WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

Newcomers on the Grid

Disrupters in the Autostore market

The world of warehouse robotics

WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

Source:
STIQ Report
GOODS TO PERSON SOLUTIONS 2023

https://www.styleintelligence.com/products/market-report-goods-to-person-ecommerce-fulfilment-robotics-2023

G2P AMR
- Mobile robots that carry <3m shelves from storage & presents to picker
- Navigates using datametric fiducials (QR codes)
- Closely related to AGV

PERMANENT FIXTURES

Mobile ASRS (new segment)
- *Permanent fixture*
- *Mobile robots acts as shuttles*
- *Included in cASRS in this report*

MOBILE ROBOTS

AGV & AMR
- For more information on the AGV & AMR Robotics sector – download STIQs free report on the sector here

Cube ASRS
- Permanent fixture
- Very dense storage

ASRS
- Permanent fixture
- Robots (shuttles) move on rails inside fixture

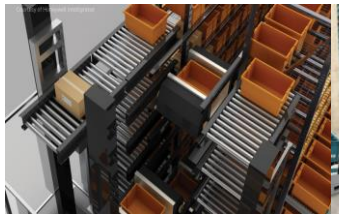
AMR Shuttle
- Mobile robot with high fixture (up to 8m) that can pick totes
- Robots move on the floor all the time
- A few different configurations exist

P2G
- Mobile robot, often with fixture, such as a small 'put wall'. Configurations may vary
- Uses SLAM to navigate and are related to AMR robots, but use application specific & additional software & workflow packages

The world of warehouse robotics

WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

ASRS




cASRS



AMR-Shuttle (Totes)


G2P-AMR (Pods)



P2G

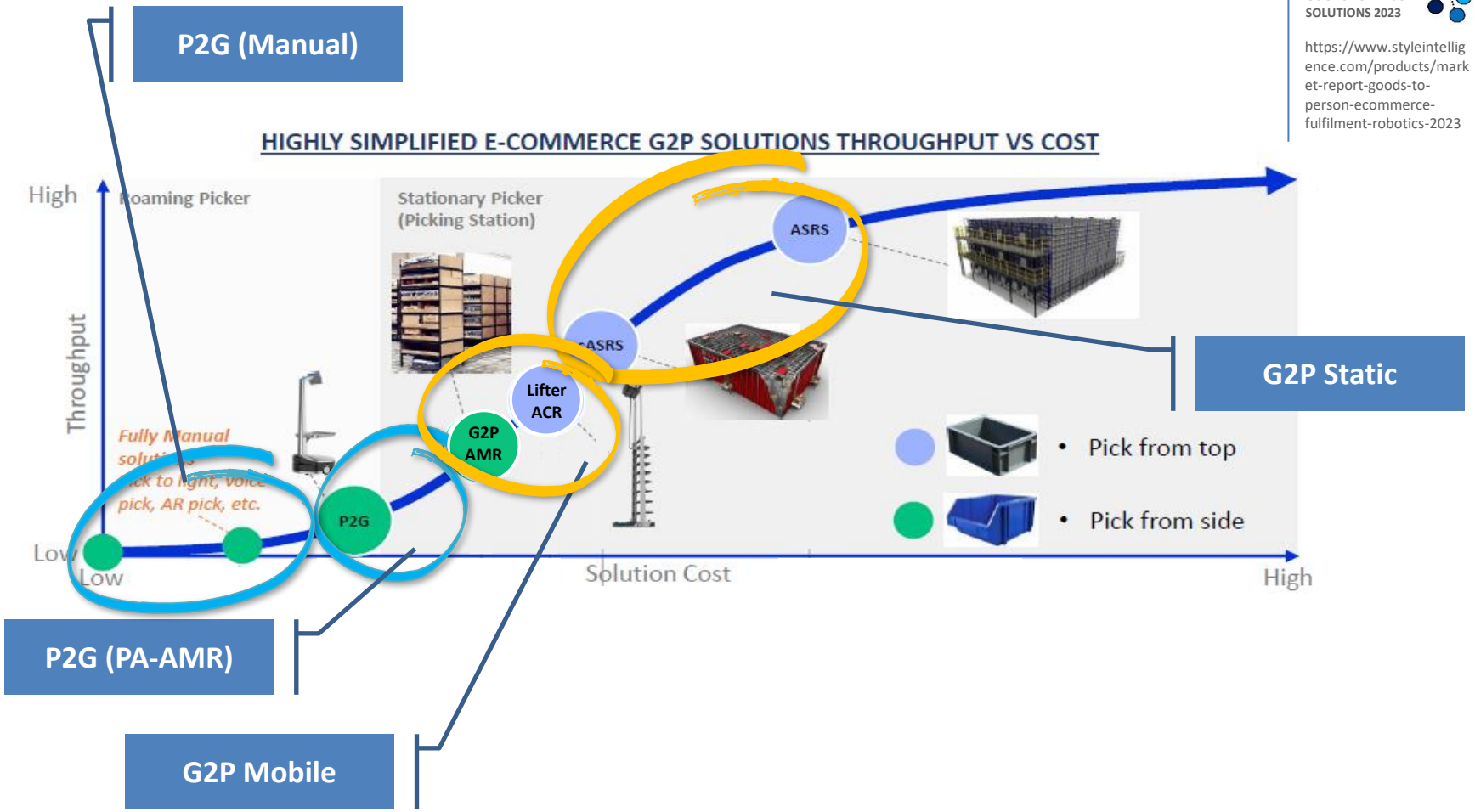


Intro G2P mobile robotics framework

WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

Source:
STIQ Report
GOODS TO PERSON SOLUTIONS 2023

https://www.styleintelligence.com/products/market-report-goods-to-person-ecommerce-fulfilment-robotics-2023



P2G and G2P solutions compared

		Fulfillment Profile Factors			Orderline Throughput per Day								
Piece Pick	P2G/G2P	SKU´s	Rate/Hr	Pick-Pack	0-1000	1001-5000	5001-10000	10001-15000	15001-20000	20001-25000	25001-50000	50001-100000	100000-xxxxxx
Paper Pick List	P2G	<1000	25-75	No									
RF Scanning	P2G	<5000	50-75	No									
Pick-to-Cart	P2G	<20000	100-200	Yes									
Zone Pick	P2G	<5000	125-250	Yes									
Pick & Pass	P2G	<10000	150-300	Yes									
Batch Pick to Putwall	P2G	<50000	360-480	Yes									
Miniload	G2P	<50000	360-480	Yes									
Pouch Sorter	G2P	<10000	480-600	Yes									
G2P-AMR (Shelf to Picker)	G2P	<100000	360-480	Yes									
AMR-Shuttle (Bin to Picker)	G2P	<100000	480-600	Yes									
cASRS (Autostore)	G2P	<100000	480-600	Yes									
ASRS (Shuttle)	G2P	<100000	480-720	Yes									

- Autostore as mentioned in the above table stands for cASRS (cube ASRS)
- By far is Autostore the largest supplier with over 1.000 installations worldwide
- As we will see, within the cASRS domain, multiple solutions are available
- All solutions have there own characteristics, pro's and cons

source: Dematic

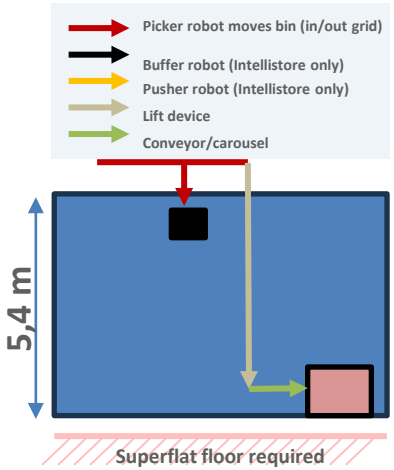
Intro cASRS system suppliers

- Autostore has firmly established itself worldwide over the last two decades with its robust and time-tested technology
- Expiration of patents on Autostore's technology has given opportunities to new players in the field
- Besides Ocado, which is the most comparable "top load" cASRS to AutoStore, there have been some new entrants worth noting
- These players either bring up more or less similar solutions or enter the market with more disruptive technologies
- Besides Autostore three suppliers are presented who got quite some attention (Attabotics, Jungheinrich, Intellistore) and these will be positioned in a more detailed way
- Furthermore we present six suppliers of partly disruptive cASRS solutions, including two gantry robot based solutions (as totes are stored in stacks)

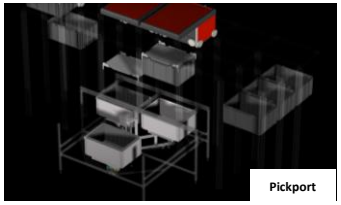
Main cASRS solution competitors

AutoStore

Robots drive <u>on</u> the grid and dig



Superflat floor required

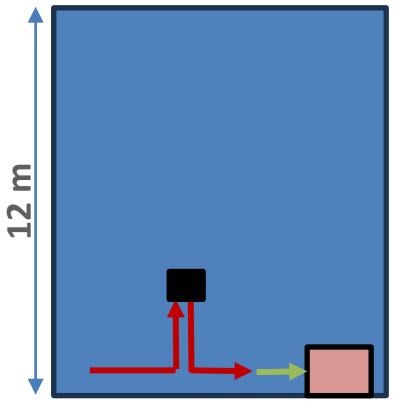


2 handling components
(robot/caroussel)

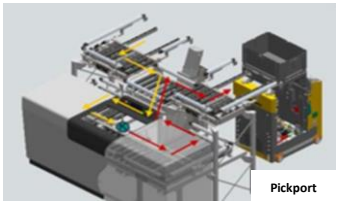
3 binsizes, 1 binsize per system
Dim. Intern: 603 x 403 x 202 (l x b x h)
Dim. Intern: 603 x 403 x 312 (l x b x h)
Dim. Intern: 603 x 403 x 402 (l x b x h)
Max fillweight/bin: 30 kg

JUNGHEINRICH

Robots drive <u>under</u> the grid and dig



Flat floor required



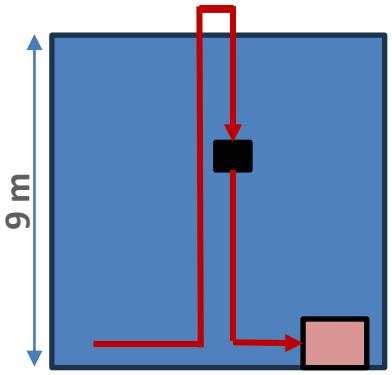
2 handling components
(robot/conveyor)

1 binsize
Dim. Intern: 605 x 450 x 290 (l x b x h)

Max fillweight/bin: 50 kg

ATTABOTICS

Robots drive <u>on and under</u> the grid
and change levels



Flat floor required

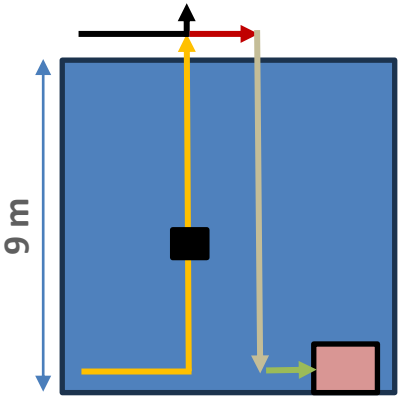
1 handling component
(robot)

2 binsizes, 1 binsize per system
Dim. Intern: 571 x 571 x 259 (l x b x h)
Dim. Intern: 571 x 571 x 405 (l x b x h)

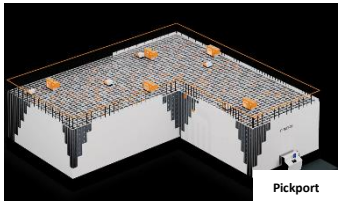
Max fillweight/bin: 45 kg

intellistore

Pusherrobots drive <u>under</u>, Picker-/
Bufferrobots drive <u>on</u> the grid



Flat floor required



4 handling components
(pusher-, buffer- & pickerrobot, lift)

3 binsizes, multiple binsizes per system
Dim. Intern: 605 x 450 x 130 (l x b x h)
Dim. Intern: 605 x 450 x 290 (l x b x h)
Dim. Intern: 605 x 450 x 450 (l x b x h)
Max fillweight/bin: 30 kg

Two disrupters in more detail

Instock

- Instock's solution requires some conceptual bending as the robots have the ability to travel on the ground or invert using magnets while still maintaining a payload of 30kg
- The layout and configuration flexibility are unprecedented, while AutoStore allows you to alter the general footprint, it does not accommodate variable heights within the same system
- Despite these advantages, it does not offer the same storage density and cube utilization as Autostore or Intellistore and fire protection compliance could pose another concern

Gridstore

- Gridstore, a newcomer bears the closest resemblance to AutoStore, but with key enhancements that could make it a real game-changer
- Gridstore uses a structural plastic bin similar to Autostore's bin (in three sizes), seems more rigid and potentially more expensive than an Autostore bin
- Gridstore differentiates itself with two robot types operating in tandem within one system where the first robot (Ace), akin to an AutoStore R5 or B1, performs simple pick-and-move tasks and where the other robot (Switch) mirrors the functionalities of the Ace but with the added ability to swivel the boom portion around the robot
- Within Autostore robots have a pre-determined "orientation" for bin access, where certain storage bins are inaccessible to robots facing a specific direction, but Gridstore's "Switch" robot solves this problem
- Furthermore, Gridstore offers two different types of port workstations, reminiscent of Autostore conveyor port and carousel port

Disruptive cASRS solutions

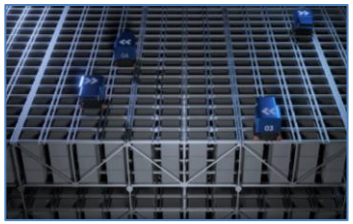
WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

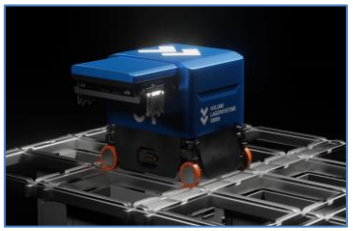
BLUE ROBOT COMPANY

Concept

- Gantry robot system
- Robot handles bin by bin (single bin handling)
- Suitable for slowmoving (and small operations)
- Hardly any space above system required (as robot takes one bin at a time)

VOLUME LAGERSYSTEME GMBH





Concept

- Cubic system
- Robots work per layer
- Multifunctional robots (with turnable liftdevice)
- Robots on all layers drop bins directly on transportconveyor (at bottom), no dedicated shafts are required
- Max 3 bins stacked per layer
- Mulitple layers per system

gridstore

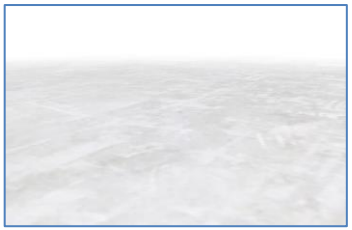
Concept

- Cubic system
- The most obvious Autostore look-a-like, but with additional features
- Three binsizes possible, one per system (as with Autostore)
- Use of carousel- and conveyorports, input/output via shaft (in stead of elevator within Intellistore)

Disruptive cASRS solutions

WHEREHOWS
WHERE TO STORE, HOW TO HANDLE

EXTOR



Concept

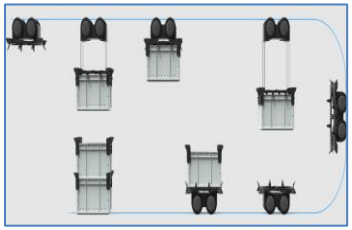
- Cubic system
- Robots drive under grid and dig
- Storage and handling of larger carton totes (not bins)
- Limited height possible (due to weight per stack of carton tote)
- Suitable for slowmoving operations using voluminous items

CIMCORP

Concept

- Gantry robot system
- Combination of lift device and transport device
- Fast excess to required bin as liftdevice takes multiple bins at once from stack
- Suitable for high performance operations
- Empty space above system is required

INSTOCK



Concept

- Cubic system
- Any robot can complete any task
- Identical robots either transport bins (on ground) or retreive bins (from ceiling!)
- Cost-effective solution as low-cost sandwichpanels are used for storage
- Easy and fast (de-)assembly and installation

cASRS solutions compared