OROK

Airport Robotics

We automatize baggage and cargo handling airside for more reliability, security and profitability

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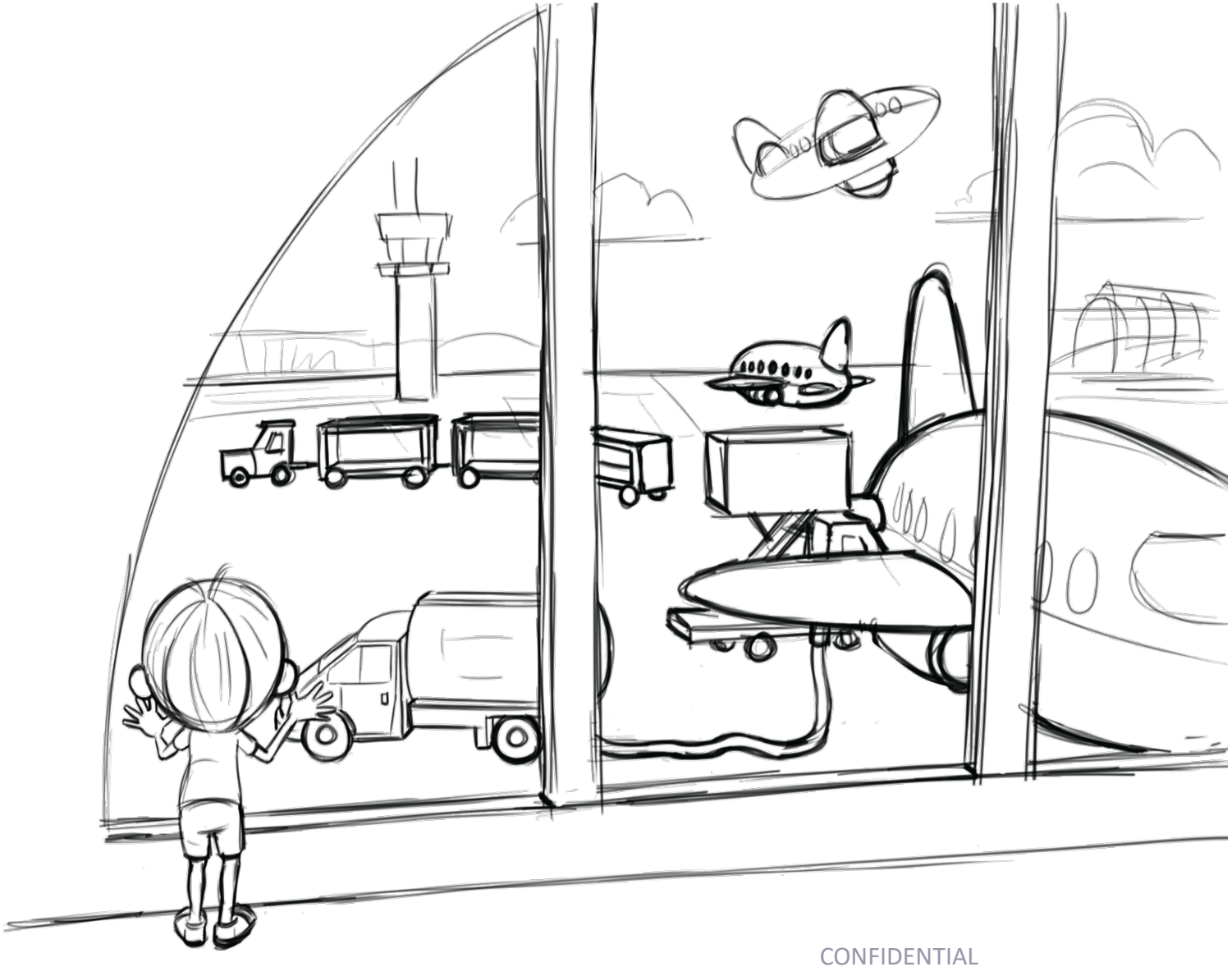
A fertile ground for automation



27,000 accidents/y

-

243,000 injured/y

-

Accidents costs: 9 bn€/y

(source: IATA)

The tarmac at the airport is a **dangerous environment for people**, where they perform **repetitive tasks** with low added value.

Our vision: it is a **good place for the automation** of logistics processes with fleets of autonomous vehicles.

Which evolved little recently

1950s

Today

Nothing has changed

An experienced and complementary team

Founders

Pierrick Boyer

CEO

Experienced project and team manager in international and technical environments.

William Lambert

CTO

Experienced embedded system architect in regulated and secure environments.

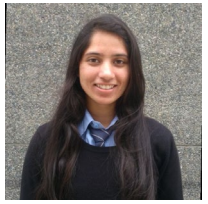
A team of 16 people (25% of women)
Including 2 pilots
60y of cumulated experience in robotics & drones
16+ developed robots

Operations

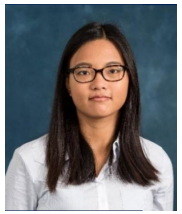
Sales

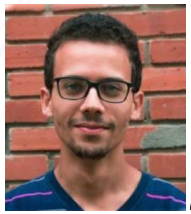
Server team

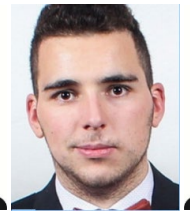
System team



Robot team







We are accompanied by experienced entrepreneurs

Advisory board

Grégory Viallard

Business Manager

Frédéric Dupeyron

Finance

Patrice Rilly

Manufacturing

JF Lambert

Management

Christophe Baillon

Software & Innovation

Mentor
Réseau Entreprendre

Jérôme Argod

Supports

Networks

Each issue can become very expensive

If you were in the airport sector, here are the issues you would face:

Turnaround duration

A delay costs

200€/min

(source: Air France)

Passenger growth

During 20 years

+4%/y

(sources: XERFI & IATA)

Quality of service

Reprocessing costs

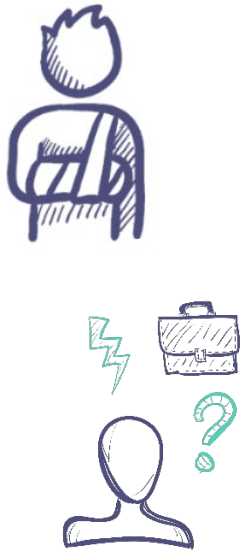
2 bn€/y

(sources: GHI)

Robotisation allows more reliability

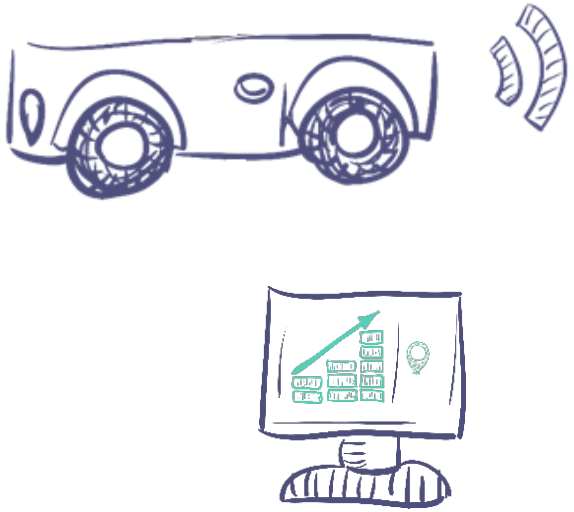
Manual

Humans make mistakes and need coordination



Automatic

Robots are reliable and are driven by an A.I.



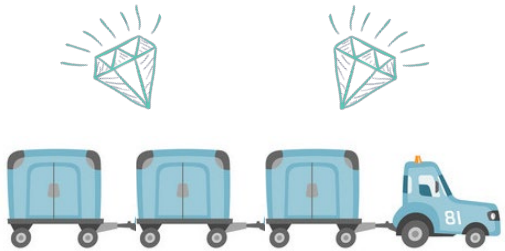
Rid people of repetitive and error-prone tasks

We identified several use-cases

Sorted by technical and regulatory complexity

Taxi

High gains



Baggage / Fret

The automation of baggage / cargo handling will be our first use case by its positioning.

Business stakeholders are convinced that automation will begin here.

Catering

Snow plowing
Degumming

Difficult → Easy

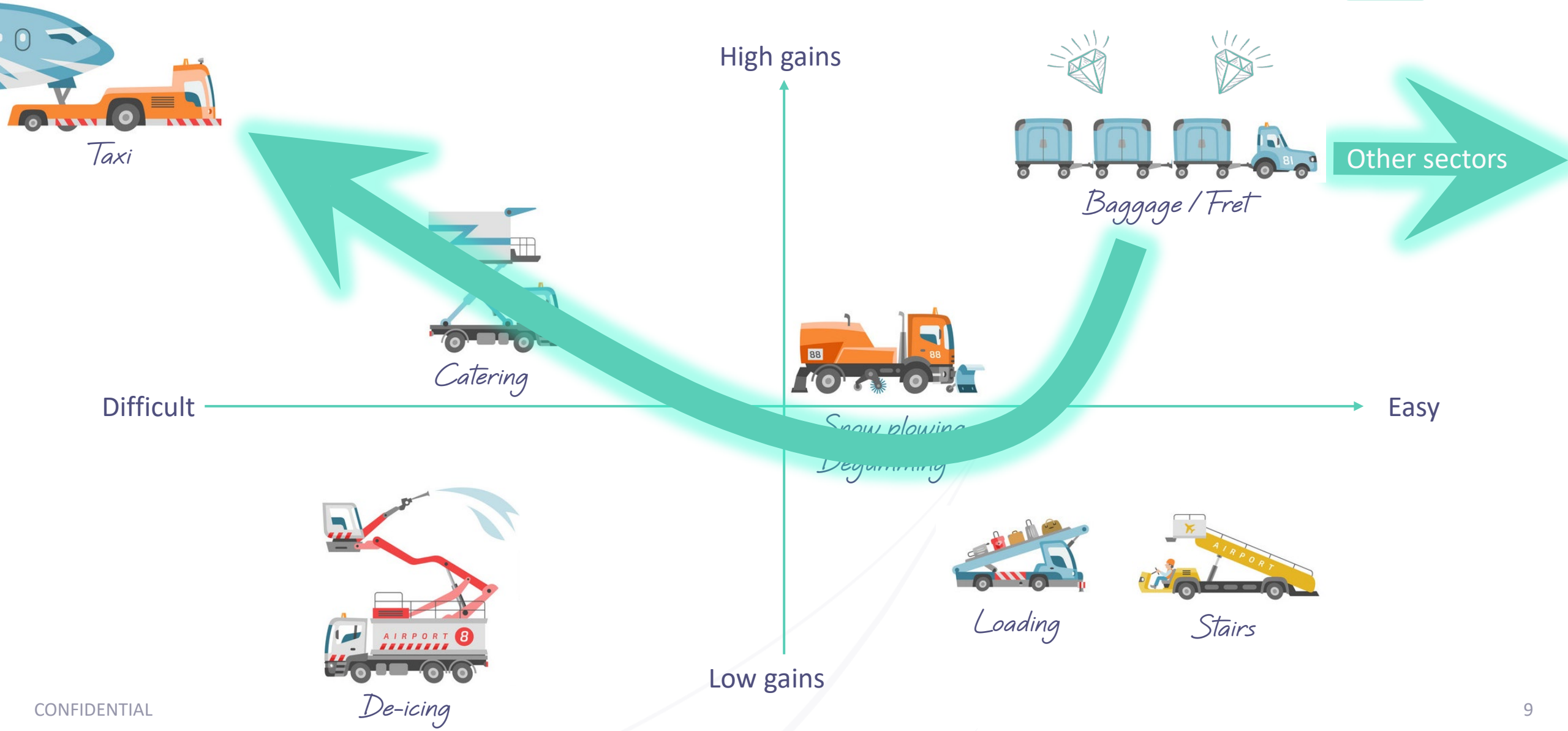
De-icing

Low gains

Loading

Stairs

We will start by baggage / cargo handling



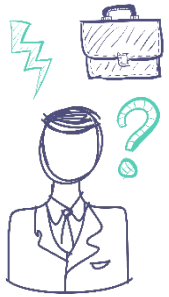
Ground Handlers are our users

They mainly face these issues:

Competitiveness

Tenders at lowest bidder

Lack of differentiation



Recruitment

30% turnover

competition with the fast-growing logistics sector

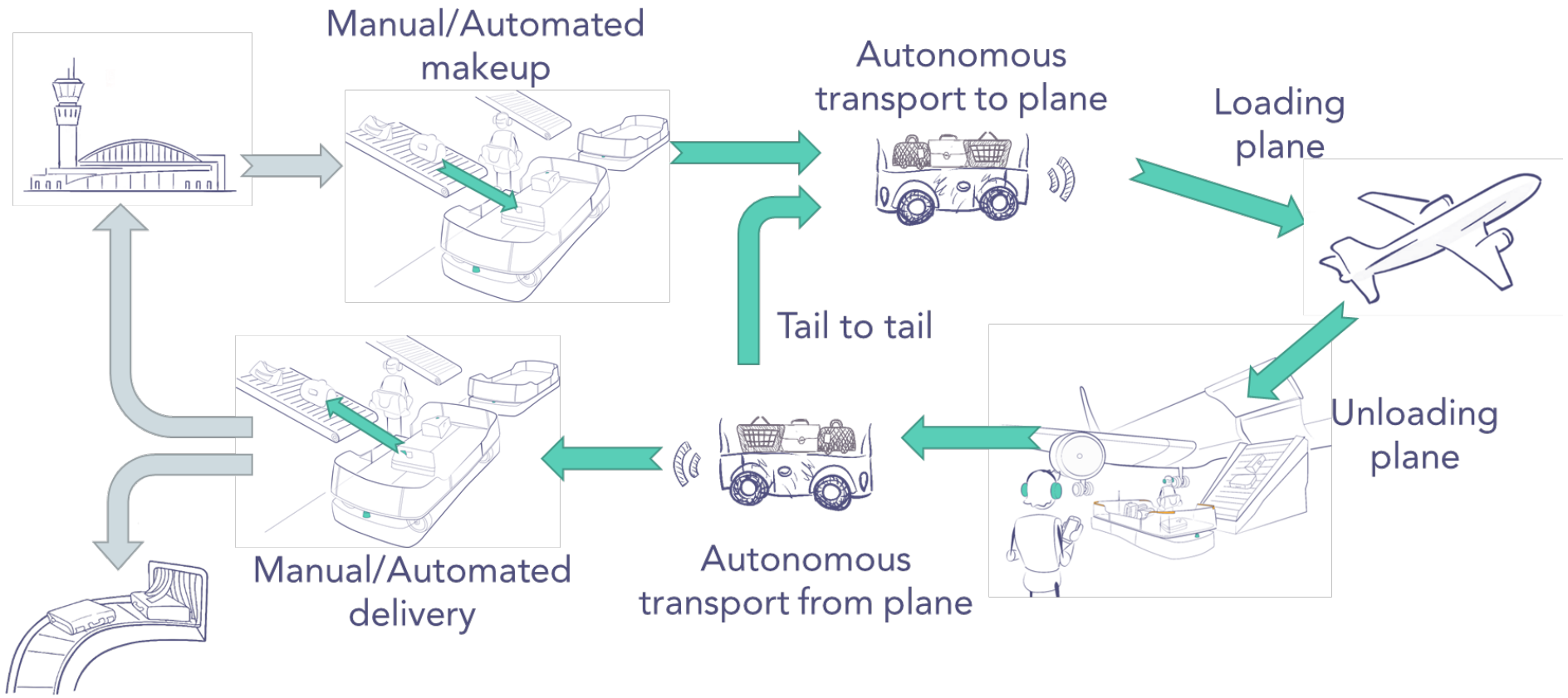
Accidents

9 bn€/y

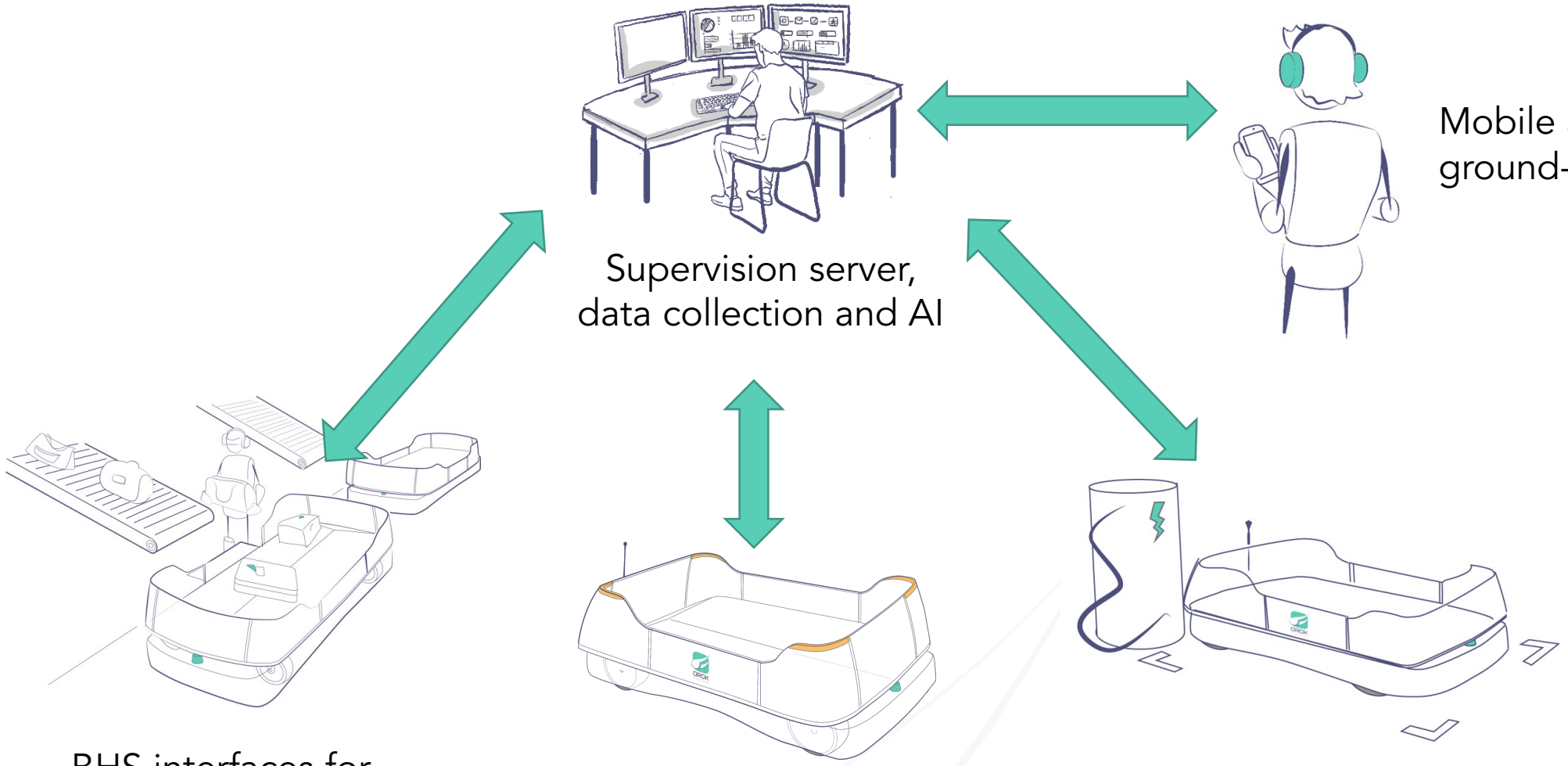
Source: IATA

We provide end-to-end automation

Both with bulk baggage and containers



We are the first in the world to come with a complete solution

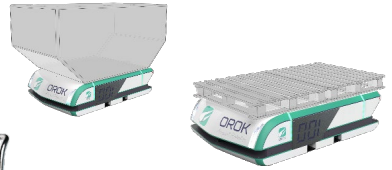


Focus on Orokart

Baggage storage

Mobile base is modular, it can transport either bulk baggages and containers.

It will be able to evolve later with other use-cases.



Electric power

Allows different charging mode to fit your environment.

Uses less energy than electric tractor and improves autonomy.

Omnidirectional

Can move in any direction: removes steering angles, improves maneuverability.

Gives opportunities to compact infrastructure.

Anti-collision system

With several sensors, it is able to avoid obstacles and so to reduce accidents and injuries.

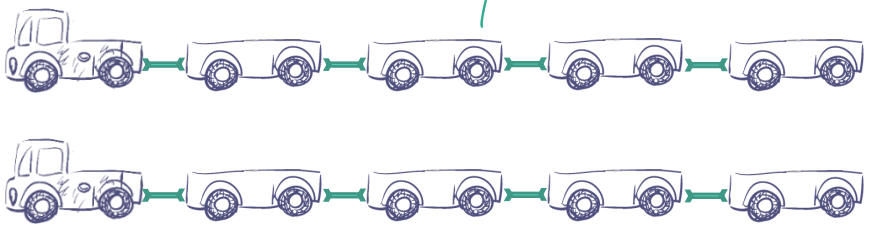
The fact that we remove the coupling eradicates completely hitching accidents.

Robots always follow the rules !

It allows huge benefits

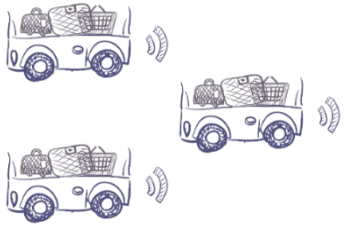
By motorizing the trailers, we remove the couplings and bring operational gains that go beyond the drivers' wages.

Today



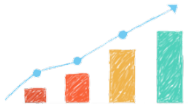
- 65%

OROK



- 50% Opex

Just in time



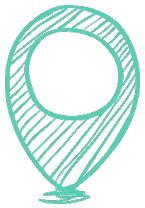
Scalable

This innovation will help aviation recover

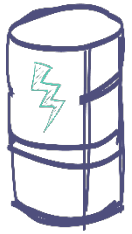
Less human injury thanks to heavy weight handling diminution

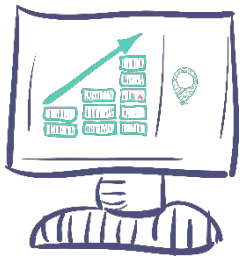
Cost efficiency
by automating repetitive labor operations
Save up to 50%

Space footprint reduction
with a fleet in permanent movement and a better maneuverability



Greener airport
Reduce your CO2 footprint and save up to 70% in electricity





Operational gains, data tracking & logistic fluidity

Traffic hazards reduction

Contactless journey
Also for the luggage and improve distancing between ground-agents

A concrete example: case study at CDG

Today

1200 u.

+

300 u.

OPEX: 77 M€/y

Invest.: 80 M€

Savings

35 M€/y

Payback: <2,5 y

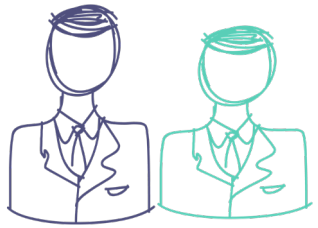
OROK

500 u.

150 u.

OPEX: 42 M€/y

Airports ecosystem



Authorities

Define rules and ensure they are implemented correctly

Airport

Rent the infrastructure

Use infrastructure

Leaser

Rent the ground support equipment (GSE)

Airline

Transport passengers / Sell tickets

Outsource turnaround management

Sell services

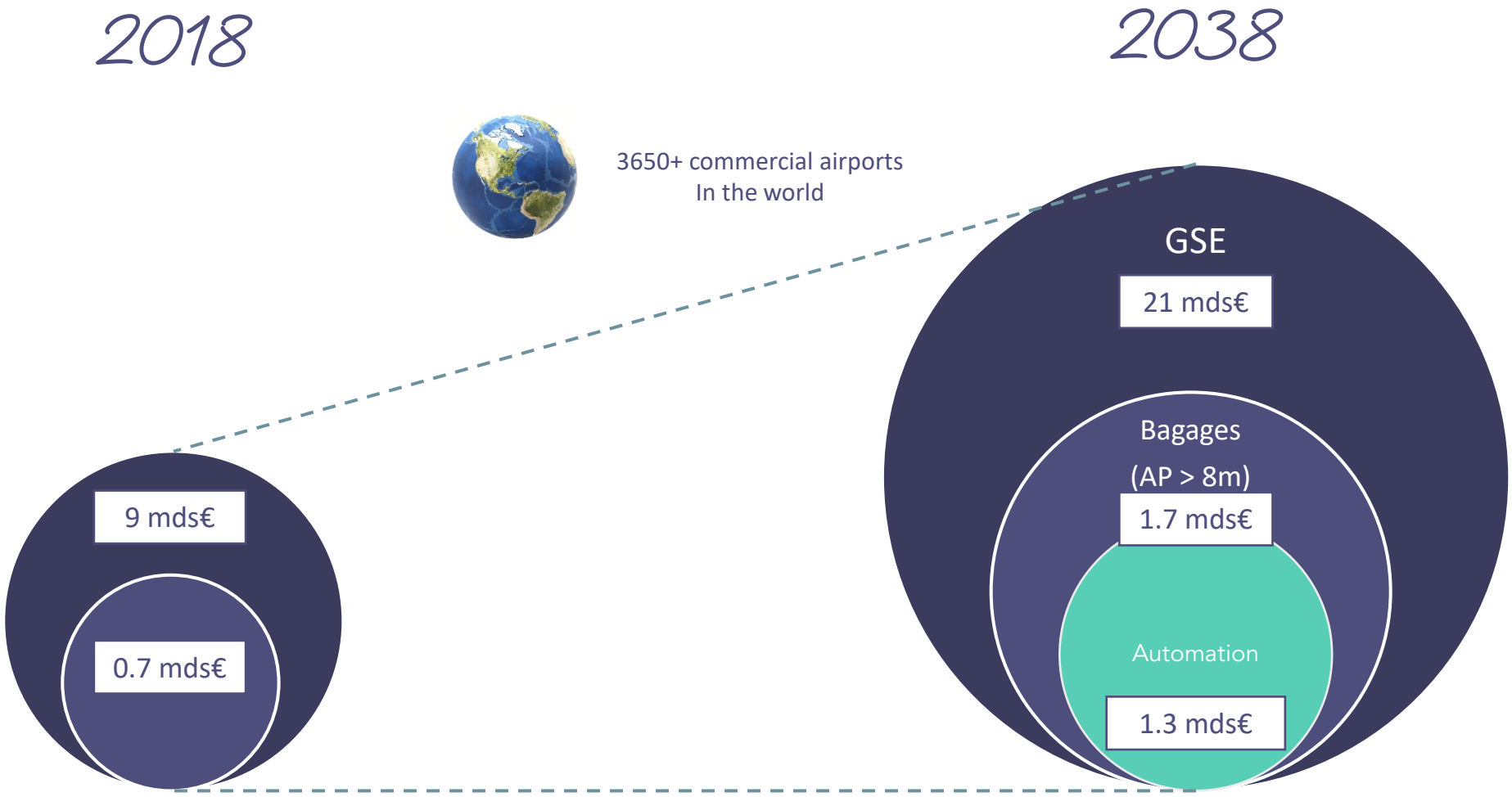
Ground-Handler

Market segmentation

We target

- Airports with more than 8m passengers /y
- In regions where
  - manpower is expensive
  - or where there is a labour shortage
  - or where innovation/technology is important
- And Ground-Handlers operating in these airports
  - whether they are small or big
  - but prioritizing handlers who have a worldwide presence

Baggage Handling Ground Support Equipment annual market in biggest Airports will be greater than 1 bn€ *



** Takes into account a 5y of delay in the usual growth due to COVID*

Competition landscape

	OROK	TLD / EasyMile	Charlatte / Navya	Gaussin	Vanderlande	Alsteff	Aurrigo	Uisee
Indoor (I) / Outdoor (O)	IO	O	O	IO	I	I	O	O
Bulk bagage	X	X	X		X	X		X
AKH/AKE	X	X	X	X			X	X
Small palets	X	X	X	X				X
Heavy palets	2024			X				
Fleet management	2023	X	X	X	X	X		X
Data analytics	2023							
Mission planner	2024				X	X		
Logistic Artificial Intelligence	2024				X	X		
Automatic load transfer	2023			X	X	X		
Auto-load / unload	2024							

CONFIDENTIAL

We position as game breaker

We are the only one to propose end-to-end automation.

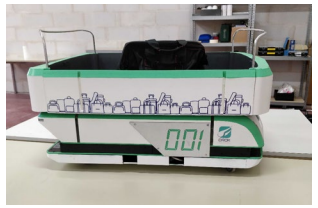
Solution of most of the competitors will make it difficult to complete their scope in the future.

Our solution is omnidirectional, bringing additional maneuverability and reducing footprint.

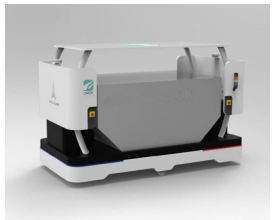
We differentiate from tractors (TLD, Charlatte) with more security and additional logistic gains due to removing the coupling. Moreover, electrifying the cart will bring many additional features they won't have (ie weight control, lightning, traceability)

Ubikart grows up

- Robot side
  - Ubikart
    - 40% scale prototype
    - Rendering close to the final look
    - Manual control
    - Omnidirectional
    - Obstacle avoidance
    - Calibration
    - Docking

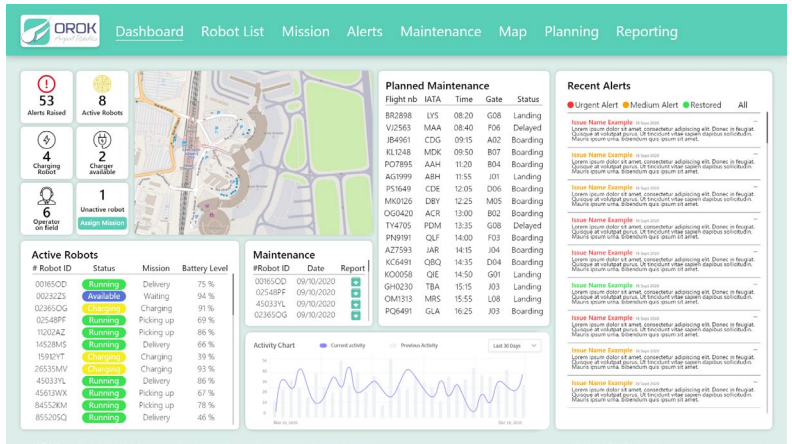


  - Demokart
    - Carriage at scale
    - Architecture defined
    - Development on going



  - Protokart
    - Definition on going

- Server side
  - Modelling of the airport with Polytechnique
  - Airport simulator
  - UI demonstrator dev on going



- Intellectual Protection Side
  - INPI report and support
  - 12+ Soleau letters
  - 2 trademarks
  - 1 model
  - 2 patents filed
    - Auto-loading station
    - Bag access restriction with shutters and RFID check
  - 2 patents to be filed soon

We already had many interests

ONET AIRPORT SERVICES partnership at LYS and CDG for trials and know-how sharing

- Focus on baggage handling
- Priority on first 20 units

ADP contract for trials in cargo handling

- 244k€ - 2y – Starts in Jan./2021

H2020 Green airport consortium

- Part of the project as provider of autonomous solution on freight

AVINOR Automatic Baggage Handling call for tender

- Part of a consortium with a leader in the cargo-handling business

Many interests from ground handlers, airports or airlines

- Turkish Airlines, Saoudi Ground Services, WFS, Dnata, Qatar Airways, GEH, Dusseldorf Airport, SwissPort, Changi Airport

Summary in a few KPIs

3

prototypes

2

patents

2

trademarks

2

planned trials

873k€

of funding

1

signed contract

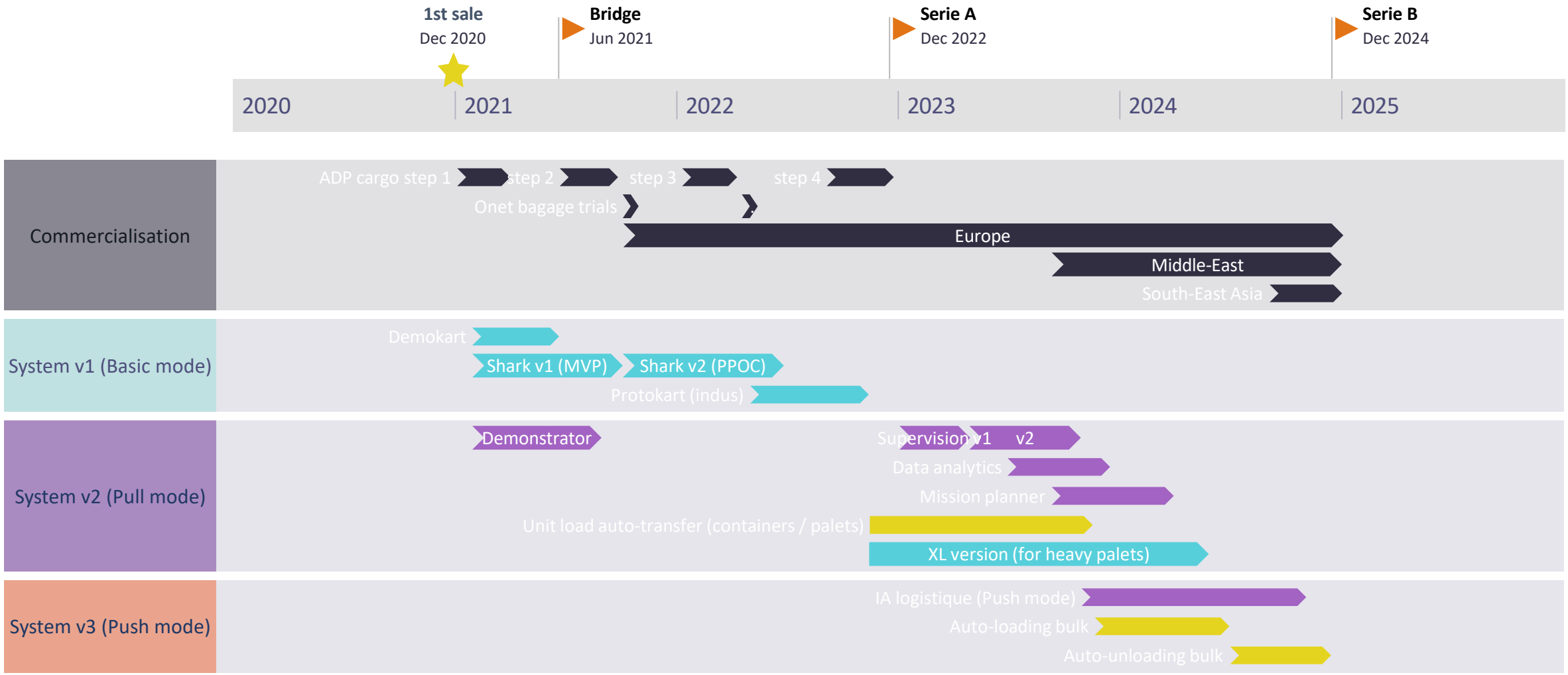
1

contract negotiation on going

4

advanced prospects

Roadmap
R&D and commercialisation

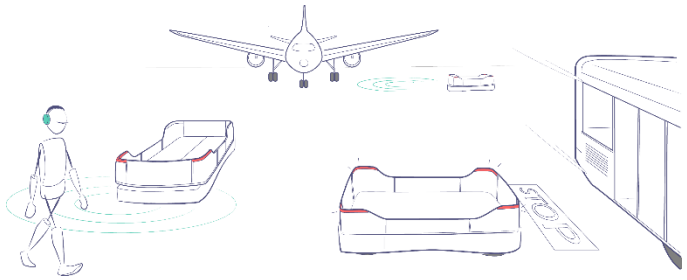


Next steps

Communicate

We exhibit during major events so that we have a worldwide visibility and to start identifying prospects.

Experiment

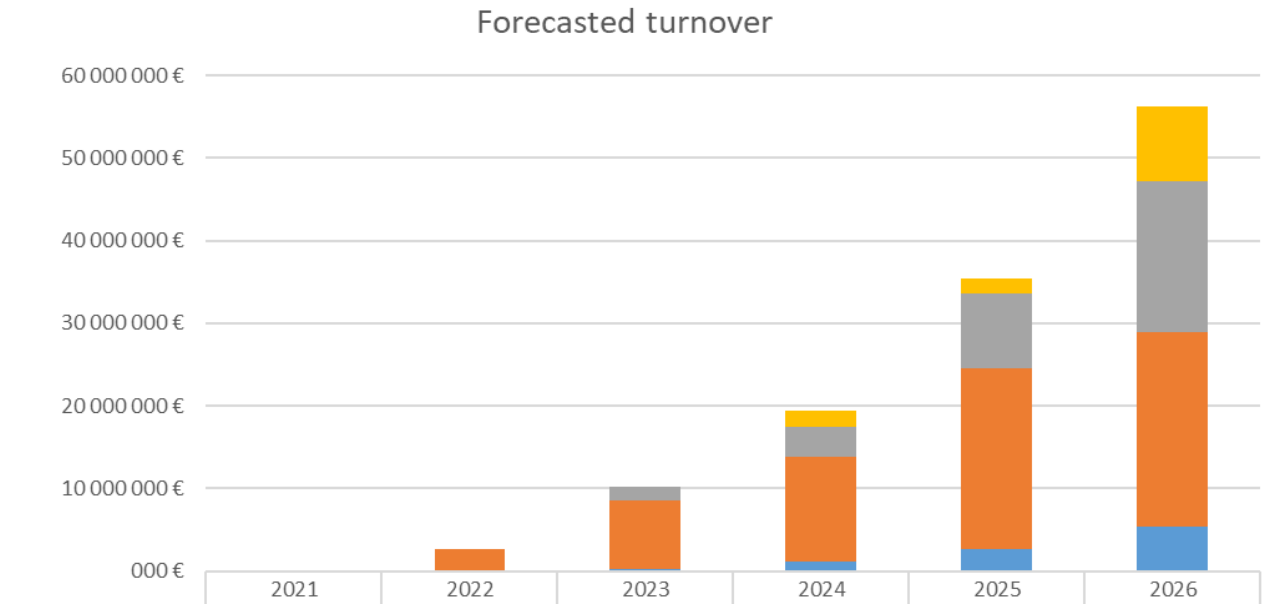


This prototype will be used @LYS & @CDG thanks to our partnership with Onet and our prize during ADP Cargo in June 2021. We will have iterative trials, until the product is mature enough.

Commercialise

We already have interesting contacts across the world who are waiting for the product to be ready and the trials to show results. We plan first sales late 2021.

A sustained growth



	2021	2022	2023	2024	2025	2026
Sales Asia	k€	k€	k€	1 815 k€	1 815 k€	9 075 k€
Sales Middle-East	k€	k€	1 650 k€	3 630 k€	9 075 k€	18 150 k€
Sales EU	k€	2 640 k€	8 250 k€	12 705 k€	21 780 k€	23 595 k€
Maintenance	k€	k€	300 k€	1 200 k€	2 700 k€	5 400 k€

Our growth engine is based on a retention model, once production target will be reached, we will continue to grow thanks to maintenance contracts.

OROK will be profitable by 2024.

Economic model
(for first version of the system)

We generate our income, on the one hand by the sale of the system (which allows to equip a complete carousel), and on the other hand through maintenance contracts on the existing fleet.
Later we will add annual licences on software advanced features.

	Cost price	Selling price	Customer gain
Example for a system (carousel)	845k€	1 650k€ Include infrastructure et installation	ROI 2 - 4 years
Recurrent revenues (maintenance)	75k€	150k€	12 years lifetime

Our funding is iterative

Mid-2018 – Creation (80k€)
Capital: 30k€
X-Up: 20k€
French Tech: 30k€

- Market study – Prototyping (Ubikart)

October 2019 (300k€)
- REI: 90k€
- Love Money: 60k€
- BPI-FEI: 150k€

- Prototyping (Demokart)

July 2020 – Seed (493k€)
- Equity: 253k€
- Bank: 140k€
- BPI: 100k€

- Prototyping (Protokart)

Q2 2021 – Bridge (1.5m€)
Equity: 800k€
Bank: 350k€
BPI: 350k€

- **MVP - Commercialisation**

Q3 2022 – Serie A (8m€)
- Equity: 5m€
- Bank: 3m€

- Complete system - Industrialisation

Q3 2024 – Serie B (30m€)
- TBD

- Mass production - Diversification

We want to prove with this iteration that our vehicle is accepted within airports and that customers are ready to buy it.

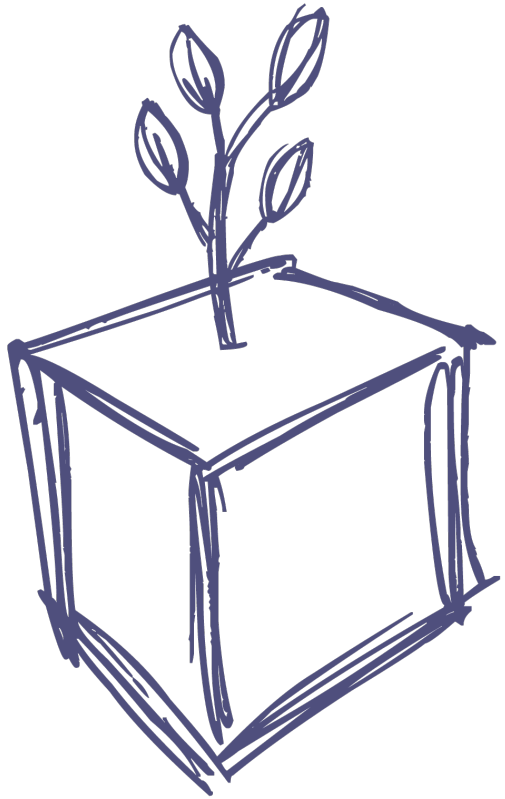
Our needs today : 800k€ in equity

Goals :

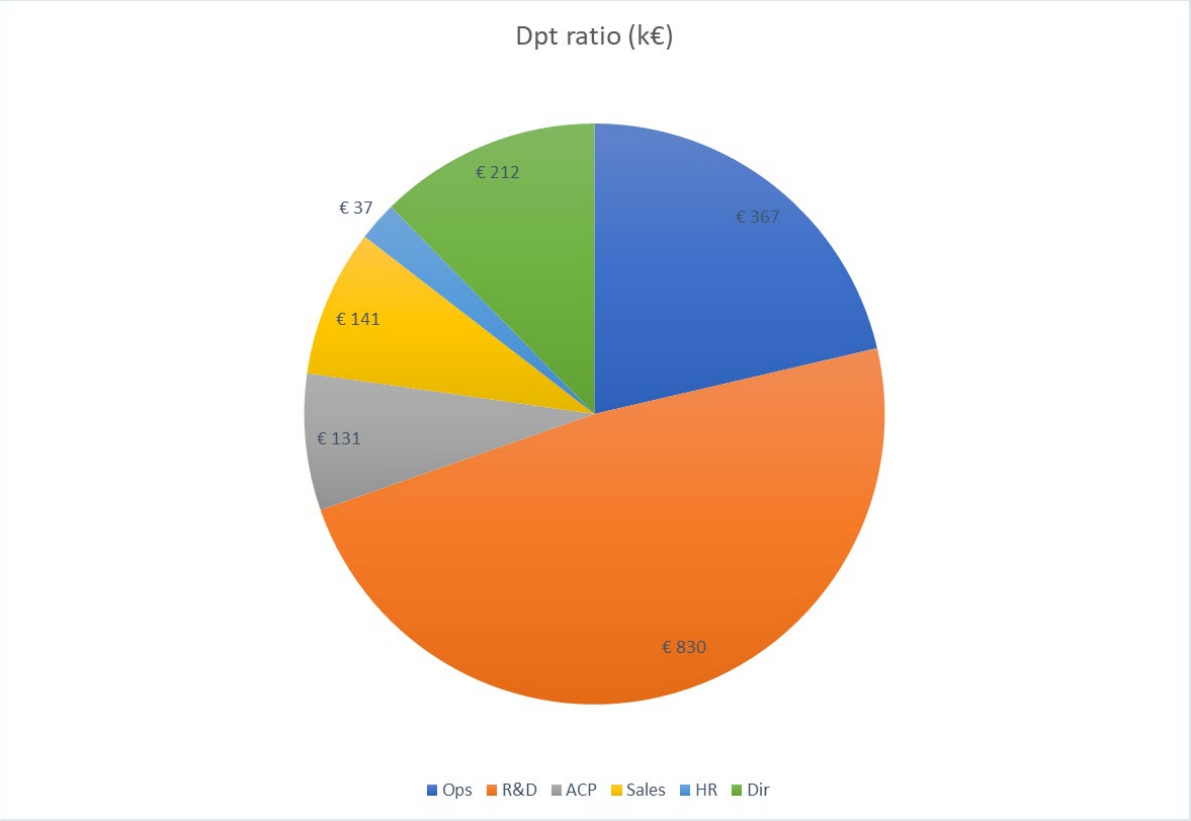
- **Finalize the development of our product**
- In order to **find our first customers**
- And **prepare Serie A** round table

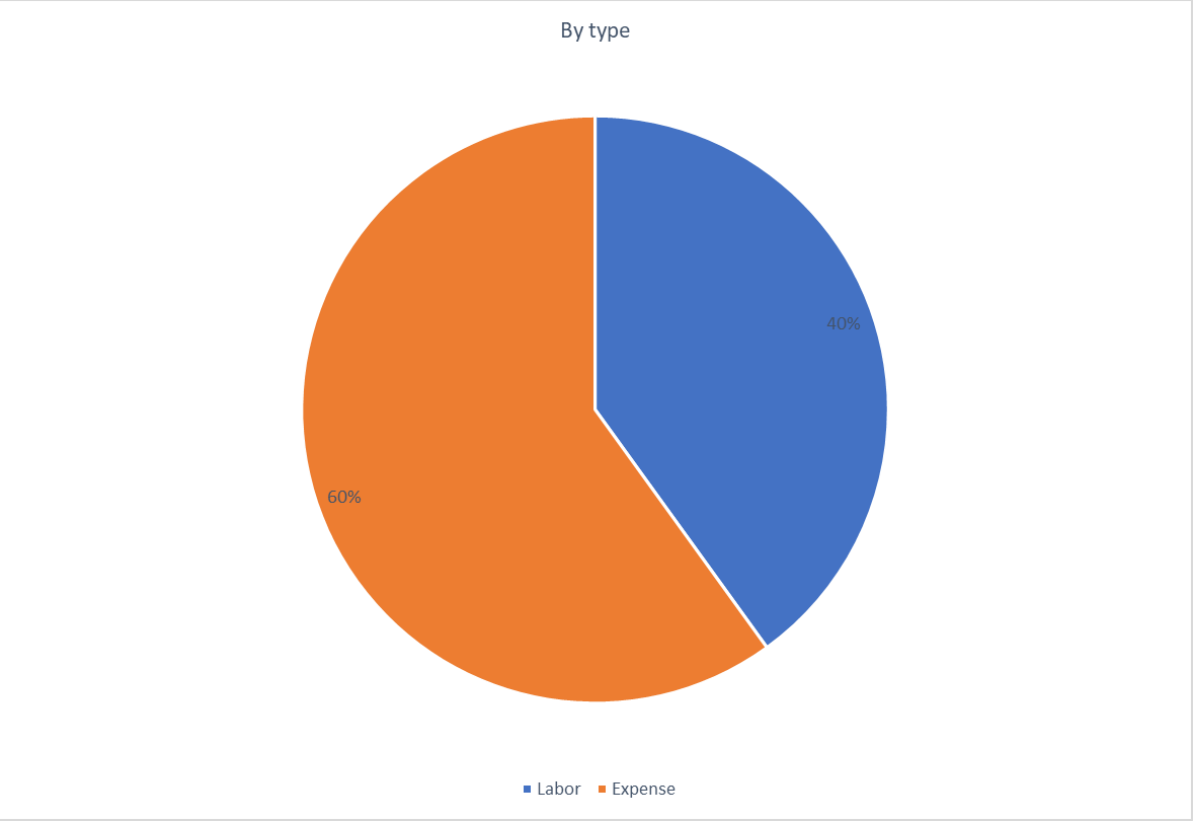
What is funded:

- R&D
  - Finalisation of the product development (Shark generation)
  - Trials in airports (LYS for baggage, CDG for cargo)
  - 2 Additional patents
- Marketing / Sales
  - Attend to 2 major tradeshows in EU (Munich 2021, Copenhagen 2022)
  - EU airport prospection (goal to have 2 sales before Serie A – around 20 robots)
  - Hire a sales director
- Operations
  - Define our detailed manufacturing plan



An important effort still needs to be done in R&D, but we will start give more weight to other topics





OROK

Airport Robotics

Thanks!

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Pricing strategy

Robot price

150k€

Installation price

10%

To estimate case by case

Maintenance contract

10%

Of installed fleet

COGS

72k€

Margin

50%

Labor cost of ground-agents

Annual salary

50k€

35h / week, 220d / y

Daily FTE

2.7

= 19h of work / 7h of work / ETP

Monthly cost

18k€

Operational day 19h
30d / month

Hourly cost

35€

Ratio 365j

1.8

Annual cost

240k€

Operational day 19h
365d / y
= 50k€ * 2.7 * 1.8
= 365 * 19 * 35€

Robot datasheet

- Size: 3500x1760x2315mm
- Autonomy:> 8h
- Charging modes: Full / Tethering / Automatic battery swapping
- Speed: 25km / h
- Weight: 800kg
- Payload: 1.6t

Server features

- **Supervision**
  - Fleet management (status, cartography, maintenance management)
  - Alarm management
- **Missions assignment**
  - Optimization of logistics flows
- **Data analytics**
  - Statistics for better overall visibility
- **Interoperability**
  - KPIs available for existing systems
  - Information retrieval to anticipate / adjust the mission

Deployment strategy

- Carrousel by carousel (10 robots on average)
- Experimental phase in France
- Then European market [2021-2022]
- Then we will go quickly to North America, Middle East, Southeast Asia
- Ideally at new airports, without being restrictive

Our values

Accountability

Transparency

Autonomy

Efficiency

Quality

Respect

Questioning

Regulatory 1/2

https://www.ecologique-solidaire.gouv.fr/sites/default/files/2_5-GuideEISA_V4.pdf

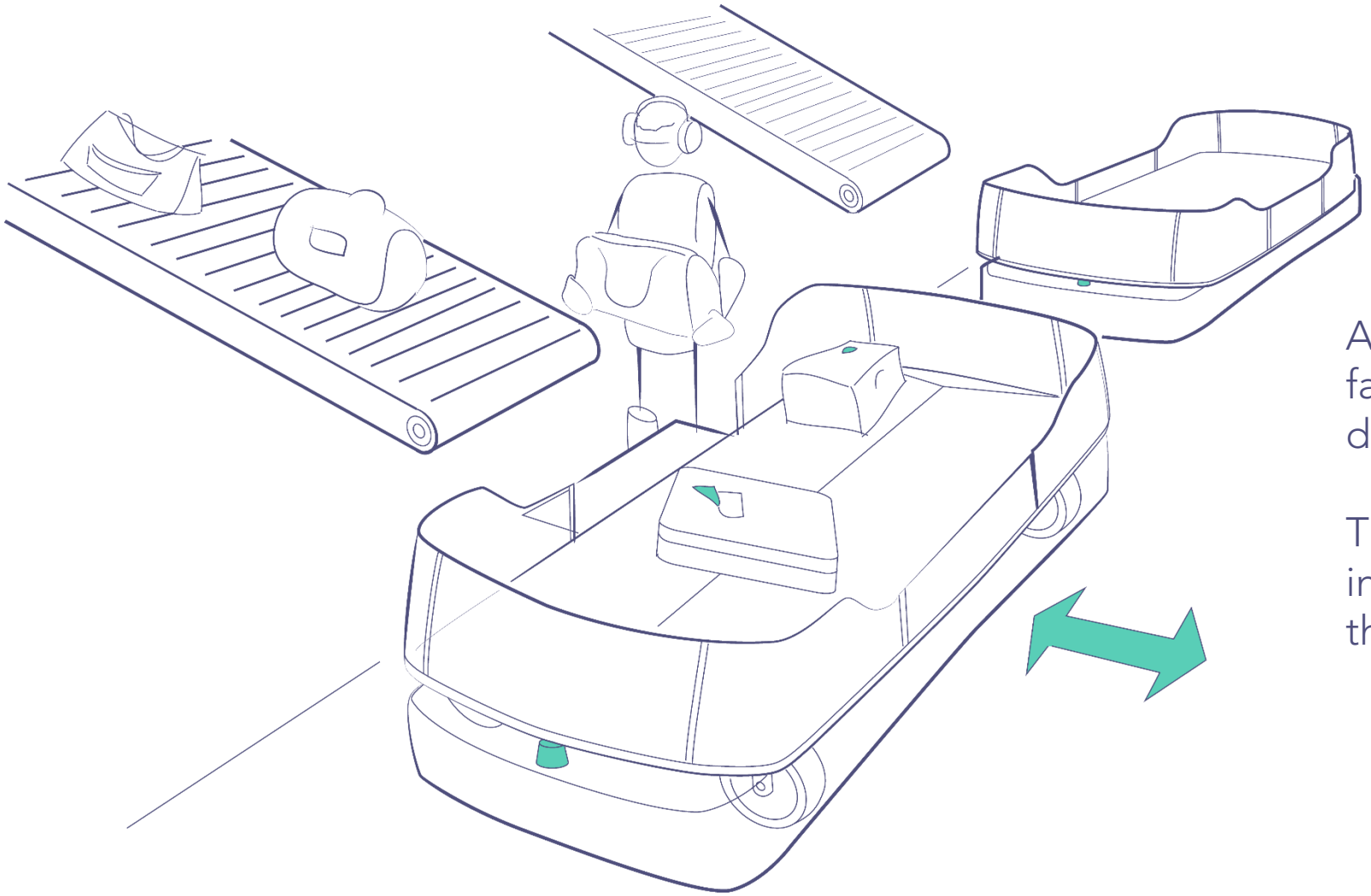
- Directives
  - 92-58-EEC security signage
  - 96-67 airport stopover
  - 98-12-CE brakes
  - 2006-42 – Machines
  - 2014-35-UE low voltages

- Norms
  - EN 1525 - Driverless trolleys
  - EN 1915 - General requirements for runway equipment
  - EN12312 - Detailed requirements for runway equipment

Regulatory 2/2

- ISO norms
  - ISO 6966: Aircraft Ground Equipment - Basic Requirements: The requirements of ISO 6966 apply to all aircraft ground equipment used on airports.
    - ISO 6966-1 (2005) : Part 1: General conception requirements
    - ISO 6966-2 (2014) : Part 2: Safety requirements
  - ISO 4116:1986: Air Cargo Equipment - Characteristics of Ground Equipment to Ensure Compatibility with Aircraft Charging Units
- SAE norms
  - AIR4286: GSE maintenance (Ground Support Equipment)
  - ARP1247E (2018): GSE conception requirements
- IATA guidelines
  - AHM (Airport Handling Manual, 2018, focus on “what to do”)
  - IGOM (IATA Ground Operations Manual, 2018, focus on “how to do”)

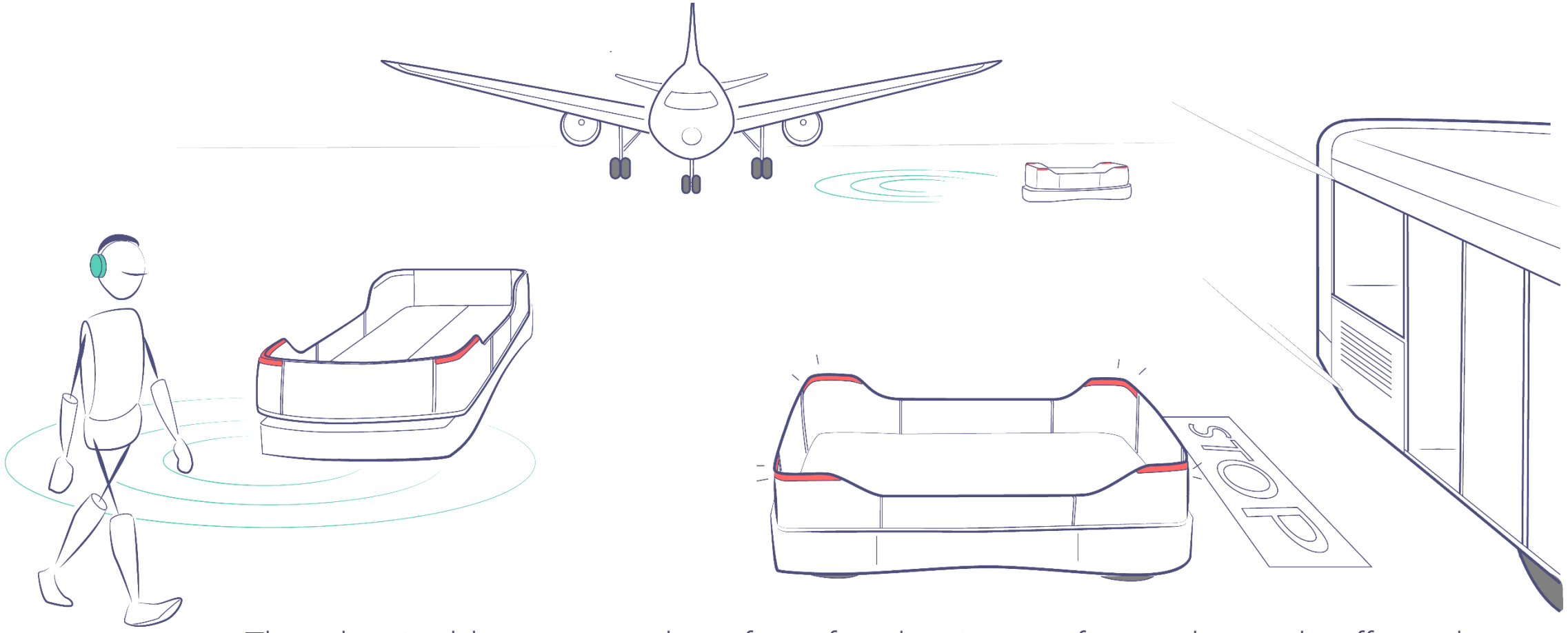
Build area



Access to the loading docks is facilitated, each robot can arrive or depart independently of others.

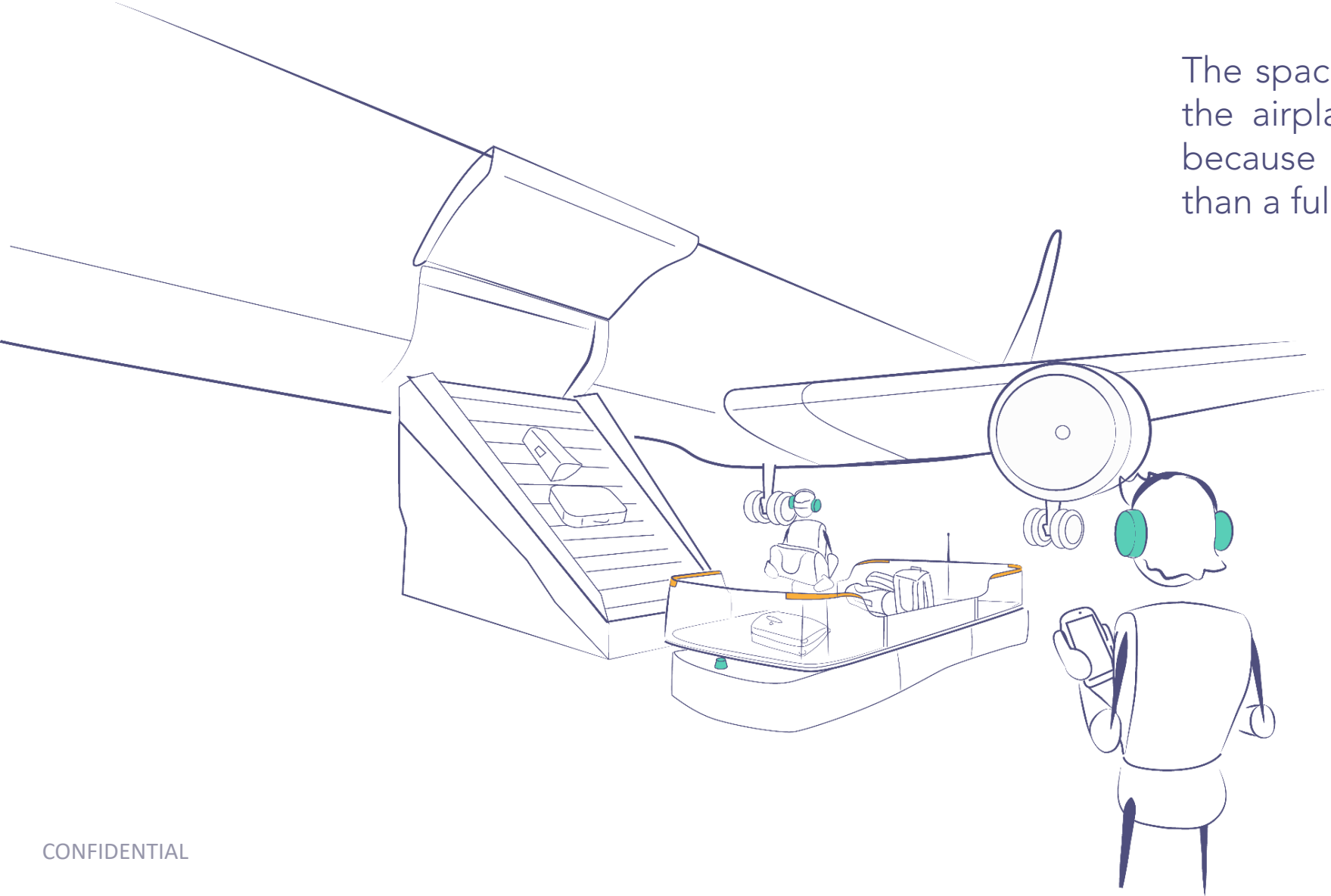
The airport can compact its infrastructure to have more flow on the same space.

Secured tarmac



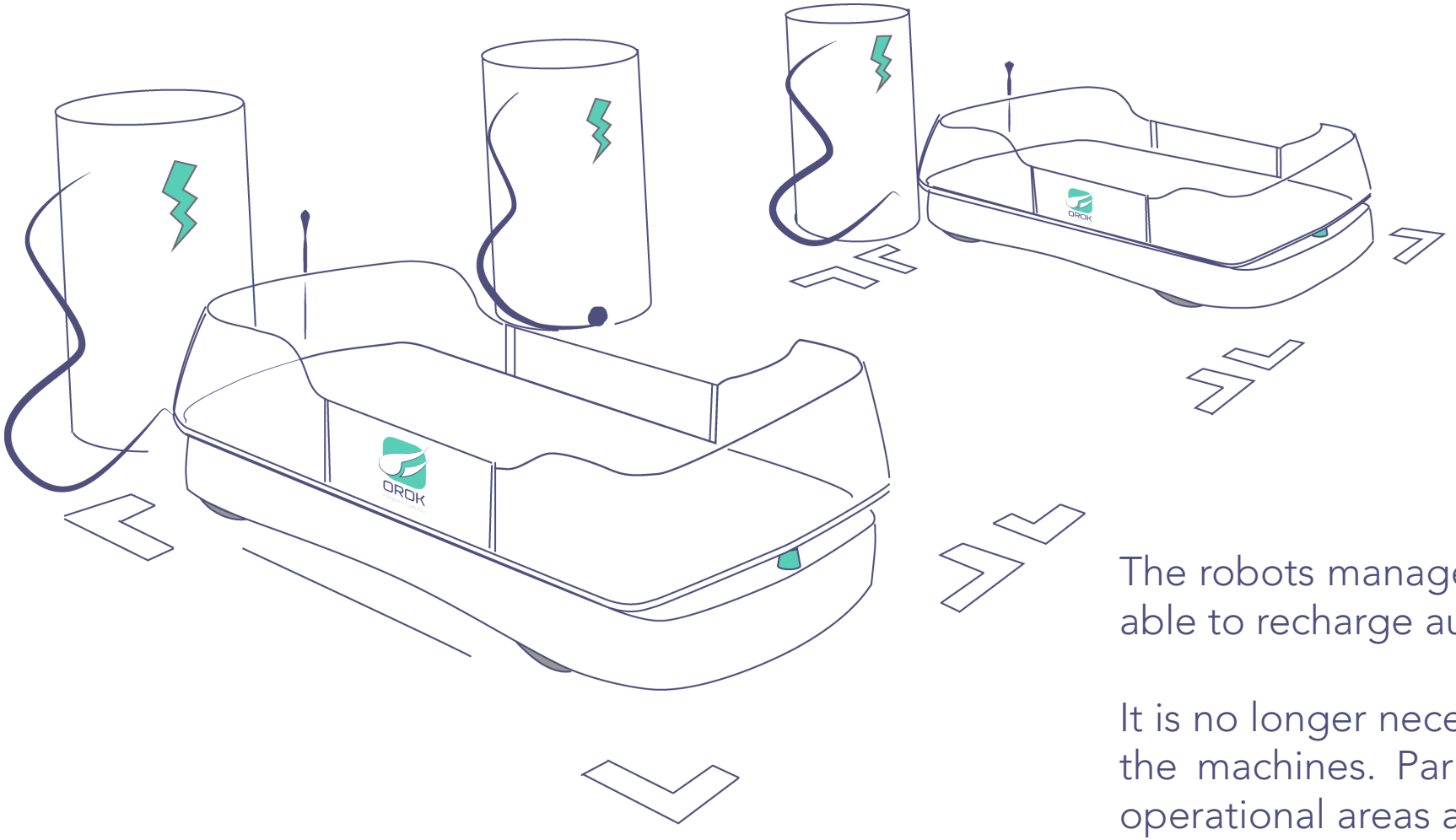
The robot is able to ensure the safety of pedestrians, to fit into the road traffic and to give priority to airplane on the tarmac.

Aircraft parking



The space occupied by the robots near the airplane baggage hold is reduced because a robot takes up less space than a full train.

Energy station



The robots manage their energy alone and are able to recharge automatically.

It is no longer necessary to pay a driver to park the machines. Parking can be removed from operational areas already congested.