

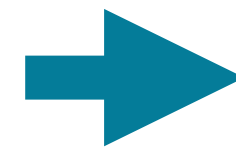
A dark, monochromatic photograph of an industrial robot arm in a factory. The robot arm is the central focus, extending from the top left towards the center. The background shows the structural elements of a factory, including beams and other machinery, all rendered in shades of blue and grey. The overall atmosphere is industrial and futuristic.

OSARO | AI FOR INDUSTRIAL ROBOTS

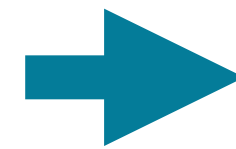
April 2019

OUR PRODUCT

OSAROPICK: AUTOMATES PICKING AND PLACING TASKS (FOR ASRS)



OsaroPick **automates stationary picking stations** in “goods to person” distribution centers.



This is done by integrating with automated storage and retrieval systems (ASRS) for Level-4 automation (**no human in the loop**).

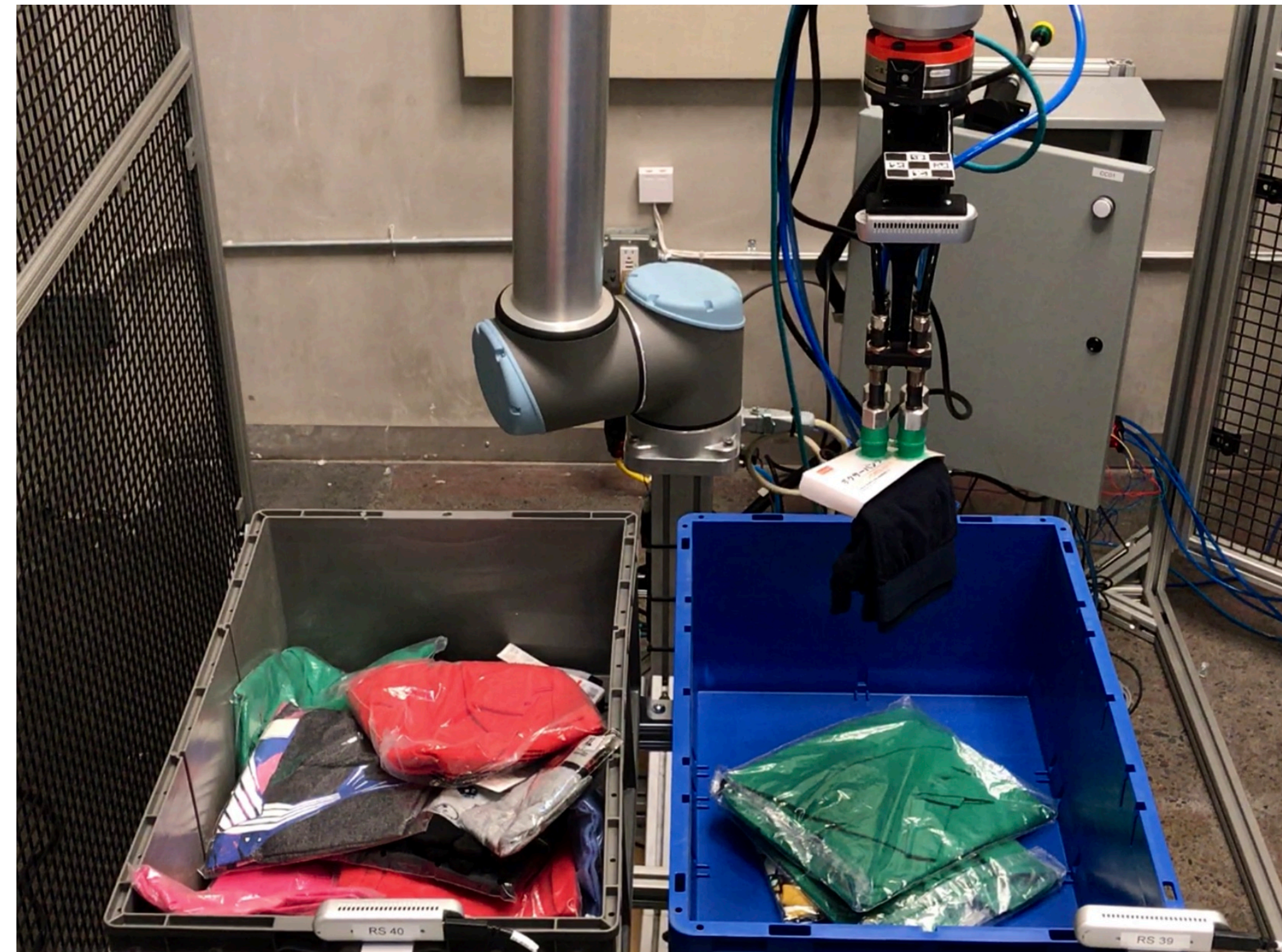
WHAT OSARO DOES WELL

AI-ENABLED VISION AND CONTROL FOR INDUSTRIAL ROBOTICS

Osaro sets itself apart with these **three differentiating features:**

1. **Detecting** objects
2. **Picking** objects robustly
3. **Placing** objects intelligently

To do this, we use many techniques, including **deep learning**.

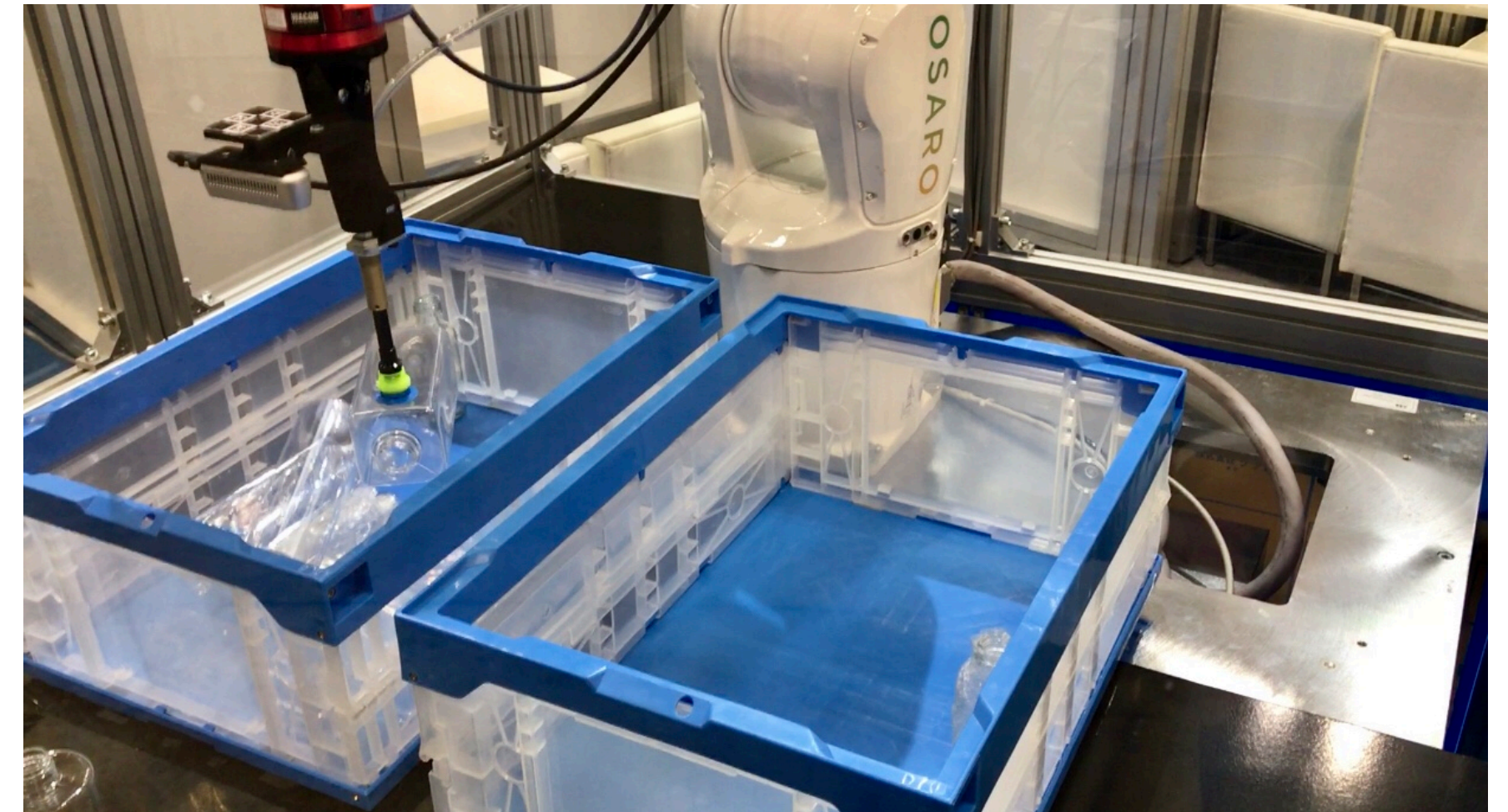


SUBTASK 1

OBJECT DETECTION: UNMATCHED VISION SYSTEM

Osaro is the **only** industrial grade AI system capable of successfully **detecting the most challenging items**, like:

- Clear bottles
- Mirrors and reflective products
- Clothes wrapped in plastic



SUBTASK 2

PICKING OBJECTS: DEEP LEARNING TO GENERALIZE PICKING TASKS (SCALABILITY)



Suction brush, not thin handle



Don't get fooled by reflections



Pick clear box, not what's inside



Avoid pump, aim for body



Target label, not gloves



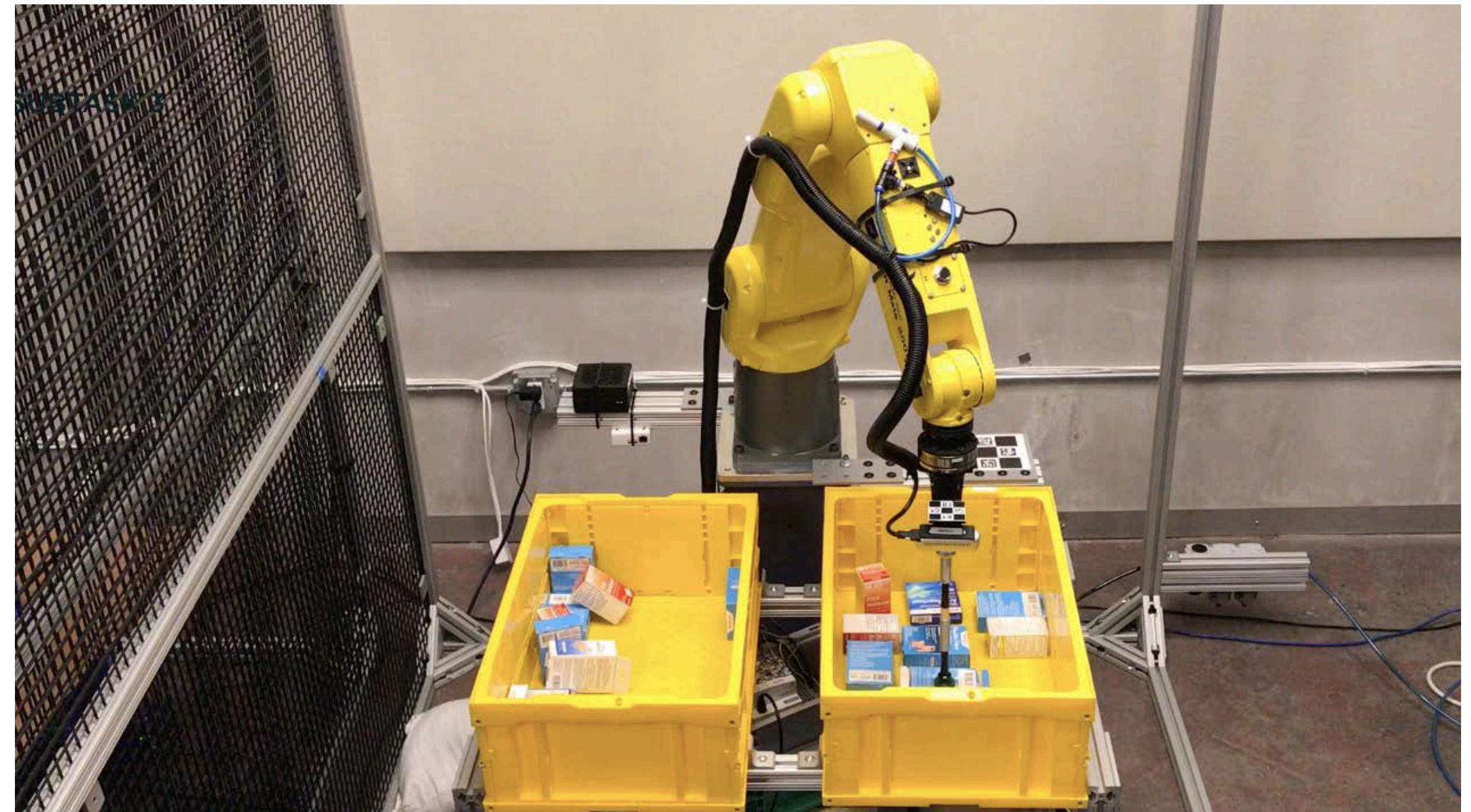
Avoid contour, pick flat parts

SUBTASK 3

GENTLY AND INTELLIGENTLY PLACING OBJECTS

To place objects intelligently, Osaro's system must:

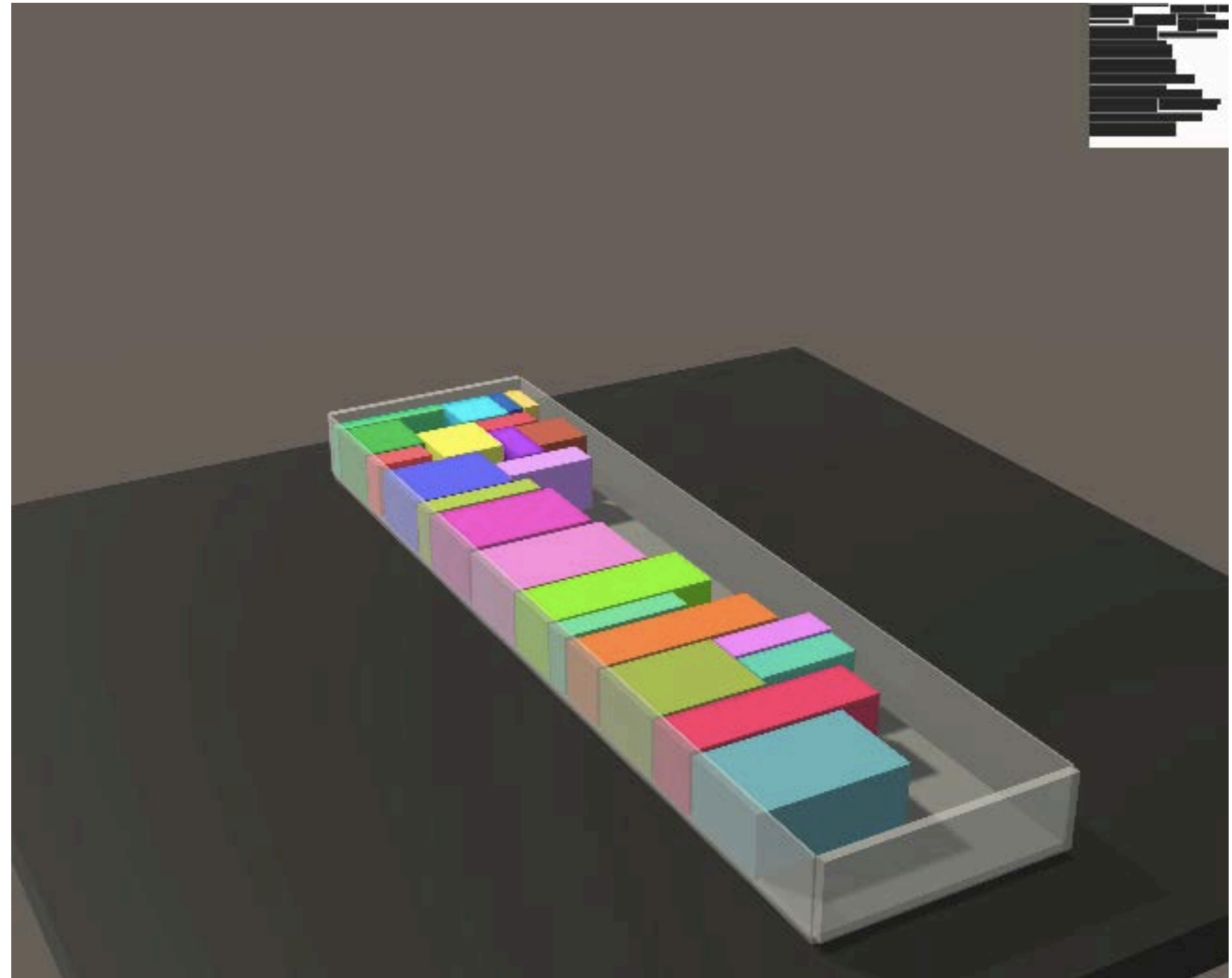
1. **Recognize orientation** of objects
2. **Search for empty spaces** and calculate optimal placement positions
3. **Modify motion while rotating** objects to placement position
4. **Estimate object height** to place gently



GENTLY AND INTELLIGENTLY PLACING OBJECTS: PACKING PROBLEM SIMULATION

Like playing Tetris

Osaro's system can intelligently place objects into a container one at a time, without knowing the size of the next objects.



CUSTOMER PROFILE SYSTEM INTEGRATORS

ASRS Integrators are our target customers

System Integrators will distribute Osaro to end-users as part of complete warehouse solution

MAKERS

Robots:



End Effectors:



Sensors:



TARGET CUSTOMERS:

ASRS System Integrators & Material Handling Equipment Makers



END USERS

Retailers & 3PLS:



TYPES OF INDUSTRIAL ROBOTS OSARO CONTROLS

Osaro only makes software, so we use whatever hardware is best each job:

Robots: Kuka, ABB, FANUC, Denso, UR

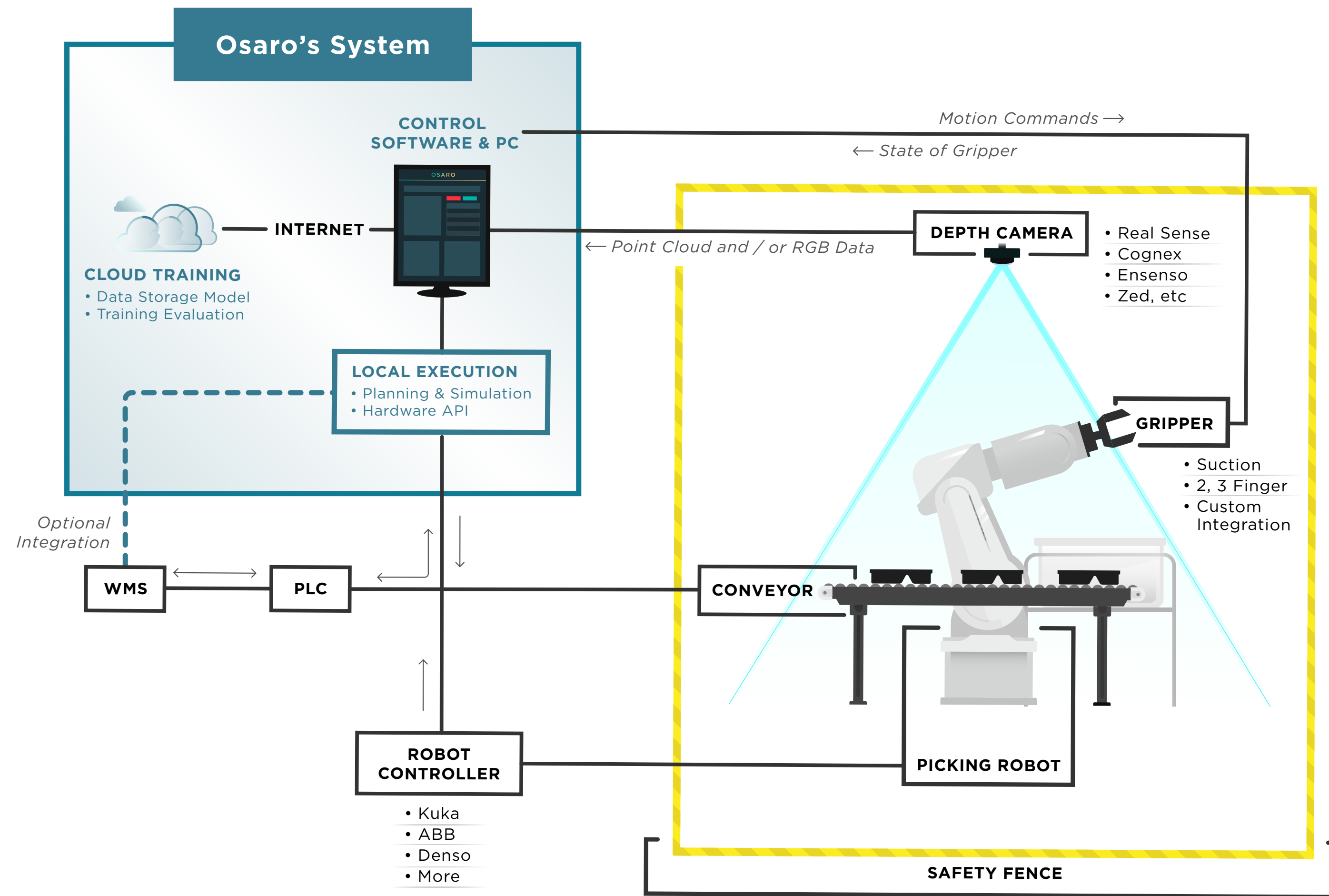
End effectors: Schmalz, Schunk, Nitta, etc.

Sensors: Realsense, Pointgrey, Zed, etc.



OSARO IS OPTIMIZED FOR SYSTEM INTEGRATORS: SCALABLE SOFTWARE-BASED PICKING SOLUTION

- Executes locally
- Data collected as needed
- Updates from cloud
- Integrates with warehouse management system



DOES YOUR COMPANY HAVE LARGE-SCALE REPETITIVE PICKING?

Distribution Centers (ASRS):

- Ecommerce
- Cosmetics
- Grocery chains
- Food packagers

Kitting:

- Auto manufacturing

High Volume Sorting:

- Parcels
- Apparel

CUSTOMER TESTIMONIAL:
IHI, TOP 10 GLOBAL SYSTEM INTEGRATOR

“Osaro’s solution is able to handle items that others fail at.
These types of items are essential to automating ASRS.”

Tsuyoshi Tsuchida, President of IHI Logistics & Machinery Corporation



IHI is one of Japan’s top 3 integrators & subcontractor to GE.

PARTNER TESTIMONIAL:
DENSO WAVE, TOP 6 ROBOT MANUFACTURER

“Osaro has helped Denso achieve unprecedented lead generation and I’m confident that our companies will unlock a new level of automation together.”

Yosuke Sawada, Managing Director Robot Business Unit

DENSO Denso is one of the top global industrial robot manufacturers.

OSARO: OUR CO-FOUNDERS

- Machine learning for Robotics
- Founded in 2015
- 30 Employees, 8 PhDs, 11 Masters
- Expertise in: **Deep Learning, Reinforcement Learning, Controls and Motion planning, Simulation, Robotics, Cloud Infrastructure.**



Derik Pridmore
CEO

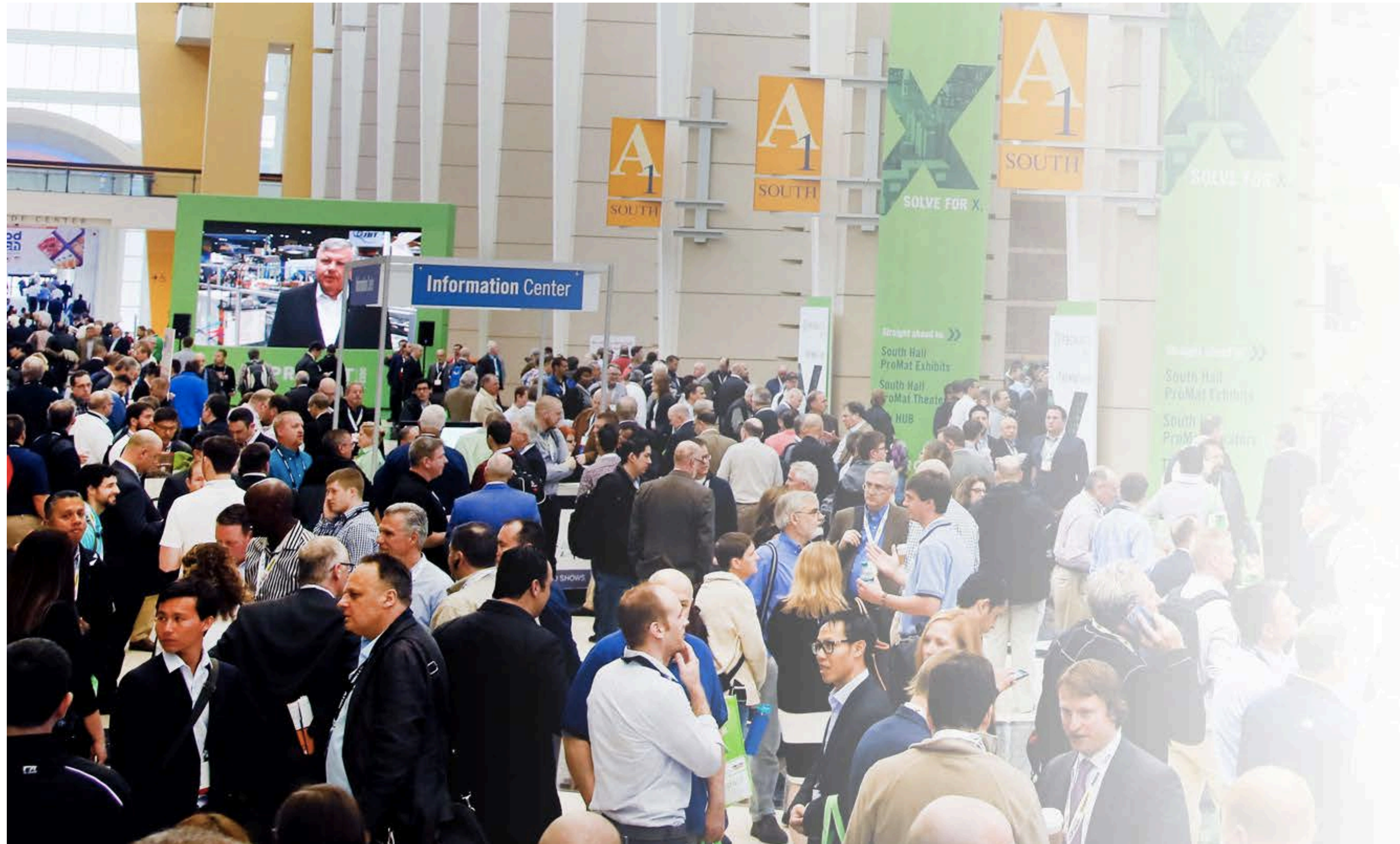
Led DeepMind Series A
Investor - Founders Fund
Founder - Arda Capital
Physics & CS - MIT



Michael Kahane
CTO

Serial Entrepreneur
Senior Engineer - Samsung
Elite R&D Unit - IDF
CS, EE - Ben Gurion

PROMAT 2019: CHICAGO APRIL 8 - 11



Visit Osaro at the Dematic Booth (S3202)

Osaro will be exhibiting its latest integrated ASRS picking solution.

Thank You

Sid Henderson, VP of Sales | sid@osaro.com

(we're hiring! osaro.com/careers)