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Manufacturing intralogistics through aerial pods

Problems to be solved

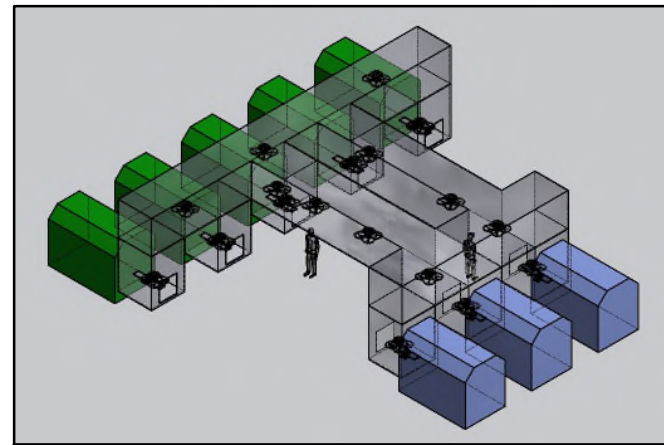**CONVEYOR SCENARIO**
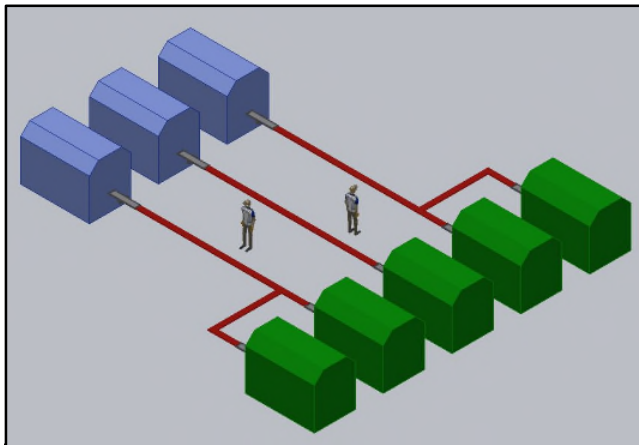
AIR PODS SCENARIO

MAIN LIMITATIONS:
- FLEXIBILITY
- SCALABILITY
- TRACIABILITY ONLY IN/OUT
- INTEGRABILITY IN EXISTING FACILITIES
- HIGH FOOTPRINT IN OPERATOR FLOOR
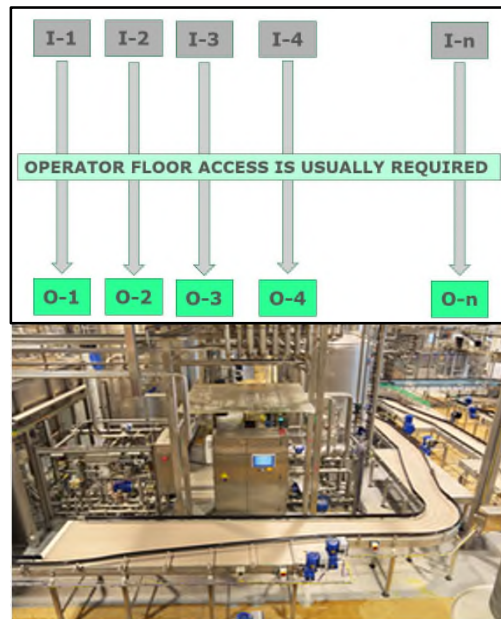- HIGH MAINTENANCE
- COSTS

MAIN BENEFITS:
- FLEXIBILITY
- SCALABILITY
- 100% TRACIABILITY
- EASY INTEGRABILITY IN EXISTING FACILITIES
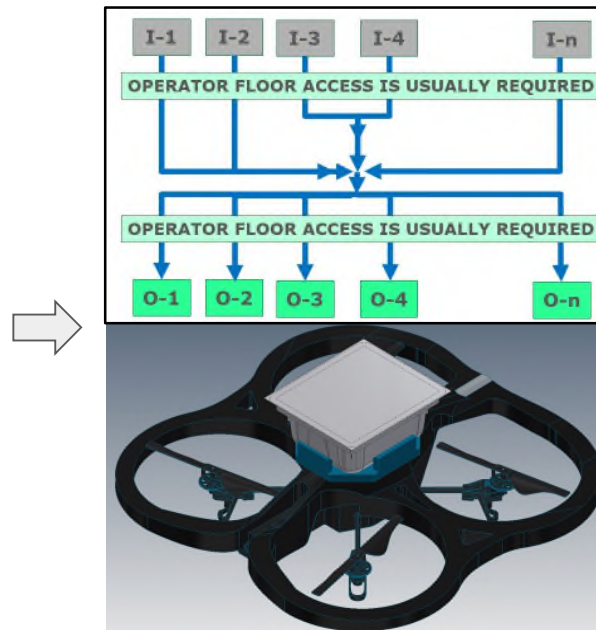- LOW FOOTPRINT IN OPERATOR FLOOR
- LOW MAINTENANCE
- COMPETIVIE COSTS

Concept: replacing fixed conveyors with aerial pods

STANDARD SCENARIO

NEW SCENARIO

**From *machine-centric*
to *product-centric* material flow**

Efficiency

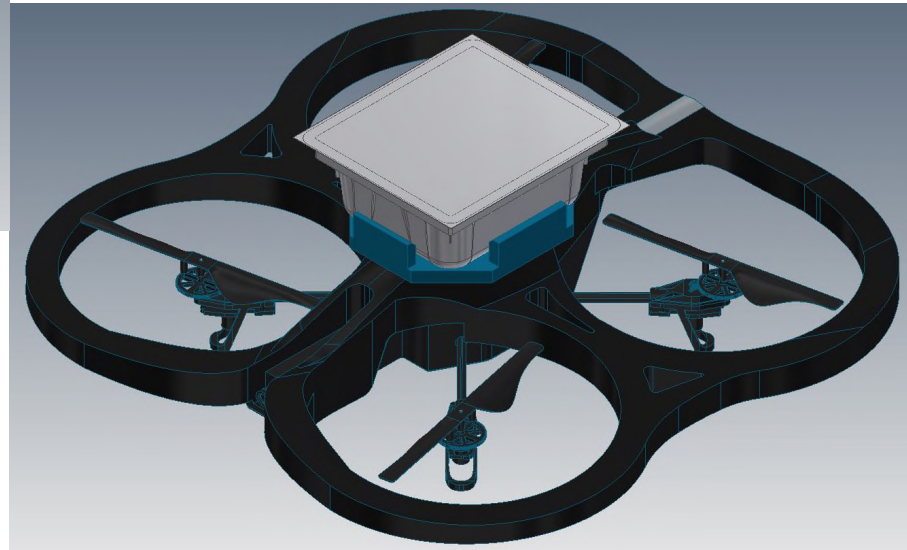- <u>Optimized</u> use of machinery: remove I/O bottlenecks
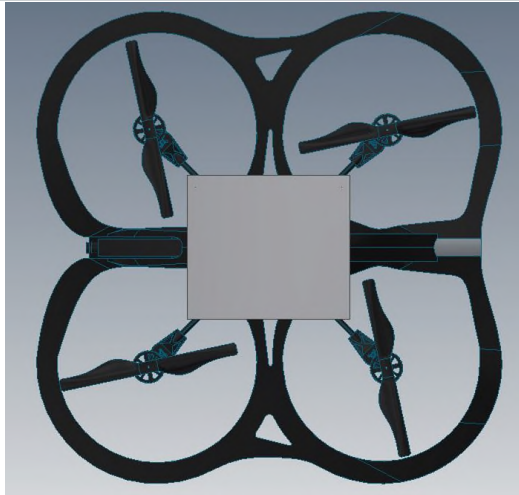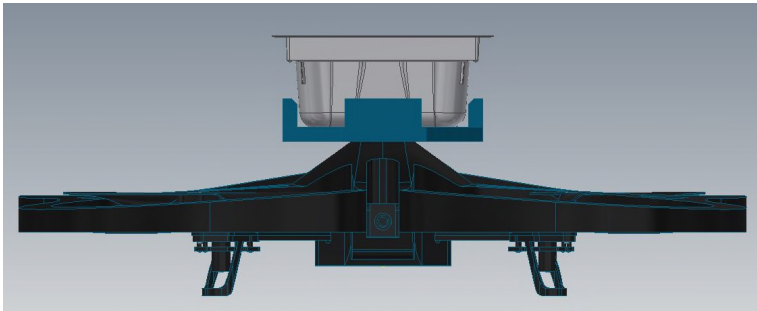
Flexibility

- <u>Traceable</u> product flow: "lots of size 1" production

Scalability

- Grow/shrink <u>on-demand</u>: commodity hardware

Intralogistic aerial pod example

Payload up to 3 kg
Approximate dimensions 700 x 700 mm, H = 300 mm

Background: similar concept in warehouse intralogistics

Conventional

- Fixed racks, fixed conveyors
- Fixed size and performance, dedicated space

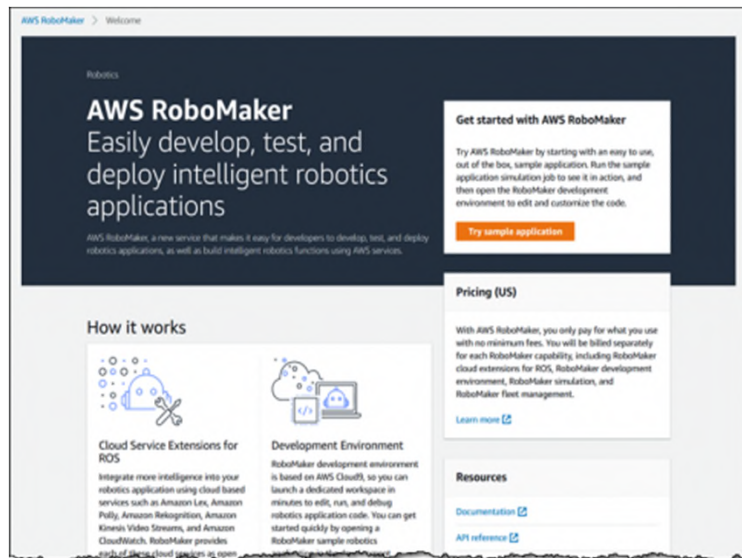**Amazon Robotics (formerly Kiva Systems)**

- Racks moved by pods, fleet control
- Efficient, flexible, scalable:
  - 20% OpEx savings
  - 50% more inventory per square meter
  - 80k pods in 25 warehouses (mid 2017)

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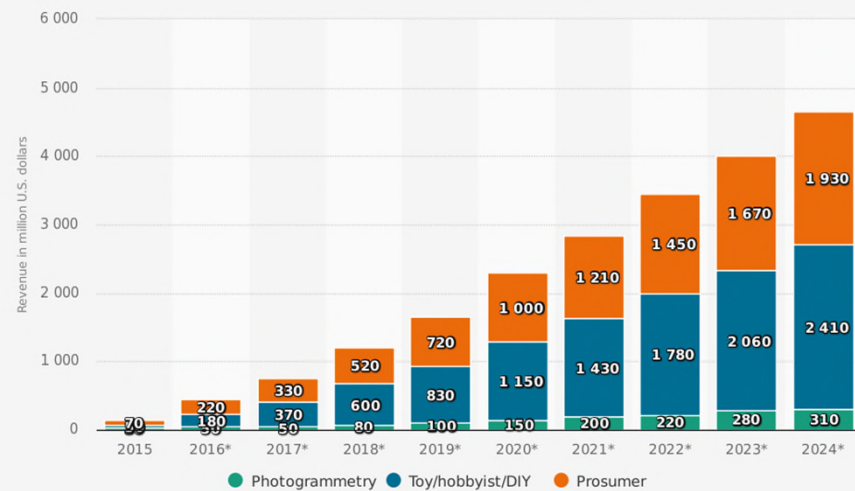(Deutsche Bank estimate, src: Quartz)

Why now

Leverage fast-growing commodity technology:

- Drones: consumer market growth
- Cloud robotics: Amazon, Google, AWS

Consumer drone market size by technology in North America from 2015 to 2024 (in million U.S. dollars)
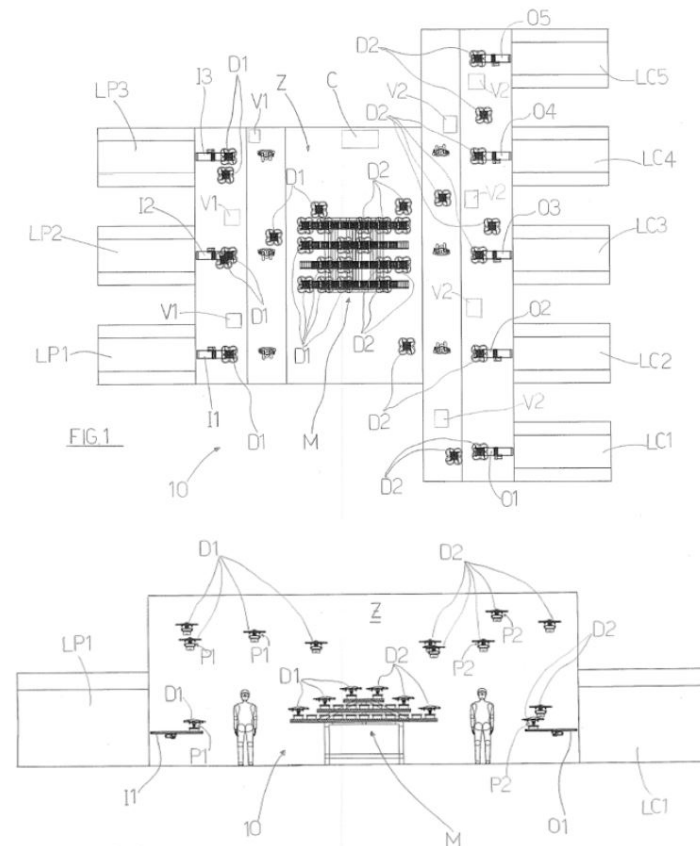
Why us

- **Patented idea:**

  - European Patent **"A PRODUCT TRANSFER SYSTEM IN A CLOSED INDUSTRIAL ENVIRONMENT"**
  confirmed in Italy, Germany, Denmark, Netherlands and Switzerland.

- **Experience and Innovation:**

  - The Andronica team can provide innovative solutions starting from a solid experience in the packaging sector especially in the pharmaceutical segment
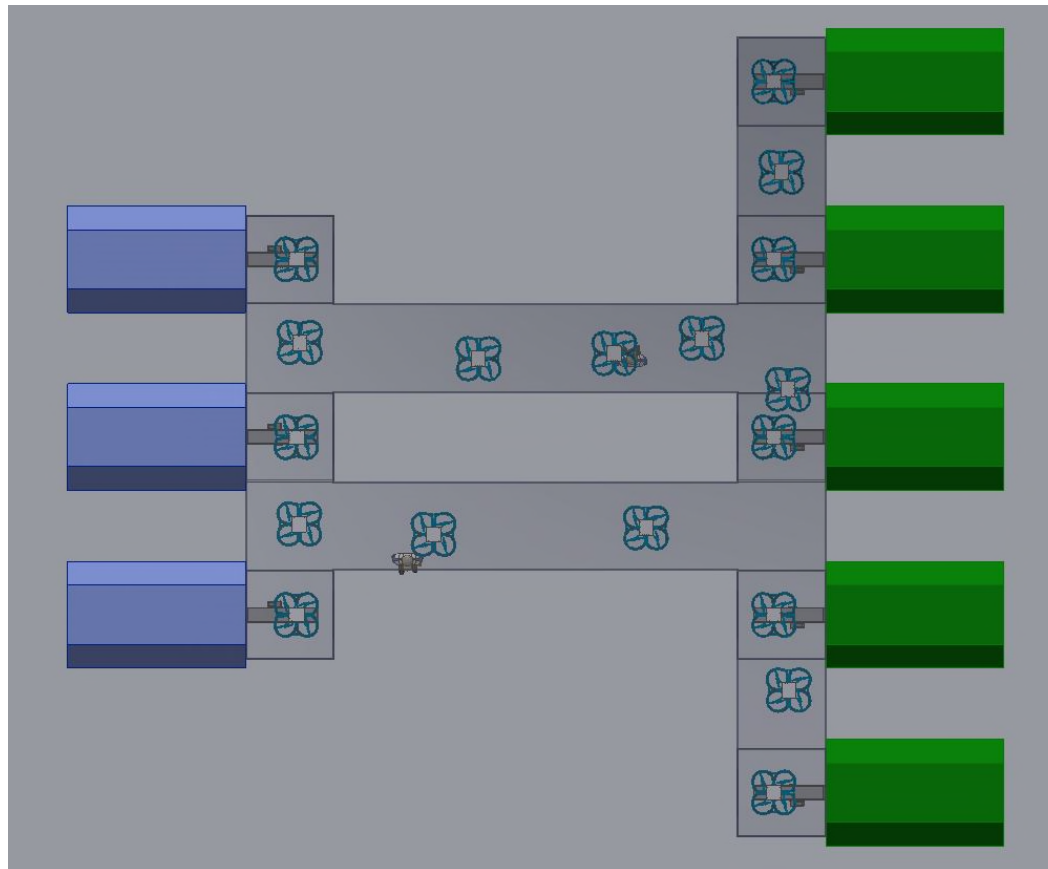
Layout example: 3 Input and 5 Output Animation
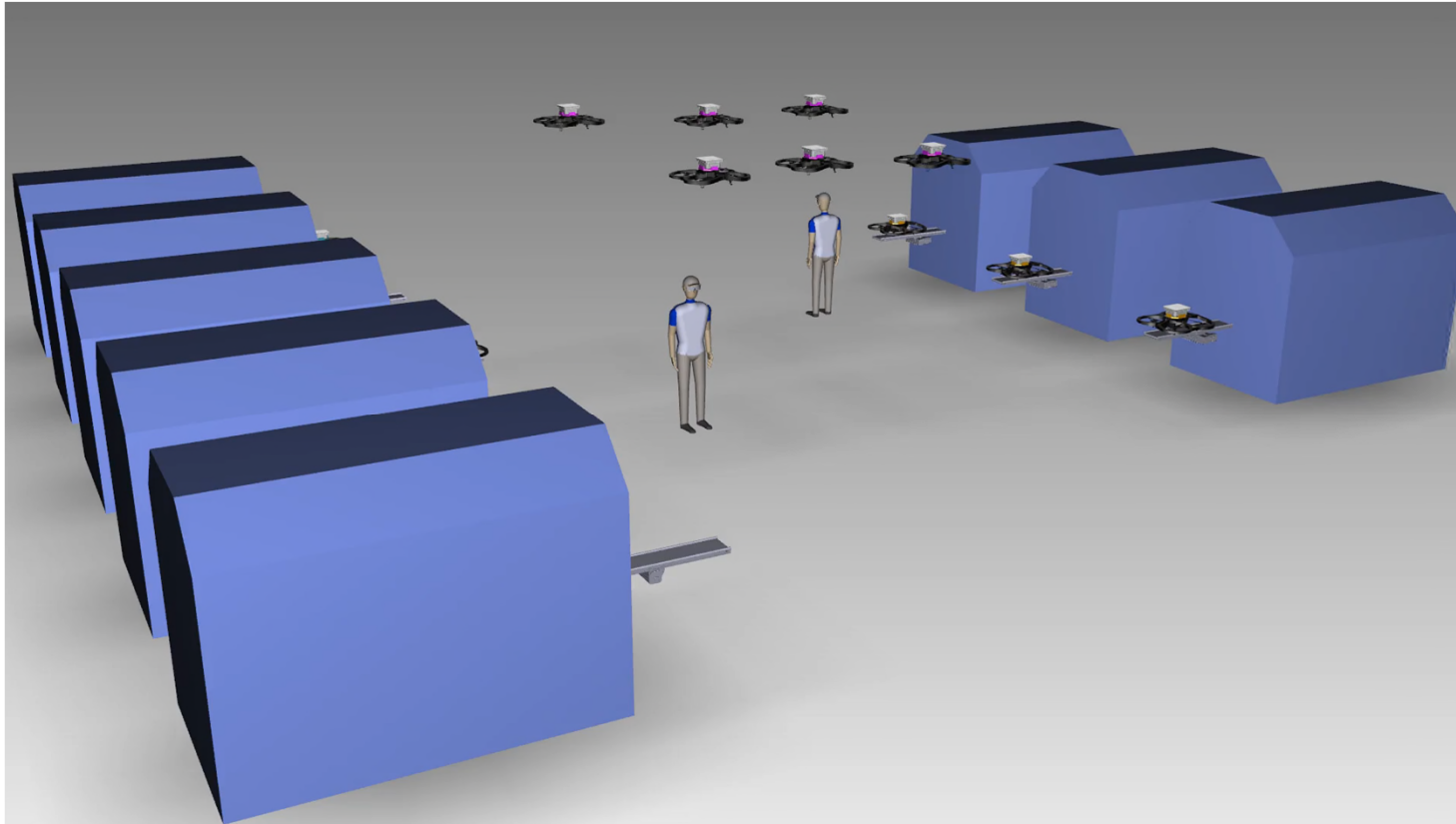
Layout example: 3 Input and 5 Output
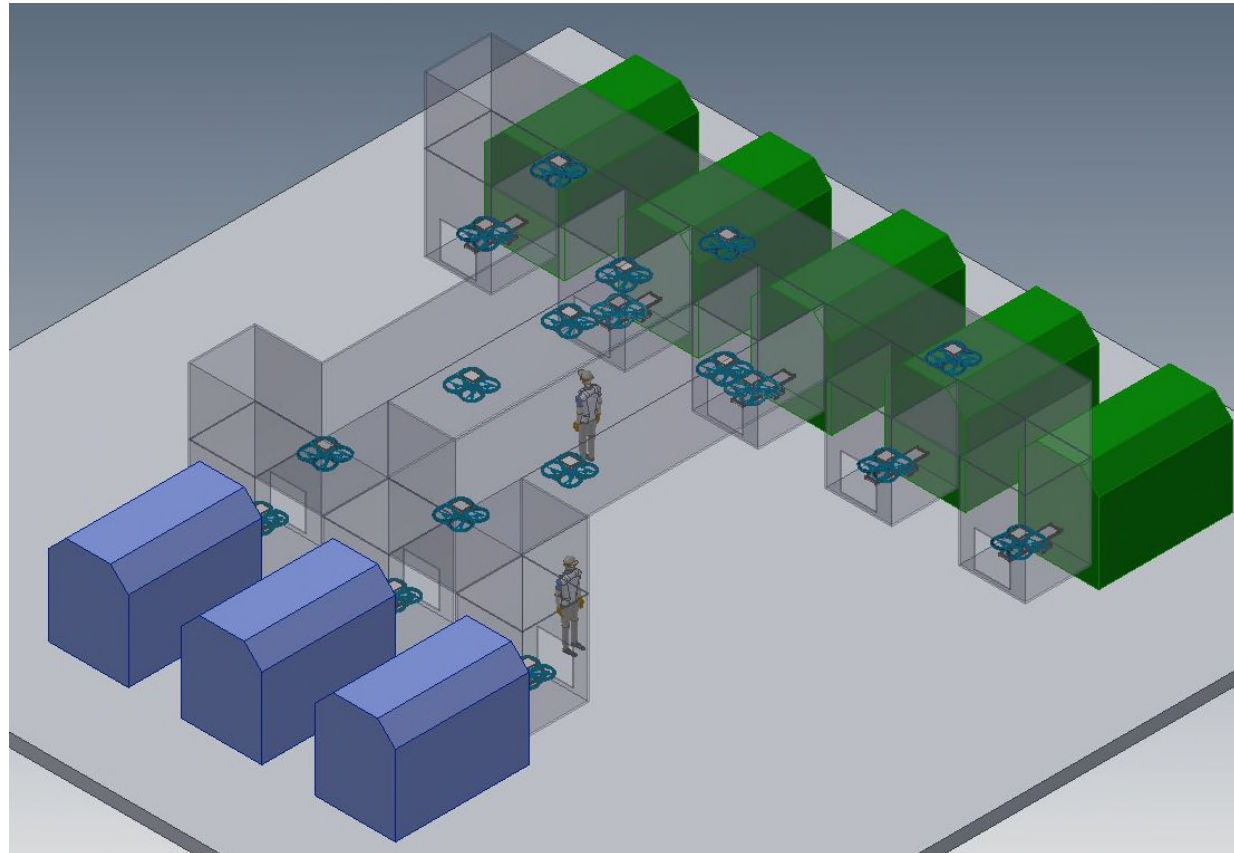
Layout example : 3 Input and 5 Output

Efficiency

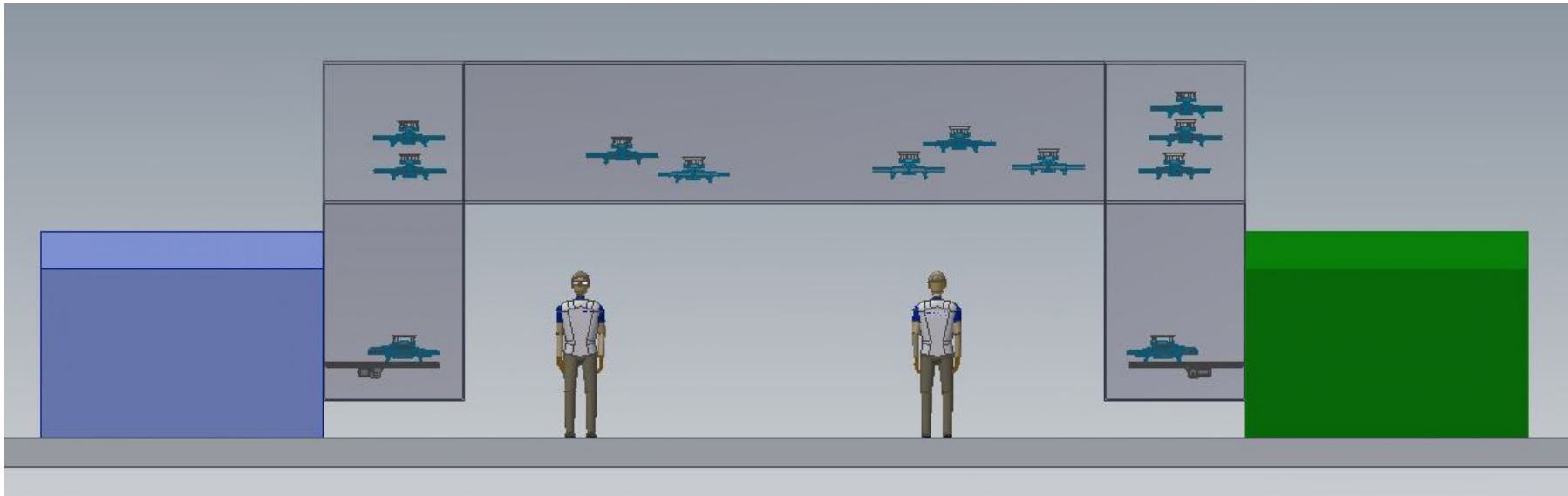- Optimized use of machinery: remove I/O bottlenecks

Flexibility

- Traceable product flow: "lots of size 1" production

Scalability

- Grow/shrink on-demand: commodity hardware

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Layout example : 3 Input and 5 Output

Closed flying zone (metal fences or nets) for drones safe, quick and easy to install especially for existing facilities.

An optimized footprint for the best use of workspaces even at different work surfaces.

Possible pilot layout: Conveyors vs Drones

Coneyors scenario:

- 4 lines at 4 ppm per line;

- Overhead transport;

- Avarage distance 40 metres per line;

- 160 metres of chain/belt conveyors: 50 Drive units, around 200 sensors ecc. (heavy wiring and installation);

- High maintenance costs and energy consumption;

- Total costs around **500 K€ for the complete application**

Drones scenario:

- 4 lines at 4 ppm per line;

- Overhead transport;

- Active canalizations (1500 x 1500) around 100 m;

- Overall 24 Drones with integrated LIDAR and control static components (QR codes, Rotuer, PC ecc.) with a quick and easy installation;

- Low maintenance costs and energy consumption;

- Total costs estimate: **300 K€ for the complete application**