#### **QENVI ROBOTICS**

### → Artificial Intelligence at your service

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At the heart of innovation



# About QENVI Group







QENVI Group began its journey in 2008 at the Sophia-Antipolis technology park near Nice. The parent company, QENVI, gathers experts in:

- Supporting certifications for quality/security/environment/Lean 6 Sigma; corporate strategy; IT services
- Engineering services (IT, embedded systems, robotics, AI).

#### **QENVI is CIR accredited.**



As part of its QSE/Lean 6 Sigma services, QENVI addresses the issues of laborious tasks and their costs in industries, as well as the lack of flexible load-carrying solutions suitable for various processes.

In 2016, QENVI created its subsidiary, QENVI Robotics, which offers customizable standard robots with following and/or autonomous functions, capable of carrying loads up to 150kg or 300kg.

QENVI Robotics develops custom robots for its clients that can carry up to 2 tons, such as wheelchairs, stretchers, hydraulic machines...

QENVI Robotics offers software for: inventory management, fleet management.

Patents filed in France and Europe (10 countries).





# **QENVI ROBOTICS TEAM**





LAURENT VAN DEN REYSEN FOUNDER AND CEO

An engineer from Centrale Lille University, Laurent has more than 30 years of experience in optronics, robotics, IT, quality and project management within Sopelem group, Cap Gemini, PSA, Sema Group and Atos Origin.



MARIANNE RAY BUSINESS DEVELOPPEMENT, MARKETING, RH MANAGER

Marianne joined QENVI in 2015 after obtaining a master's degree in business administration from MBway in Nice and a bachelor's degree in mechanics from the University of Technology of Troyes



ARTEM MELNYK R&D/ROBOTICS MANAGER

Artem has more than 15 years of experience in R&D and Robotics with INRIA and Amadeus. He joined QENVI Robotics in 2019, after obtaining a PhD in computer science/automation and signal processing in 2014. The technical teams: QENVI team gathers more than 30 consulting engineers who are passionate about IT, robotics, embedded systems and AI.

**QENVI Robotics team joins** 4 full-time robotics engineers and part-time engineers.



### **QENVI ROBOTICS TEAM**





MARTIN Robotics Engineer AI / Robotics Engineer (ENSTA 2021) + Signal Processing (2022)

> OLGA Robotics technician Electrotechnical Engineer (2004)



ICHRAK Robotics Engineer Electrical Engineer (2018) + electronical 2020 + robotics (IOT Toulon 2021)



IT Engineer IT Architecture Engineer (2011)



ALENA Robotics Engineer Robotics Engineer (Centrale Nantes 2022) B.S in Mechatronics (ITMO 2019)



CALVYN IT Engineer IT Software Engineer (2019)



JUN Robotics Engineer Mathematics Engineer (ENSEEIHT 2012) - PHD in Al/vision (UTT 2017)



Distributed Systems IT Engineer (2018)



### **Our standard products: 2 customizable bases**



They carry 150kg and 300kg and can be equipped with "Following" or "Autonomy" functionalities or combination modes.

Qbot150 is small and easy to handle. It allows optimal maneuvers in the narrow aisles of your warehouse.



« **Qbot150** » can carry up to 150kg. (\*) 7h battery life. Interchangeable rackmount battery Impressive and easy to handle, put the Qbot300 to the test when carrying your heaviest loads!



« **Qbot300** » can carry up to 300kg. (\*) 7h battery life. Interchangeable rackmount battery

All QENVI Robotics robots are CE certified according to European directives: - Machinery, Radio Equipment, Low Voltage and Electro Magnetic Compatibility. (view ISO3691-4\_driverless\_cart)



# Your tailor-made solutions

Transform the structure of your choice into a following and/or autonomous robot.

Send us your base to robotize

QENVI Robotics robotizes then sends your new machine back to you when it is ready.

#### To carry loads up to 2 tons.

#### Do you have an idea?



Let's discuss it !

#### **QENVI Robotics has already robotized:**

- wheelchairs
- A hydraulic machine carrying 650kg.
- An all-terrain tracked mule





### **Examples of customizations**





Qbot150 customized SAFE



Qbot150 customized SAFE



**Qbot150** customized WHEELS



**Qbot150 customized WHEELS** 

Customize the shape, functionality and power of your robots according to your needs! (Request a quote!)



Wheel chair









Bike tracking robot: up to 25 km/h!

QBOT-300

QBOT-300

Qbot150 customized SIDE-PANELS

# Two functions available to choose from or in combination

	« Following » Function	« Autonomy » Function		
Description	Allows your robot to follow your every movement.	Allows the robot to move autonomously within the establishment.		
Activating the robot	Immediate: A simple button to turn on this function. The robot is operational immediately. It follows a beacon which you will hold while moving.	Immediate: A simple button to turn on the robot. A device with a touch screen connected to the internet allows you to choose the desired destination in the establishment. When you select the destination on the screen, the robot moves autonomously to the chosen destination.		
Infrastructure / prearrangements	No infrastructure required. No additional costs.	Requires intervention of the technical team to analyze your environment and implement the mapping of your establishment. Movements are programmable using fleet management software.		
Mobility Environment	The robot can move indoors and outdoors.	The robot only works within the mapped area.		
Security	A secure system with an emergency stop button and obstacle avoidance.	The robot detects and avoids obstacles then automatically integrates them into the map. Emergency stop button.		
Speed	The movement speed is adjustable and modulates according to nearby obstacles.	The movement speed is adjustable and modulates according to nearby obstacles.		

# 🛓 Cobotics : Following = human + robot

A cobot, or a collaborative robot, is a robot intended to carry out work in collaboration with humans with the aim of freeing them from arduous and low added value tasks in order to improve their productivity.

#### An important segment of sector

growth

Collaborative robots are the fastest growing elements of industrial automation

#### **Easy installation**

**Cobots** installation is **simplified** and requires **fewer adjustments**. Cobots are **deployed** in **open spaces** and can **adapt** to their **environment** 



#### A tool serving CSR issues

ROBOTICS

Cobotics makes it possible to respond to several issues within industrial companies

- Work accidents
- Musculoskeletal disorders among employees
- Lack of handling tools and ease of installation
- Lack of efficiency in movement operations
- Recruitment difficulties
- Better acceptance



# **Robotic : AUTONOMOUS = robot**

The autonomous robot replaces humans in repetitive tasks.

#### A rapidly growing segment

Robots are the fastest growing elements of industrial automation. A very important ROI.

#### **Supervised installation**

Autonomous robots must be welcomed after a detailed analysis of the processes. Their development environments must be studied and correspond to standards. Limitless mapped environment, even outdoors.



#### An acceleration tool

- Work accidents
- Musculoskeletal disorders among employees
- Lack of handling tools and ease of installation
- Lack of efficiency in movement operations
- Recruitment difficulties
- Almost total replacement of the workforce for impacted tasks
- Project Management Assignment is reoriented towards tasks with greater added value

# **Robot fleet management software**



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DESTINATION DIRECT TO: : DEPART DEPART Destination : atelie DIRECT TO: TO DESTINATION : TO DEFINE DEFINE

1 robot 001

2 robot 002

is: 11



### **Choose QENVI Robotics**





A high-end partnership for the modernization of your business:

We offer you unique solutions thanks to our tailor-made service.

A high-tech, easy-to-use solution to optimize product transport and repetitive tasks.

Substantial Return On Investment (ROI):

Saving time and reducing costs :

- Reduction of micro-operations (Following);

- Resources release (Autonomy).

- Transported loads multiplied tenfold for the same FTE. Increase in the added value of employees' work.

Your winning partnership with QENVI Robotics

#### **QENVI Robotics team:**

Our team of engineers and Ph.D. in robotics and Al is dedicated and attentive to your issues, offering tailored assistance and availability.

A secure and certified solution: QENVI is a support expert in quality / safety / environment. QENVI Robotics robots are equipped with emergency stop buttons, Lidars and sensors to detect and avoid obstacles.

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A humane solution: Reduction in arduousness and work accidents.

Reduction in MSDs (musculoskeletal disorders) and pain associated with manual work.

Cobots help humans, they don't replace them.

Increased employee satisfaction and reduced absenteeism.

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#### **Standards and directives: a secure solution!**



NF\_EN\_ISO\_3691-4 \_driverless\_cart

NF\_EN\_ISO\_12100-2010\_principle\_general\_design\_risk

NF\_EN\_ISO\_13849-1\_machine\_safety

### European directives :

-Machinery, Radio Equipment, Low Voltage and Electro Magnetic Compatibility. Director Laurent VAN DEN REYSEN's expertise in auditing and supporting quality / safety / environment. Large-scale projects management, risk management.

Director's certificates:

IRCA ISO 9001 V 2015 certificate link

IRCA ISO 14001 v 2015 certificate link

# **QENVI ROBOTICS Patents**

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#### Link : QENVI ROBOTICS patents publications

Short title	Holder	Country of file	Status of the file	deposit date	Filing number	Publication number	Publication date	Date of issue	expiration date
ROBOTIC CART	QENVI Robotics	BELGIUM	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	SWISS	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	GERMANY	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	SPAIN	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	FRANCE	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	UNITED KINGDOM	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	ITALY	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	MONACO	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037
ROBOTIC CART	QENVI Robotics	THE NETHERLANDS	Operative	02/06/2017	17174382.6	3382488	03/10/2018	08/11/2021	02/06/2037

# A solution that saves you money



Value Stream Mapping : value chain mapping

	Opération	Transfert	Contrôle	Attente	Stock				
ETAPE						Description	Distance (m)	Temps (sec)	Commentaire
1		0 🖈		V		Depuis établi vers stock	3	5	
2		• •		$\mathbf{i}$		Recherche de 2 membranes, tubes, supports, embouts		10	
3				V		Retour établi	3	5	
4				V		Dépôt sur établi		1	
5				V		Découpage		30	
6				V		Colle/graisse	1	5	
7				V		Collage/graissage extérieur		5	
8				$\overline{\mathbf{A}}$		Visserie préparée (sous établi)	0	30	
9		0 🔿		1		Vissage externe	0	10	
10				V		Dépôt sur établi		5	
11				V		Etau embouts 2 sur 4		10	
12				V		Perçage embouts 2 sur 4		10	
13				V		Changement perceuse		10	Batterie vide
14				V		Perçage embout		30	
15				V		Assemblage membrane		300	
16				V		Air comprimé	3	5	
17				V		Vissage air comprimé		20	Insuffisant
18		•		V		Vissage à la main (fin)		20	Pas de couple
19				V		Bouchons		30	
20		0 🔿		V		Etiquettes flèches + Dessalator		20	
21				V		Collage n° série + membrane		5	
22				V		Serrage tuyau		10	
23				V		Vers Stockage	3	20	
24		0 🔿				Mise en stock		1	
	•					•			•



Implementation of QENVI Robotics tracking and/or autonomous robots to reduce your transfer costs and work accidents for your employees

**TAKT Time** calculation (cycle time) & Calculation of **TRANSFER** costs (T or HJ, KM, KG, €)

- $\rightarrow$  Tasks and travel optimization
- $\rightarrow$  AT calculation (work accidents)
- $\rightarrow$  Risk reduction and alleviation of arduousness

**Link: ROI calculation** 

Trust QENVI to optimize your processes!!

### The possible uses of our solutions





An area is mappable if it is indoors and if it has a WIFI connection



Mapping produced using the robot's lidars, map imported into the robots' fleet management software.





### The pricing of our solutions

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Standard models

QBOT-150: carries 150 kg From **18 000 € ex-tax\*** 

QBOT-300: carries 300 kg From **23 000 € ex-tax\*** \*Excluding customizations

#### Tailor-made models

From **28 000 € ex-tax\*** corresponding to R&D and implementation of the requested solution (monitoring/autonomy), \*Excluding equipment, on quote

#### Fleet management software





#### 200 € ex-tax/user/month

Maintenance packages

From 180 € ex-tax/machine

# THANK YOU !

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# Scenarios

Logistics, warehouses, industries, Big-Box stores...





### **OUR LOGISTIC SOLUTION**

	WAREHOUSE – STABLE MAPPING	WAREHOUSE/U NMAPPED AREA	AREA WITH QENVI BEACONS (INDOORS/OUTDOO RS)	OUTDOOR or "ALL TERRAIN"
REPETITIVE PROCESS	Autonomous	Following	Autonomous	Following
SINGLE PROCESS	Autonomous or Following	Following	Autonomous or Following	Following
MISSION	Following	Following	Following	Following
TRAIN	Autonomous or Following	Following	Autonomous or Following	Following

Following



#### ROI 141% with 2 robots

**Combined** 

(Following +

Autonomous)



<u>Autonomous</u>

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**ROI 468%** 

**ROI 437%** 

# Example : AUTONOMOUS scenario



A robot moves in a work zone if a minimum clearance of 0.5m wide for a height of 2.1m is provided on both sides of the circuit (see ISO3691-4)



- In black:
  - QR carts or robots carrying xxkg circulating in the aisles
- In orange :
  - QR robots circulate from meeting point to meeting point. Points preassigned in the fleet management software
- The transfer of objects is done at each meeting point
- Autonomous robots could have these structures complemented with scissor systems:





## **Example : FOLLOWING scenario**



A robot moves in a work zone if a minimum clearance of 0.5m wide for a height of 2.1m is provided on both sides of the circuit (see ISO3691-4)



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- In black:
  - QR carts or robots carrying xxkg circulating in the aisles
- In orange
  - QR robots follow the nacelles alone or by train
- The transfer of objects is done gradually
- Autonomous robots could have these structures complemented with scissor systems:







# **Example : COMBINED scenario**



A robot moves in a work zone if a minimum clearance of 0.5m wide for a height of 2.1m is provided on both sides of the circuit (see ISO3691-4)



- In black:
  - QR carts or robots carrying xxkg circulating in the aisles
- In orange :
  - QR robots follow the nacelles alone or by train
  - QR robots return autonomously to a meeting point
- The transfer of objects is done gradually
- Autonomous robots could have these structures complemented with scissor systems:



