

THE AUTONOMOUS MOBILITY PROVIDER

Our background and our vision

Who

GAMA (previously Navya, as a result of the acquisition of its assets) is a **leader in self-driving solutions** for passengers and goods transportation, building tomorrow's innovative and responsible mobility solutions for **restricted areas and smart cities**.

What

GAMA offers turnkey self-driving custom solutions (software, hardware, services) :

- self-driving shuttles for **people transportation**
- self-driving tow-tractors **for logistics**
- self-driving systems for **customized people & goods transportation**

How

GAMA leads the autonomous transportation value chain ecosystem and guides all stakeholders in delivering the self-driving services. Our customers rely on our **expertise of managing diverse use case** in the smart mobility movement.

Why

GAMA's **core technology** is a key success factor for challenges of cities & industries in developing new transportation systems (environmental-friendly, zero-carbon, on-demand, safe and low infrastructure investment)



Built on years of experience and unmatched expertise



1MM

> 1.000.000 km



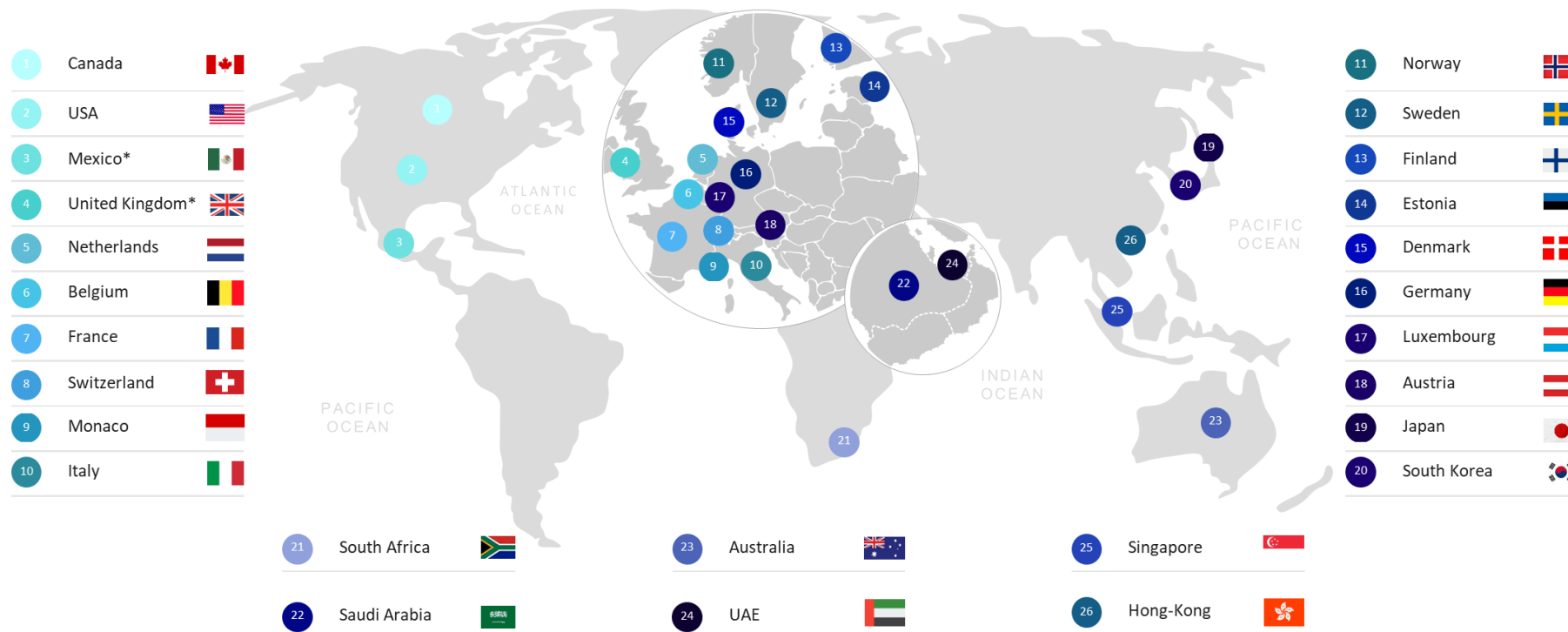
220+

Vehicles
commissioned



26

Countries authorized our
autonomous solution



- Gama is the leading solution provider of **automated mobility** for people and goods.
- We offer **turn-key solutions with a complete service package**, accelerating the deployment of future mobility models for the benefit of all.
- Built on Navya's experience with more than **220 shuttles and tow tractors** for targeted applications in **26 countries** across the world.
- Our **unique technological skills and expertise cover the entire value chain**, from defining customer needs, through production to the deployment of our vehicles.
- We are a strategic player **at the center of multiple strategic partnerships and ecosystems**, and one of the **three most important R&D centers in Europe** dedicated to automated mobility systems.

A redefined strategy to ensure fast revenue and future growth

A proprietary software to power many platforms

GAMA Drive

Autonom® Shuttle EVO

navya



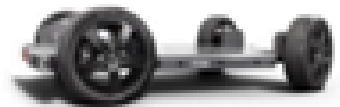
Off-Road platforms

CHARLOTTE
AUTONOM
NAVYA INSIDE



On-Road platforms with L4 capabilities

bluebus, Others



Bluebus platform is developed as part of EFIBA (Emergence Filière Bus Autonomes), supported by France Relance

Providing an entire ecosystem



Unlimited applications and use cases

Addressed thanks to our wide product portfolio

UC
1

Transport passengers to connect various points of interest on restricted areas



@EDF Civaux nuclear plant, France



@Mayo Clinic, FL, USA

UC
2

Provide public transportation to unserved areas in peri-urban & remote areas



@Val de Drôme, France



@Masdar City, UAE

UC
3

Transportation on Dedicated & segregated lanes (BRT)



Not addressed by Gama today



UC
4

Transportation of passengers in city centers



@Sion, Switzerland



@Lyon, France

Vehicle's portfolio

Autonom® Shuttle Evo

A vehicle made for shared mobility on restricted uses cases



Maneuverable

Silent

Accessible (Adapted to PRM)

Enhanced **thermal comfort**

Connected et **Communicating**

Secure et **safe**



Autonomous

100% electric

15 passengers

25 Km/h max.

10H average autonomy

No heavy infrastructures
modifications



Autonom® Shuttle Evo

Sensors' set specifications

GNSS, NTRIP

Allows an accurate localization by correction of satellite

IMU: Measures acceleration and rotation

LIDAR SENSORS

LIDARs 360°

LIDARs mono-layers

Illuminate the surroundings with a laser light and measure the reflected pulses

ODOMETER

Estimates the velocity of the vehicle and the position changes

COMMUNICATION

V2X: Enables interconnection with urban infrastructure

4G: Communicates with GMM supervision centre

CAMERAS

Enables remote supervision

Enable Machine learning (obstacle classification, Traffic lights, tec))

Record outside and inside events



Interactions between Autonom shuttle EVO and users

Vehicle state

Road users' awareness

Visual



EMERGENCY STOP
Please wait for the intervention of an agent. Unlocking the emergency stop button is authorized only after inspection by the qualified personnel.

Audio



- Custom Internal announcements
- Support Multilanguage



- Acoustic Vehicle Alerting System (AVAS)
- Obstacle specific buzzer

A new vehicle for public transportation certified for L4 autonomous driving

As part of the EFIBA* project



Maneuverable

Silent

Accessible (Adapted to PRM)

Enhanced **thermal comfort**

Connected and **Communicating**

Secure et **safe**



Autonomous

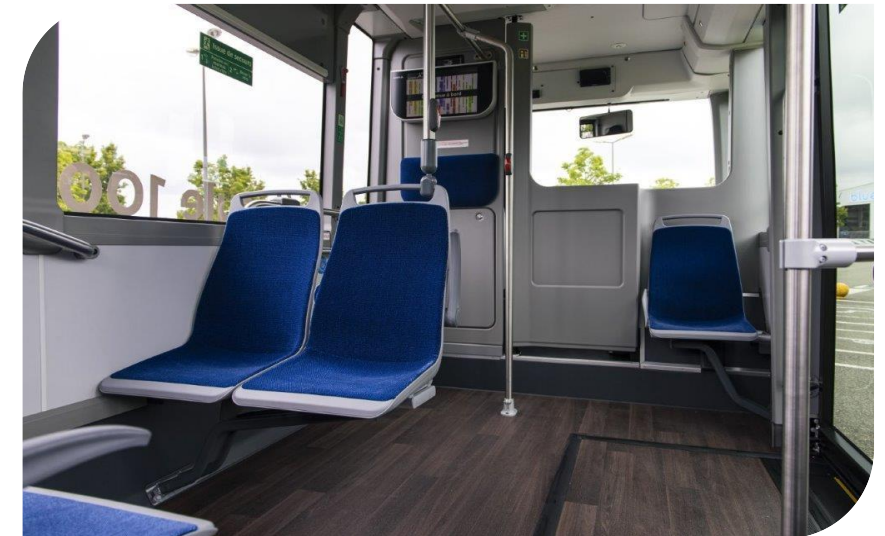
100% electric

33 passengers

70 Km/h max*

280 km** range

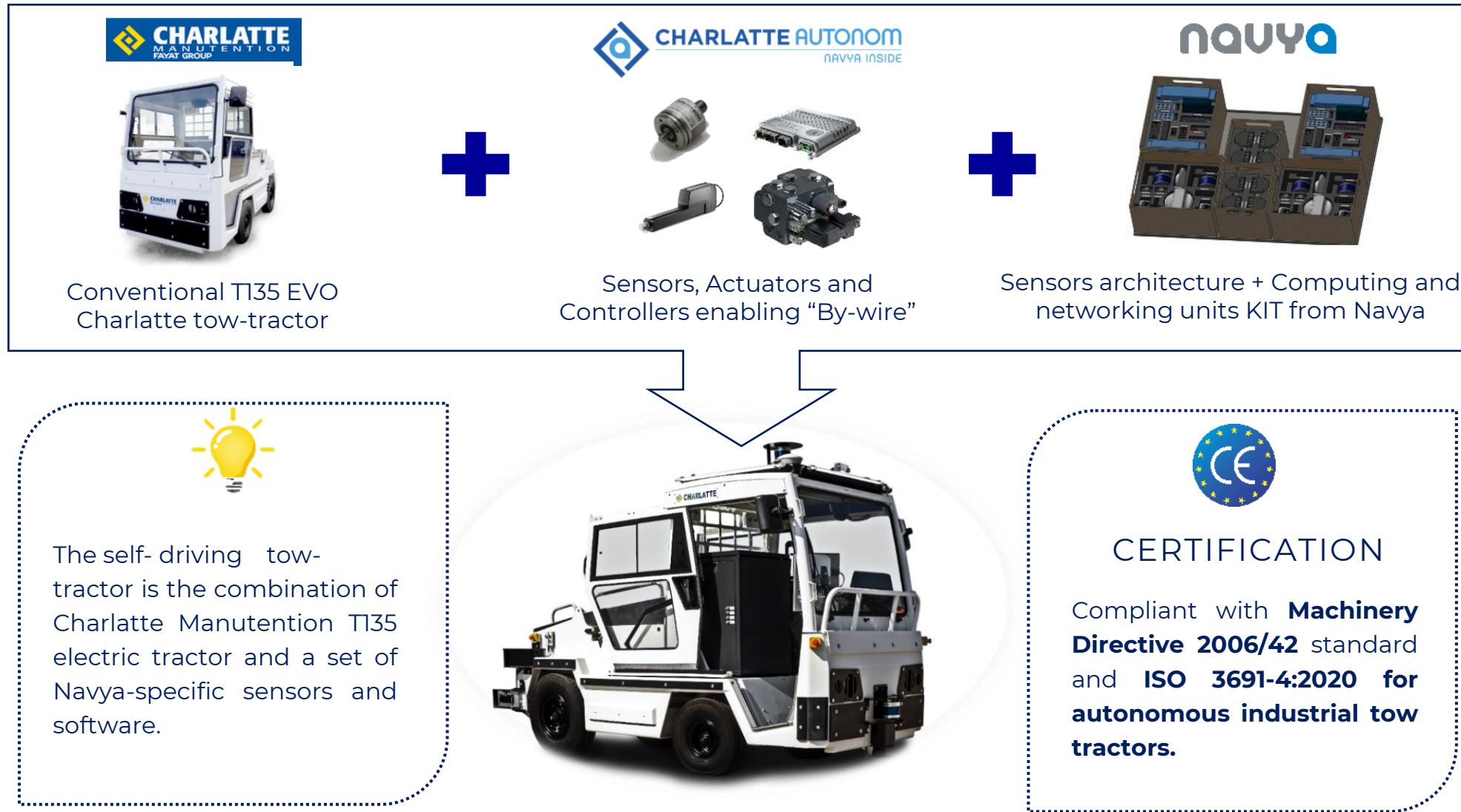
No heavy infrastructures
modifications



*EFIBA = Emergence Filière Bus Autonomes), supported by France Relance

Autonom® Tract AT135 : the PERFECT combination

Combination of expert leaders since 2018

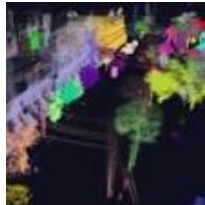


Gama's software and services

With softwares

Gama Drive

Gama Drive is the **self-driving software** developed by our R&D team that allows the vehicle to **perceive, decide an act** according to its environment. The set of interconnected functional modules gives the vehicle its intelligence and allows it to operate without a driver on board.



▪ MAPPING

Very high definition 3D maps are regularly produced, programmed, updated and enriched to incorporate the maximum amount of information that the Gama Drive uses.



▪ PERCEPTION

Understand the environment in which the vehicle is located, know its position, detect, categorize and track obstacles over time.

Sensors

The optimal architecture results from a combination of selected sensors and their configuration. Our team of engineers, who have unique expertise in terms of sensor selection and configuration, is constantly on the watch for the latest sensor innovations.

Localization

This module transmits an accurate localization of our vehicles, not only based on GPS data, but fruit of a more sophisticated in-house algorithm taking into account several and complementary sources of information.

Obstacles

This module allows in real time to detect, track and classify surrounding obstacles. For each of them, it determines its position, speed and shape and monitors the evolution of this information over time to enable optimal driving decisions to be made.

▪ DECISION

Once the information received has been analysed, this module determines the optimal trajectory for the vehicle, taking the safety and comfort of operations into account.

▪ ACTION

Apply decisions taken by the Gama Drive.



▪ SIMULATION

This module provides the entire R&D department with a virtual suite in which to test and validate algorithms. These virtual kilometres, in addition to the experience we have gained in operation since 2015, contribute to the continuous improvement of the Gama Drive to make it ever more efficient and experienced.



Bluebus platform is developed as part of EFIBA (Emergence Filière Bus Autonomes), supported by France Relance

With software

Gama Operate

This tool, named Gama Operate, is a supervision tool allowing:

- **Fleet monitoring:** to monitor site and vehicles activity in real time via vehicles metrics and video feeds.
- **Remote control:** communicate with passengers, activate specific functions (doors, ramp, ...), send missions (set of stations) and log activities.

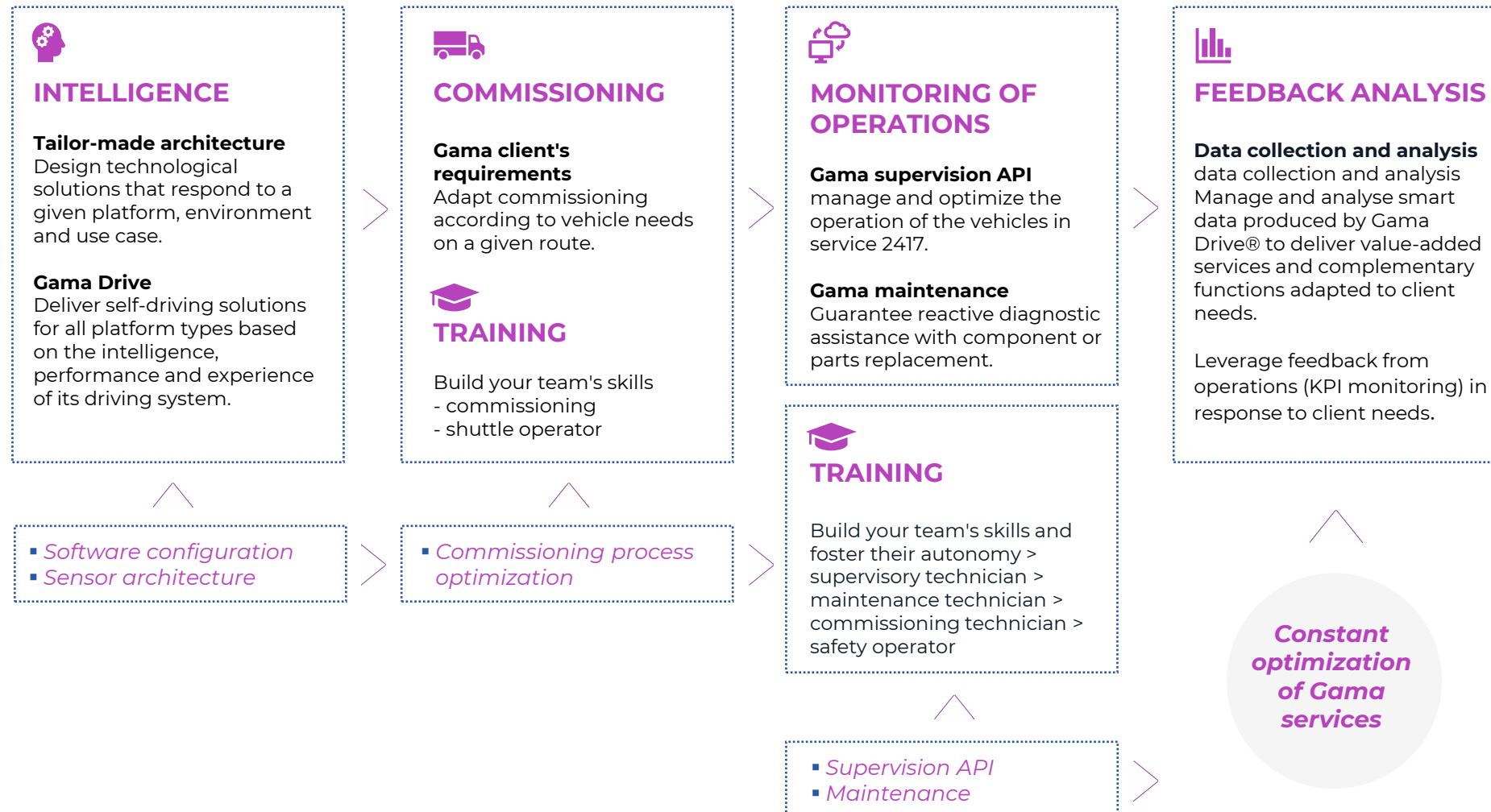
Gama Operate is based on the following principles:

- **Permanent connection with the vehicle:** using a redundant communication architecture ensuring permanent connection of the vehicles with the cellular network.
- **Understanding of vehicle's history:** using a replay module to understands the suite of events and repeat past vehicle's actions.
- **Accurate awareness of the vehicle surrounding:** using a 360° set of cameras streaming live video footage of the vehicle environment with a controlled level of latency and image quality.
- **Seamless and intelligent passengers' interaction:** using several internal cameras and accessible interphones.
- **Operation KPIs monitoring:** live telemetric data as well as events (errors messages, warning messages, ...) and automatic operational data reporting.



And services

In order to meet the needs of partners, such as operators, companies, municipal and local authorities, Gama has developed a tailor-made service offer based on continuous improvement.



Gama Middle East Business

GAMA's shuttles deployed in the Arabian Peninsula



@NEOM Community, KSA



@Masdar Smart City, UAE



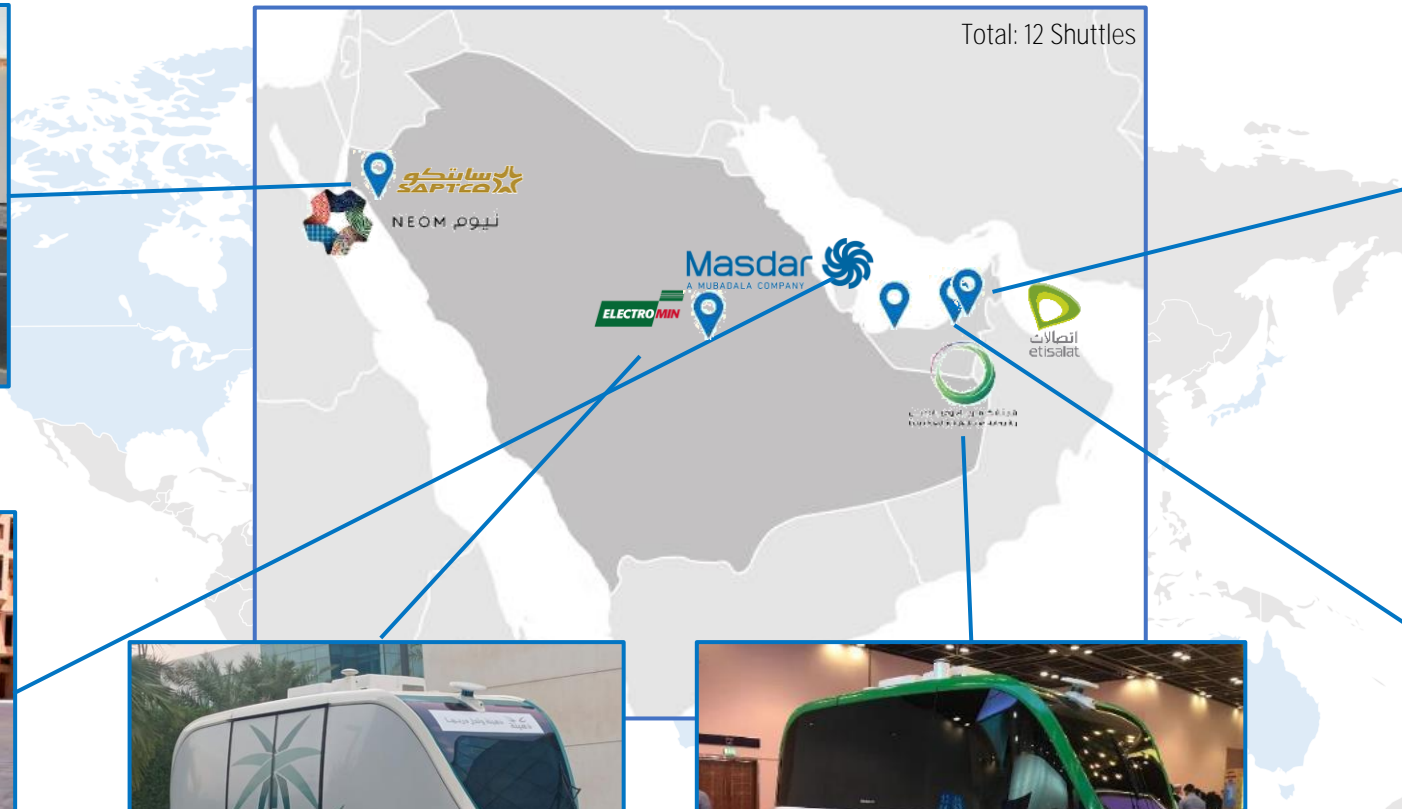
@Electromin, Riyadh, KSA



@DEWA, Dubai



Total: 12 Shuttles



@Dubai, UAE



@Etisalat, Ajman



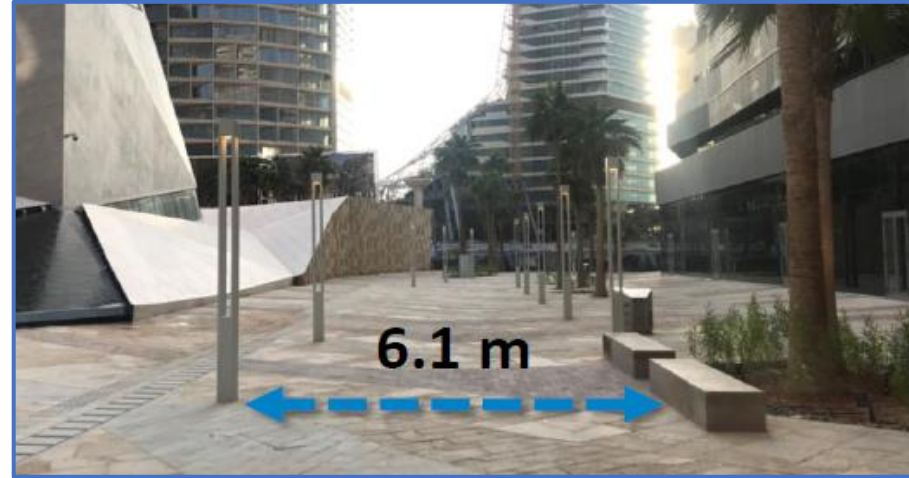
Masdar City, Abu Dhabi



Today's operations and site

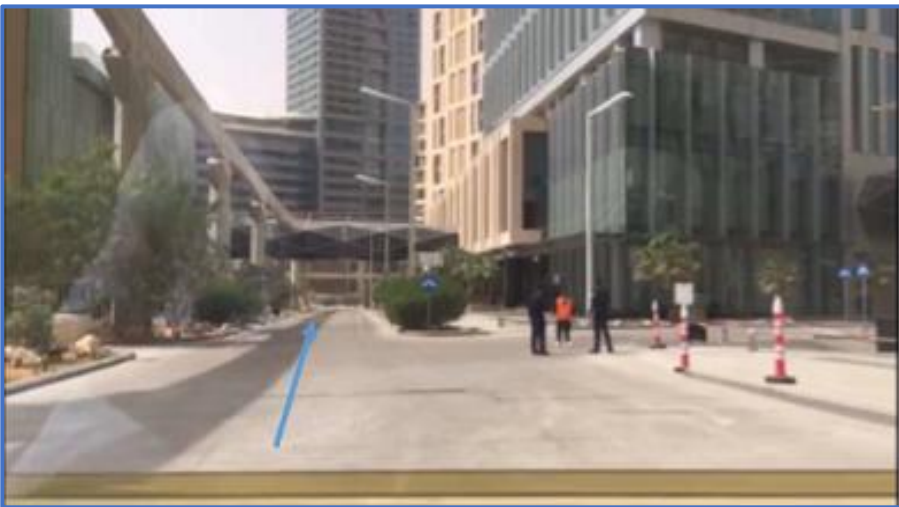
3 Navya Autonomous shuttles
Operated by ION (Bee'ah owned)
Operation started in 2018
3 routes, with extensions planned
Crosswalks, pedestrians areas, etc

Example of use case : King Abdullah Financial District, Riyadh



Large estate development, including 71 towers that are connected in between by inner private roads and pedestrian areas (“wadis”).

Lack of parking areas available, with large parking outside of the area. Need to organize park & ride.



Controlled environment, with ability to adapt infrastructure to fit the requirements of the technology.

Adapted speed and mobility need identified.

Example of use case : King Abdullah University of Science & Technology



Closed site hosting 20k people.

Clear traffic rules, behavior and adapted conditions.

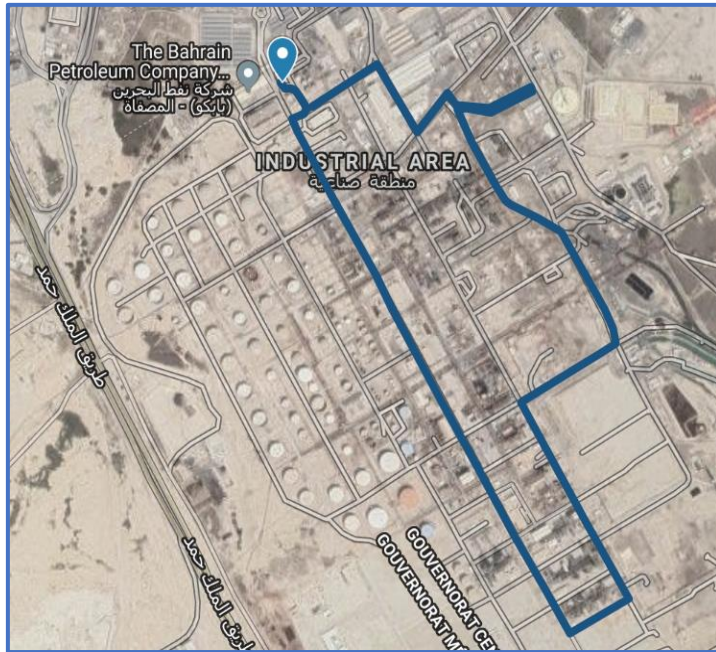
Possible adaptability of the infrastructure.



Mobility plan with, as of today, 50+ 22 seaters shuttles in the community to transport people across the campus.

Development and advancement of innovative and sustainable solutions.

Example of use case : BAPCO, Bahrain



Adapted speed

Sufficient width of paths

Constructed environment with clear traffic rules

Mobility need identified

Control of the rules & accesses by owner of the site, and capacity to adapt to the needs or requirements of the technology



Example of use case : KAPSARC, Riyadh



Adapted speed

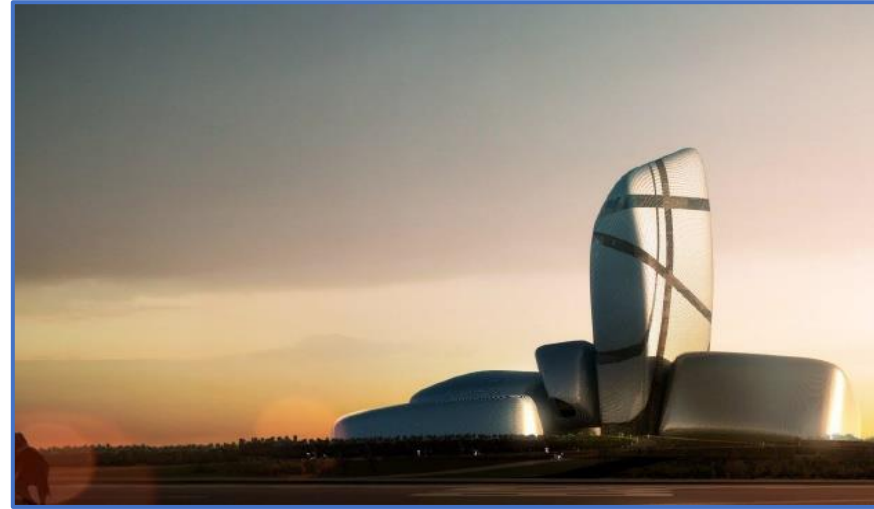
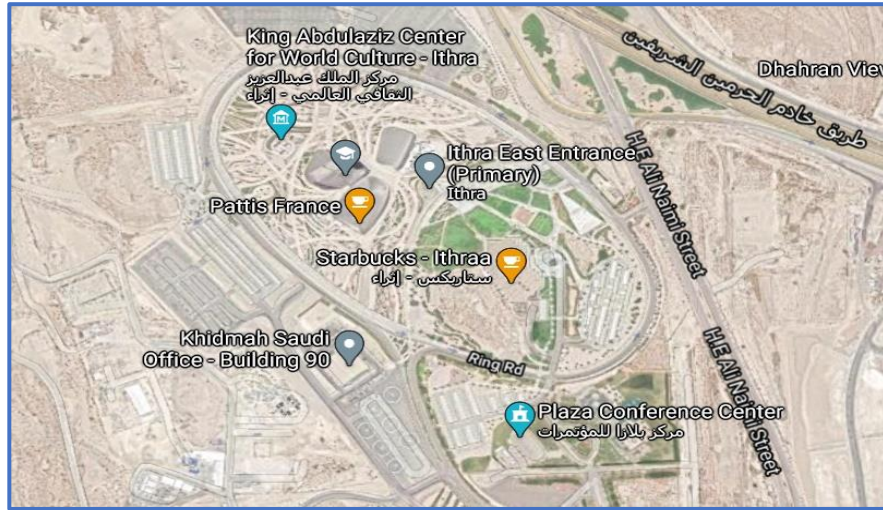
Sufficient width of paths

Constructed environment with
clear traffic rules

Mobility need identified

Control of the rules &
accesses by owner of the site,
and capacity to adapt to the
needs in infrastructure or
specific requirements of the
technology

Example of use case in the region : Saudi Aramco, Saudi Arabia



Closed sites and campuses, with offices and residential areas for dozens K people.

Mobility plan with, as of today, hundreds/thousands of shared mobility solutions.

Development of innovative solutions / strong interest for technologies and post-oil era solutions.

Mobility needs identified.



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