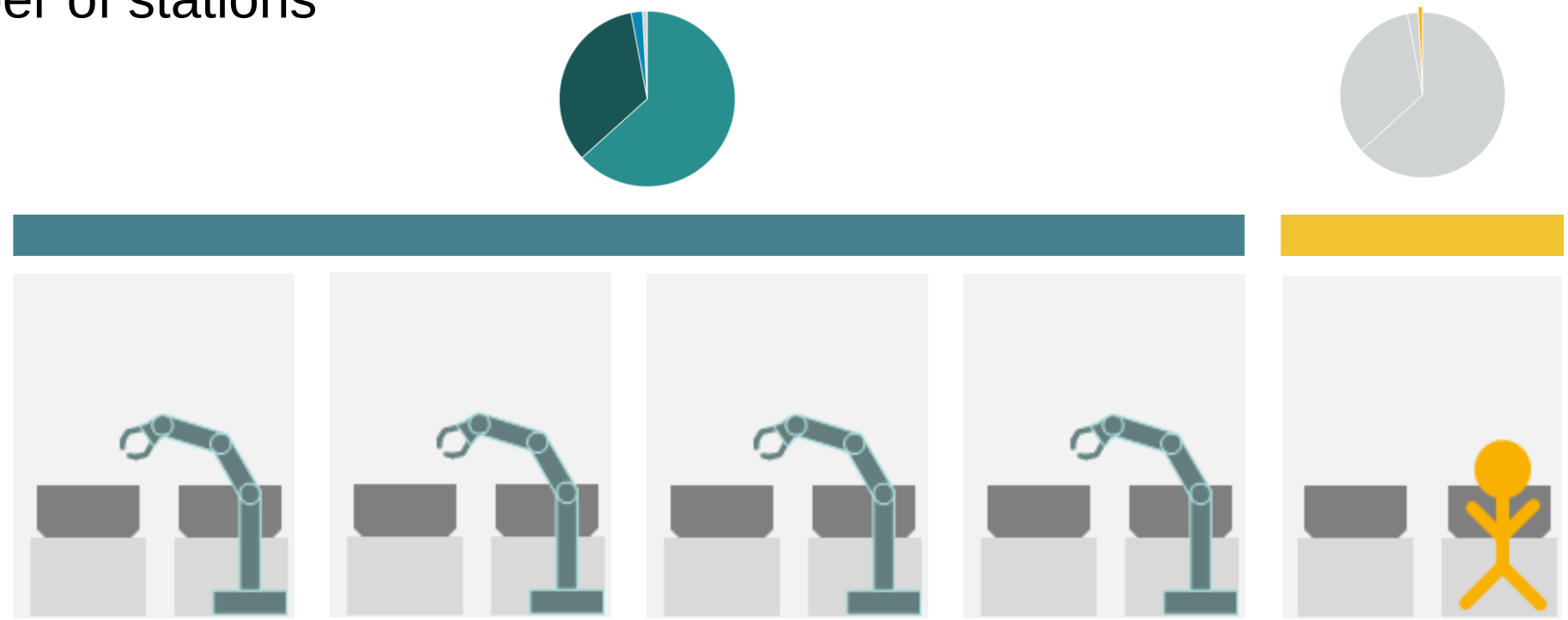
Solution Design

Number of stations



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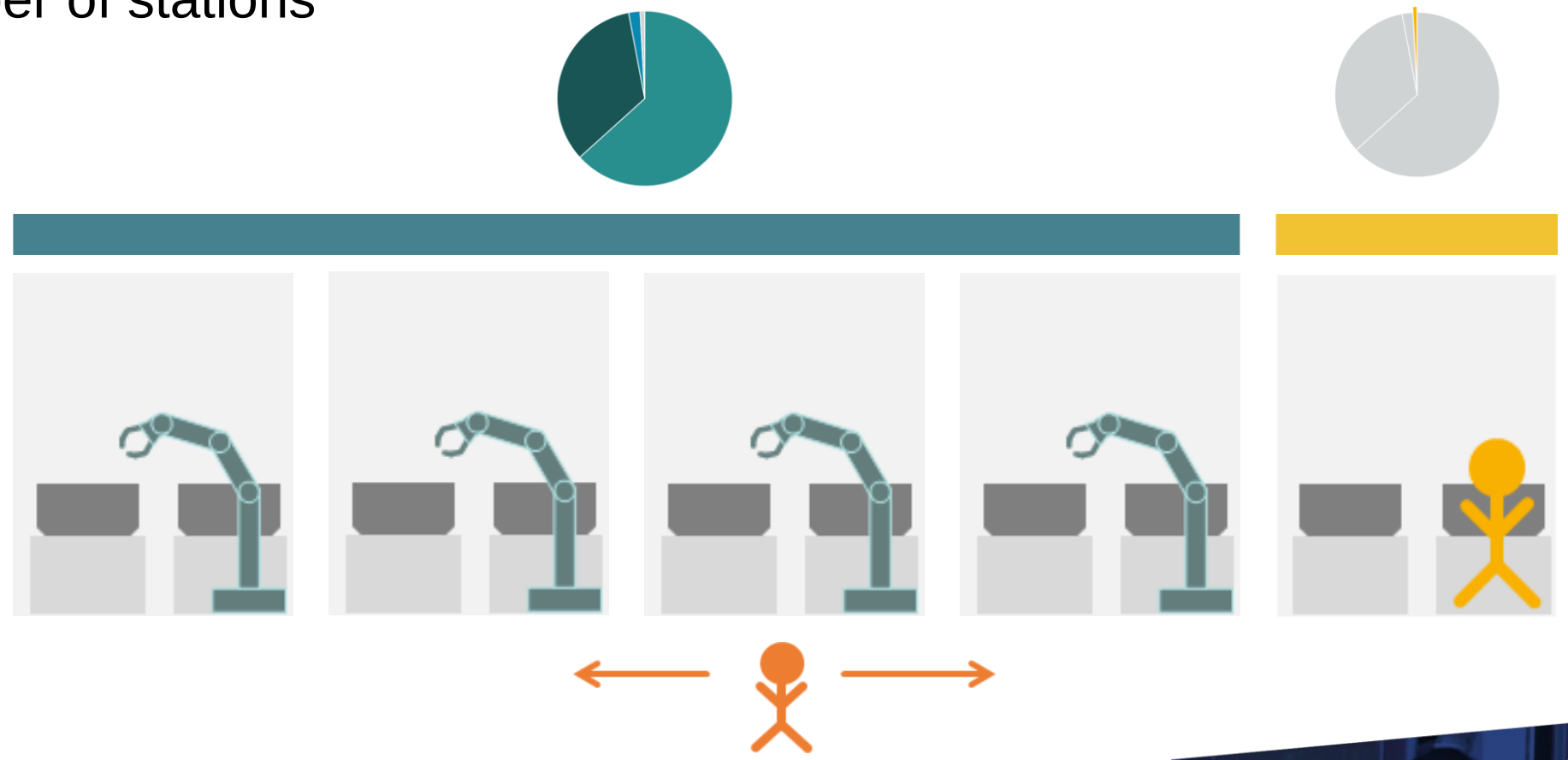
Solution Design

Number of stations



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Workflow

goods-to-picker

Physical workspace

Robot-friendly workspace

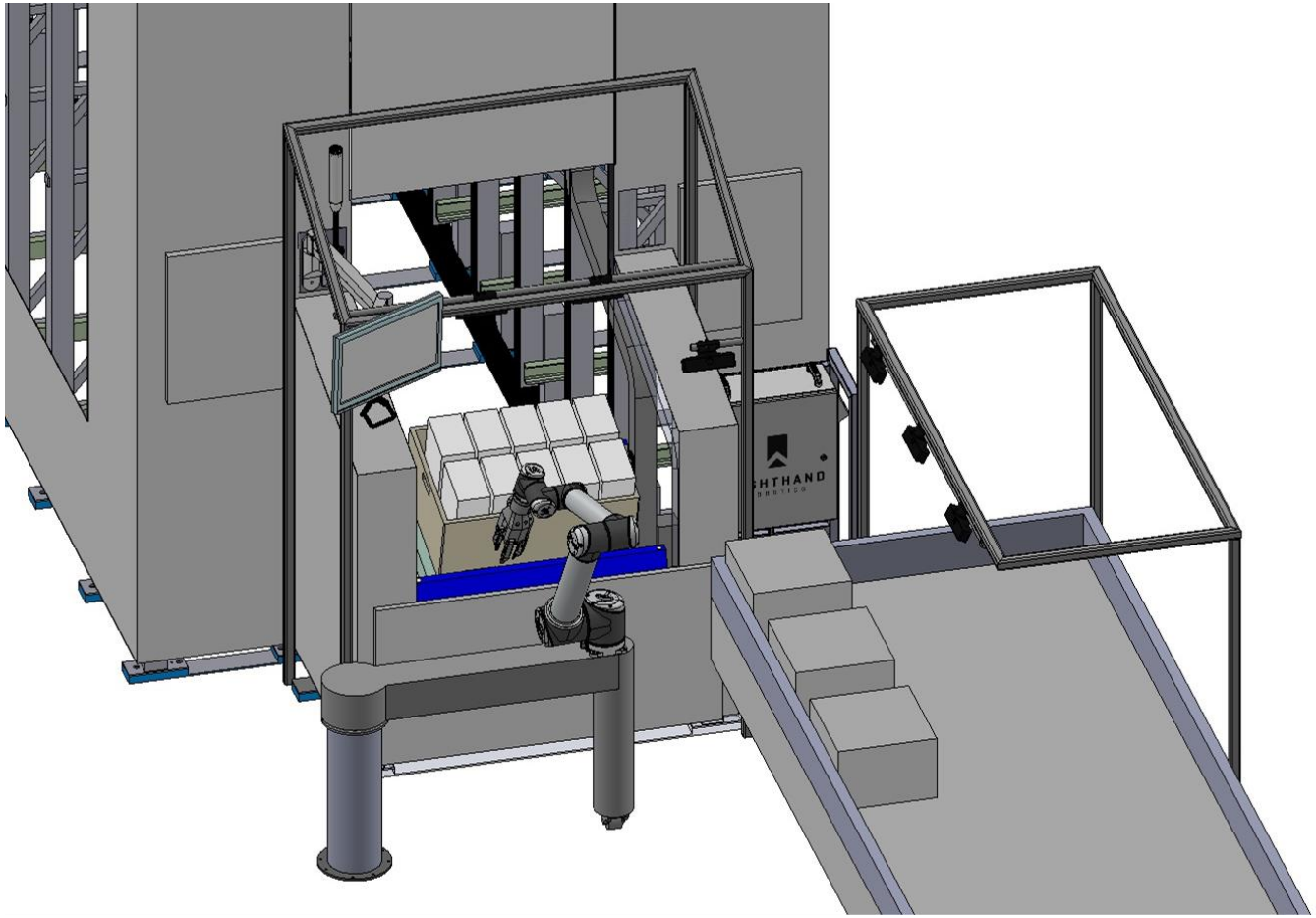
1 source: 4 destinations

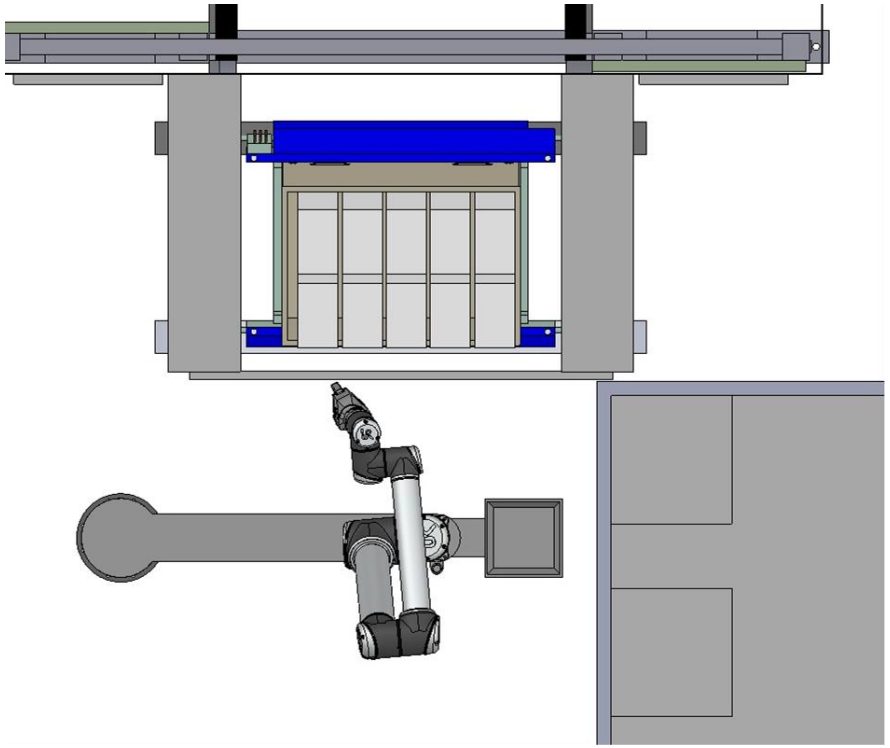
1 source: 1 destination

Within Robot Reach

Open Order Container

Workstation design - overview





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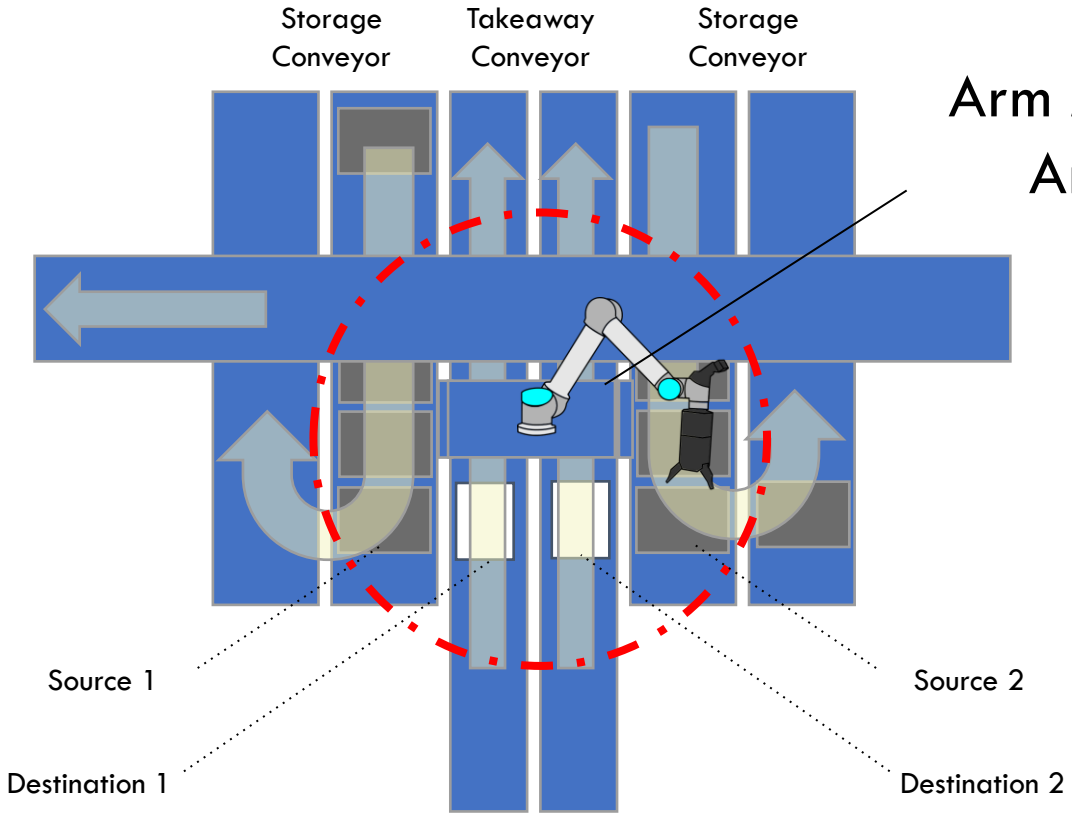
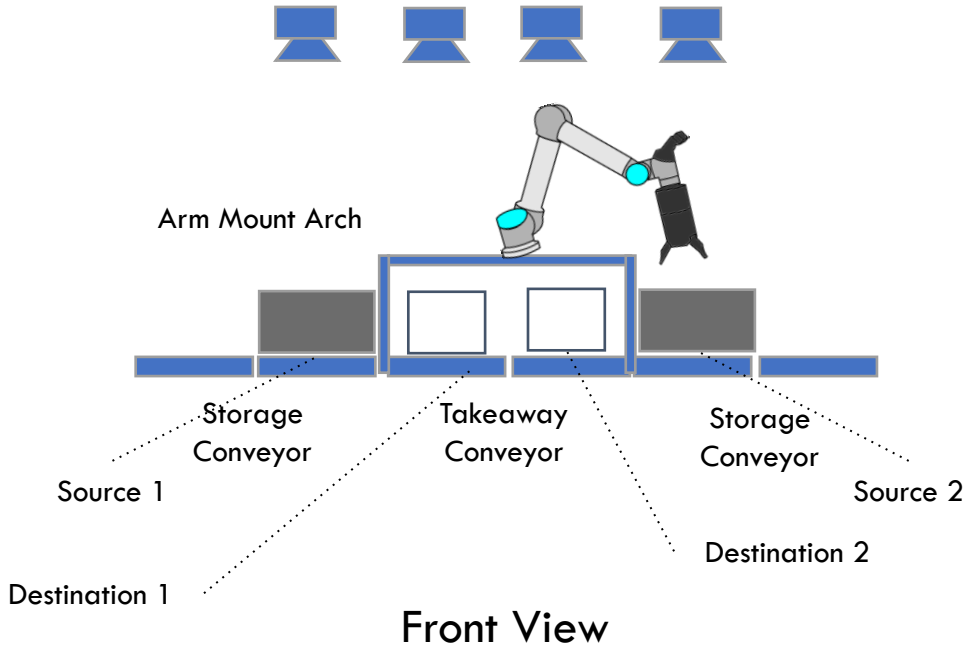
Example concept



Overhead View

Cameras ~1 m above totes



Front View

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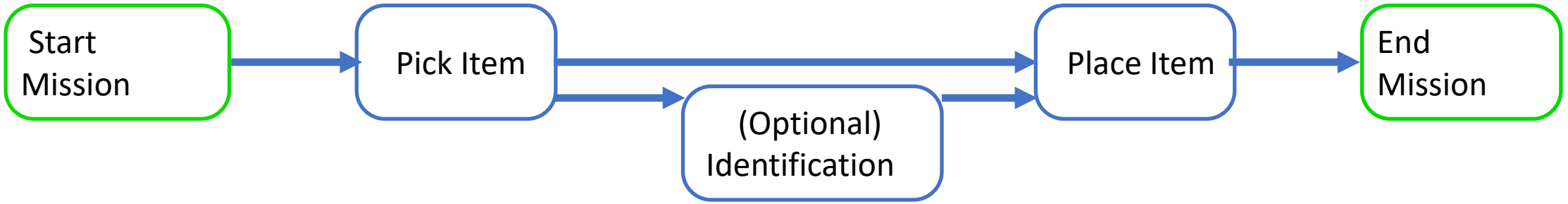
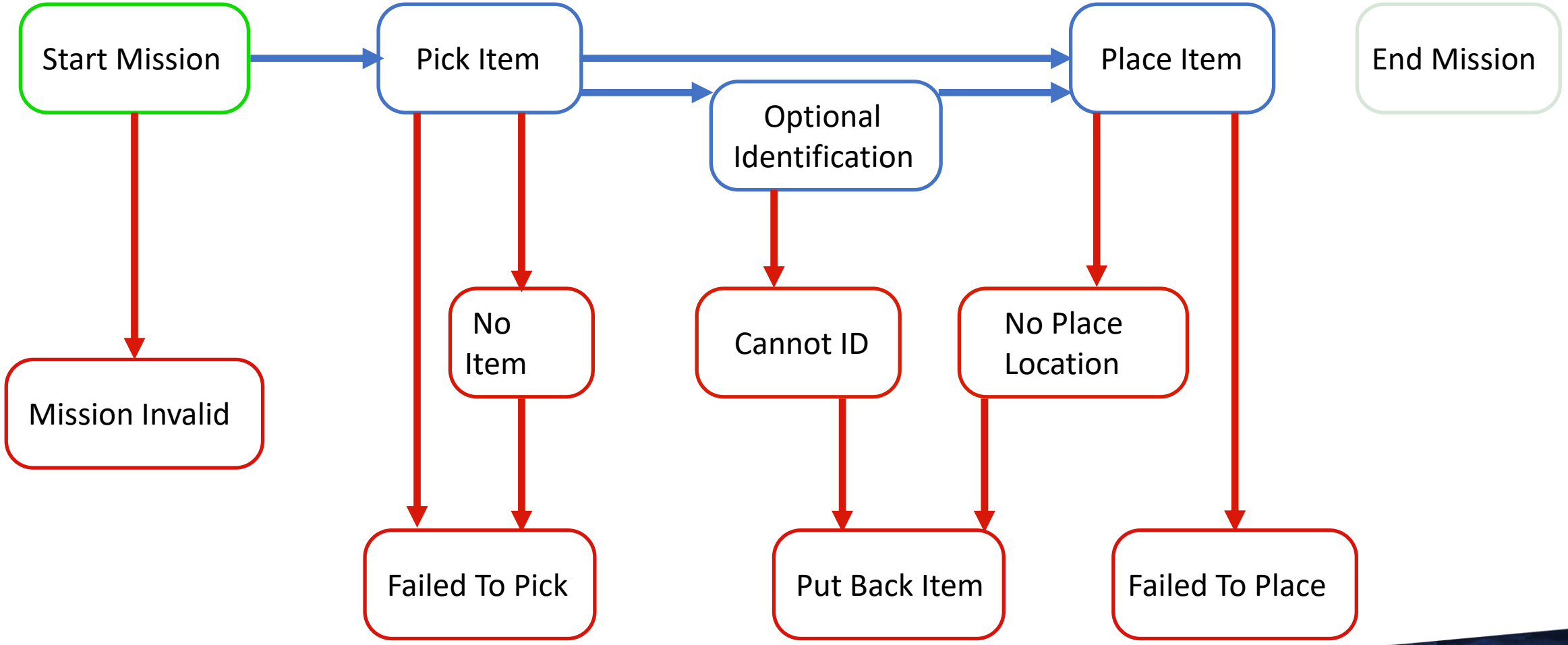
Software integration

Software API – Mission Control Protocol

- Pick Mission is a set of instructions for a pick and place
- Each mission includes:
  - Pick information (source, destination, item, item metadata)
  - Place information (location, timing)
  - Result information sent from the robot
  - Status information sent back and forth every minute and as needed

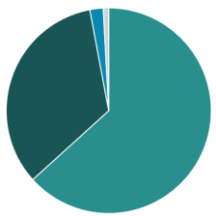


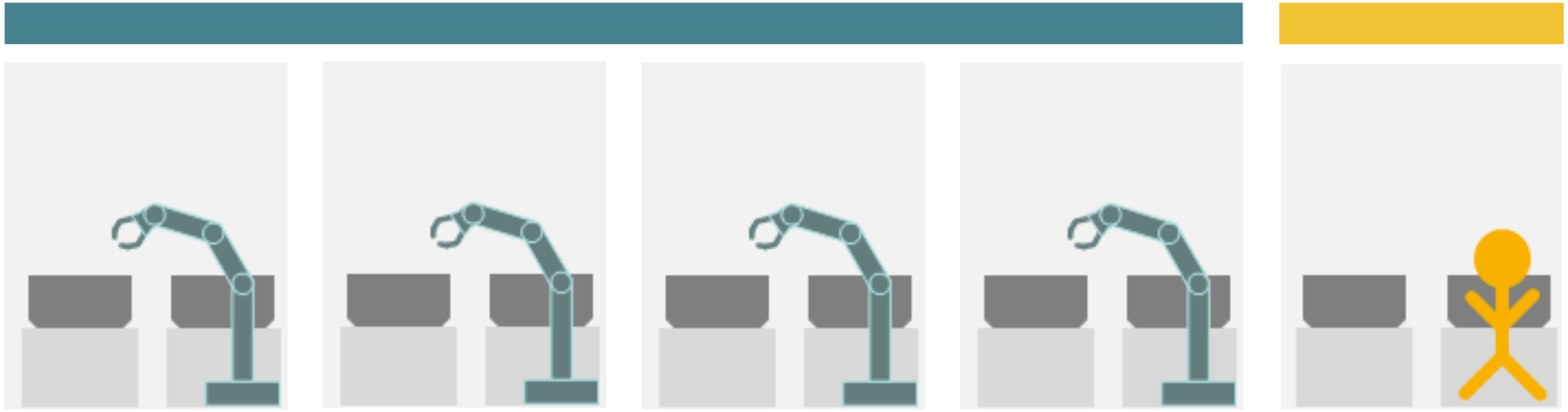
Mission Control Flow: Exceptions



Solution Design

Overseer labor, routing





Field example – multi-robot installation

Putting it all together

- At the pace with which the technology is maturing, now is the time to plan for robotic piece-picking
- Define business objectives, 3R needs, whether you want to make or buy and whether you benefit most from retrofits or greenfield projects
- Understand what's robot pickable and what really shouldn't be and work with your provider(s) to decide how you will manage some likely mix
- Select a workflow that is significant to your business and collaborate on workspace design, software integration and exception handling.
- Define a practical operational model and provide training for the team
- Track key metrics and iterate or adjust as needed – it may take some tuning to maximize the benefit

Thank you

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