

# vision 4rescue



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# Introduction

## Context :

In France, natural disasters have increased fivefold in fifteen years, with two-thirds of municipalities now likely to experience some kind of major natural disaster<sup>3</sup>. Faced with more frequent, intense, and complex interventions (natural disasters, industrial hazards, urban accidents, or emergency medical interventions), emergency and rescue professions need to adapt to increasing challenges. This adaptation is even more necessary given an aging population, growing urbanization, and an increasingly strained healthcare system, where personal assistance now accounts for over 80% of emergency service's operational activity (4 million interventions per year<sup>4</sup>). In life-threatening situations such as Sudden Cardiac Arrests, every minute gained in giving first-aid measures increases the chances of survival by 10%. Reducing response time is therefore a daily priority for emergency services.

To be more effective, a key factor is removing the technological barriers between the different services used by emergency teams. Whether it involves vehicles, video surveillance cameras, or communication systems, emergency services now need seamless integration among all these devices. "Vision 4Rescue" offers a system of integrated, interconnected, and secure technologies to:

- **Anticipate** with precision emergencies through risk and mitigation simulations, ahead resource planning, enhanced field vision and real-time analysis of multi-source data.
- **Act** more effectively at every stage of the emergency and rescue intervention, with tailored, accessible, and integrated devices.
- **Communicate** more efficiently with emergency teams and with the public through more direct, faster, and targeted messaging, thereby enhancing collective resilience and the ability to respond effectively.

## vision 4rescue benefits for

### Firemen:

- A permanent connection to their environment, via embedded and interconnected digital tools
- Saving precious time at each stage of the intervention, with simplified and automated devices
- Better risk anticipation, thanks to an increased view of the field and real-time analysis of data, such as knowing the flow of occupants of establishments open to the public near the intervention to better assess the impacts of a risk and refine the safety perimeter.
- 4Rescue is an intelligent mobile command post, capable of adapting the operational response in real time to the most complex and simultaneous situations.

### Civilians

- Connected urban infrastructure plays a key role in managing emergency situations by enabling real-time alert transmission, precise geolocation of incidents, and immediate public guidance. These smart systems support first responders by creating a more informed and reactive environment, improving coordination and facilitating faster intervention.



Service départemental  
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## ATOS



### Explanations & benefits

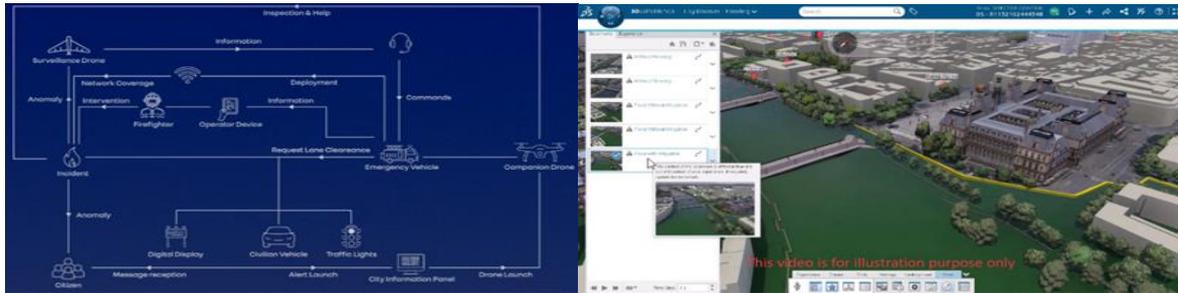
Atos is contributing to vision 4rescue through 3 key technologies:

**Atos Gemma Platform:** a robust, global crisis management solution that organises rescue operations ahead of and during an actual crisis. Gemma delivers coordination, reactivity and resilience by supporting multi-agency coordination (fire brigade, ambulances, police) from planning to tracking. It features high adaptability for real-time events, multi-incident coordination for managing crisis such as floods and forest fires simultaneously, and seamless integration with organizations and existing systems (prevention plans, monitoring and AI-powered simulation data). Gemma consolidates multiple information sources, including social networks listening or whether data integration.

**Synergy:** a tactical communications tool that connects vehicles, field teams and drones to maximise data collection, augment it via AI and share it in real time to support first responders on critical points. Using AI, Synergy automatically identifies in the field people or objects being searched for and locates them on a tactical map through a ruggedized mobile device, while receiving real-time video feeds from the drone and allowing for text and video messaging. Synergy enables to precisely track the position and guide the deployment of all the operators involved, ensuring perfect synchronization of efforts.

**Atos Smart and Secure Traffic Management platform:** offers a comprehensive solution for V2X communication and security challenges with a C-ITS PKI platform in a secure and interoperable digital trust domain. This ensures the security and authenticity of exchanged messages from vehicle-to-vehicle and from vehicle-to-infrastructure such as road signs or traffic lights, enhancing road safety and traffic efficiency. The platform natively supports C-ITS, EU and France's adopted V2X standard, ensuring current and future interoperability with the entire transportation ecosystem.

## Dassault Systèmes



Dassault Systèmes helps reinvent mobility services through **system-level innovation**, as illustrated by **Vision 4Rescue**, which relies on the efficient collaboration of vehicles, drones, command centers, and urban infrastructure.

Our technology connects the **virtual twins of smart objects and their environment** to support the exploration and assessment of innovative experiences. Through risk scenario simulation and the combination of real-world data with AI, we enable:

- **Firefighters** to anticipate risks, test response plans, and coordinate assets efficiently
- **Citizens** to benefit from faster, more effective interventions and safer environments
- **Authorities** to visualize possible services in their territory and make informed planning decisions

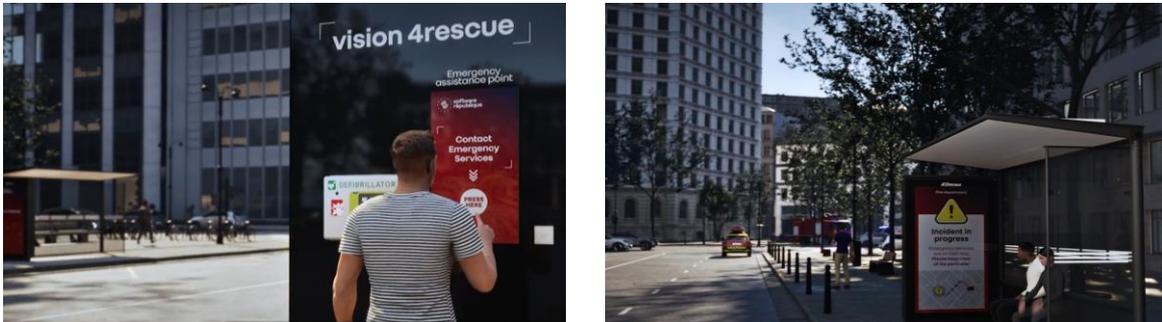
By breaking down silos, this collaborative approach streamlines planning while enhancing resource utilization, reducing costs, and boosting agility in complex emergency response.

Dassault Systèmes virtualizes and optimizes emergency responses through its powerful software applications:

- **Model-based systems engineering (CATIA):**  
Design, simulate, and validate the full emergency response ecosystem—vehicles, technologies, teams, and infrastructure—ensuring consistency, traceability, and interoperability from mission definition to detailed system design.  
→ Validate the solution’s reliability and efficiency before real-world implementation, with a particular focus here on reducing response times in emergency situations.
- **Urban virtual twins (GEOVIA):**  
Leverage 3D, data-rich city models—including infrastructure, assets, and terrain—to simulate disaster scenarios (e.g., floods, heatwaves) and assess climate resilience strategies.  
→ Empowers decision-makers with **predictive insights** to minimize future damage  
→ Helps cities **plan, and prioritize mitigation actions**—such as infrastructure reinforcement or land use changes—for better preparedness and impact reduction.
- **Dynamic workforce planning (DELMIA):**  
Advanced AI-powered optimization supports effective emergency workforce management. First, it enables long-term planning to define demands and adjust staff, **mid-term planning** with roster creation based on personnel skills, preferences, and estimated risks. Then, daily operations with **immediate dispatch** decisions made by factoring in resource availability and operational priorities.  
→ Supports **strategic preparedness** and ensures **agile, efficient response** across diverse emergency situations thanks to its integrated planning.

Together, these solutions create a predictive, unified solution that coordinates human, digital, and physical systems for rapid, precise emergency response.

## JCDecaux



### Explanations & benefits (for fireman, citizen, authorities)

JCDecaux integrates short-range drone capabilities and real-time public communication into its street furniture, contributing to a more connected, responsive, resilient, and sustainable city.

- For emergency teams: a drone embedded in our City Information Panels can be remotely deployed to provide immediate aerial visibility over an incident zone. This enables faster risk assessment, better operational planning, and increased responder safety.
- For citizens: digital street furniture provides dynamic, targeted messaging to the public during crises, keeping people informed, calm, and safe.
- For authorities: JCDecaux's wide coverage of public space offers a scalable infrastructure for communicating during emergencies and collecting situational data in real time.

This dual-purpose solution, serving as both a real-time sentinel and a communication interface, reinforces the role of street furniture in civil protection, fully aligned with the principles of vision 4rescue: anticipate better, act faster, communicate smarter.

### Techno used

- City Information Panel (CIP) fitted with drone launch module (short-range drone with embedded sensors and camera) and secure remote activation interface for emergency services.
- Digital display network for dynamic, geo-targeted citizen communication.
- Power autonomy & connectivity for standalone emergency operation.

This innovation once again illustrates the public utility of our media, leveraging on JCDecaux's infrastructure to support civil resilience and urban safety through innovative and integrated solutions.

## Orange



### Explanations & benefits (for fireman, citizen, authorities)

Orange leverages its technological expertise to enhance safety and connectivity in the field. Through its V2X (Vehicle to Everything) solution, vehicles can communicate in real time with their surroundings. To ensure this connectivity—even in the absence of traditional infrastructure—Orange deploys hybrid networks and innovative solutions such as embedded 5G bubbles and the SOS backpack. Additionally, the Flux Vision product helps optimize the trajectories of Thales drones during emergency operations, using the "Population Density" network API to define their flight plans.

### Techno used

- V2X (Vehicle-to-Everything) solution: A solution that enables real-time exchange of reliable data between vehicles and their surroundings (such as road infrastructure, pedestrians with smartphones, bicycles, etc.), based on 4G/5G cellular connectivity and the IoT platform Live Objects. The result of many years of research and development, it is currently in the industrialization phase and is opening to trusted partners to foster the emergence of a dynamic and scalable ecosystem. This is particularly aimed at protecting vulnerable road users (pedestrians, cyclists, etc.) and managing mobility across various sectors such as automotive, urban areas, and industry.
- S.O.S. backpack: A tactical connectivity solution designed for situations where network and power infrastructure are unavailable. This new solution, developed by Orange Innovation, has already been deployed by Orange in Mayotte following Cyclone Chido. Numerous tests have been conducted in collaboration with Civil Security stakeholders to adapt the SOS Backpack to exceptional situations.
- Hybrid Connectivity Bubble: Installed on vehicles, this system aggregates available satellite and mobile connectivity to create a tactical connectivity zone around the vehicle using 5G and Wi-Fi. This hybrid approach illustrates the complementarity between mobile and non-terrestrial networks, supporting civil security missions under the most extreme conditions.
- "Population Density" Network API: Provides real-time and forecasted estimates of population density for specific geographic areas. It is based on anonymized historical data from the Flux Vision solution.
- Flux Vision: A reference solution for analyzing mobility flows and visitor traffic, leveraging data from Orange's mobile networks.

## Renault



### Explanations & benefits (for fireman, citizen, authorities)

The result of a partnership spanning over 15 years between Renault and firefighters from 19 countries, Vision 4Rescue is a demonstration vehicle based on the Renault 4 E-Tech electric, designed to revolutionize emergency services. It plays the role of a true mobile and connected command center. As an all-wheel drive vehicle, it can operate in any situation to assess the environment and adapt emergency response in real time, thanks to its innovative equipment such as a surveillance drone and dedicated storage compartments.

### Techno used

#### Powertrain and Chassis:

- Based on the fully functional Renault 4 E-Tech electric.
- Permanent all-wheel drive with a second electric motor on the rear axle, enabling operation on all types of terrain.
- Ground clearance raised by 15 mm.

#### Connectivity and Communication:

- Roof-mounted antennas to re-establish communication networks in low-coverage areas.
- Sliding tablet and two screens connected to a high-performance computer in the rear, transforming the vehicle into a mobile office and command center. The user benefits from the Renault 4 E-Tech electric's genetic features (low load sill, long rectangular tailgate) to operate in the best possible conditions.

#### Observation and Surveillance Equipment:

- Surveillance drone housed in an aerodynamic capsule on the roof, controllable from inside the vehicle. The drone is automatically recharged as soon as it lands in its place in the capsule.

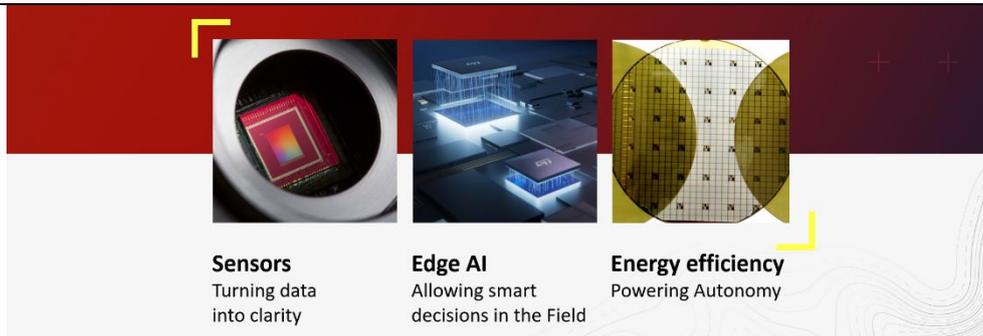
#### Exterior design

- “Combustion Red” body with diagonal fluorescent yellow-green markings to signal urgency.
- Dark gray chevron pattern on the hood and roof.
- Textured fender flares to reduce scratches, with midnight blue pearlescent accents.
- LED lighting signature (round headlights, illuminated rectangular grille, integrated blue LED light bar in the roof capsule).
- Robust bumpers with contrasting inserts and towing hooks.
- 3D-printed front and rear bumpers with shock-absorbing properties and “PinPon” pattern.

#### Interior design

- Renault 4 E-Tech dashboard adding a polished metal bar engraved with the words “Je te reçois 4 sur 4” (Reading you loud and clear) that serves both as a grab handle and a support for walkie-talkies.
- Seats featuring the “PinPon” pattern made from recycled firefighter suit foam, already fire-resistant, containing 19.3% recycled materials (as in the standard Renault 4 E-Tech electric).
- The rear door crosspiece includes a reflective strip, clearly indicating to people outside the vehicle that the doors are open, a useful feature in hostile environments with poor visibility.

## STMicroelectronics



The semiconductor industry is strategic because it constitutes the fundamental pillar of technological innovation, particularly for key industrial sectors such as automotive, consumer electronics, communication infrastructure, computing, healthcare, and more.

STMicroelectronics, one of the global leaders in semiconductors, designs and manufactures a wide variety of electronic components that are at the heart of the digitalization and energy transition of industries. Many devices used in emergency situations integrate smart sensors, solutions with embedded AI, as well as energy management technologies. Together, these components play a key role in improving the management of critical situations while contributing to the preservation and protection of natural resources.

### Smart Sensors for Optimal Responsiveness and Precision

In emergency interventions, speed and precision are crucial in the field. Thanks to equipment integrating our sensors, responders benefit from several critical advantages. These sensors enable them to see, assess, and act in challenging environments. LiDAR sensors and cameras help rescue teams build a real-time 3D understanding of their surroundings. GNSS and IMU sensors ensure motion detection and precise navigation in the emergency area. For example, this allows them to locate potential victims, identify hazards, and map fire zones and their evolution.

#### Technologies:

Smart Motion Sensors (MEMS ISPU): [ISM330IS](#)

Position Sensors (GNSS): [STA86 / Teseo VI](#)

3D LiDAR Sensors (dToF - Time of Flight): [VL53L9](#)

Compact Embedded Camera: [VD66GY](#)

### Embedded AI for Autonomous Decision-Making and Data Security

Data collected by sensors must be processed quickly, securely, and locally. The embedded artificial intelligence (AI at the edge) in electronic components used in equipment enables real-time analysis where the action takes place. It optimizes the responsiveness of the equipment during all phases of an emergency intervention and eliminates the need for data transfers to the cloud, significantly reducing latency for rapid decision-making. Local data processing also ensures greater data security. Furthermore, these components integrate energy-saving features, increasing both the autonomy and sustainability of the systems they power.

#### Technologies:

Microcontroller with AI Accelerator: [STM32N6](#)

Software Suite for Simplified AI Integration: [STM32 Edge AI Suite](#)

### New Technologies for Optimal Energy Management

For all emergency devices, optimizing energy usage is essential to ensure mission success, whether by minimizing energy consumption or delivering high power to motors when needed. The integration of new technologies, such as silicon carbide (SiC), plays a decisive role in this optimization. SiC-based components allow devices to extend their lifespan and operational range. With better energy management, they enable heavier loads to be lifted, significantly expanding the range of actions they

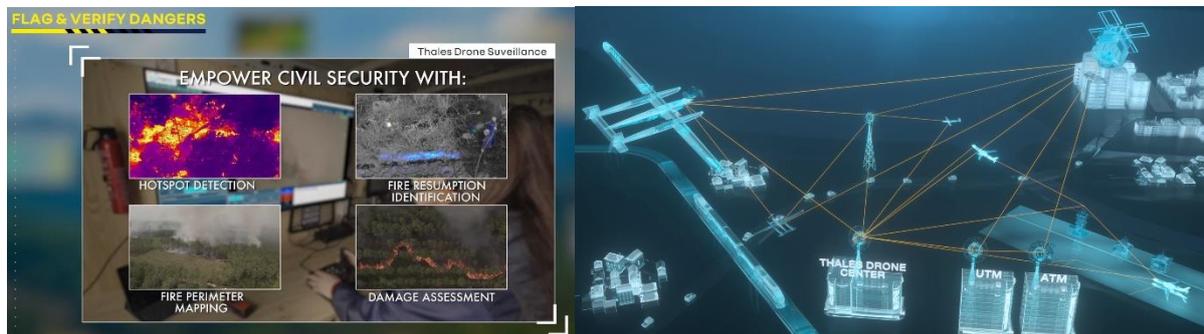
can undertake. This translates into an increased ability to perform complex tasks, such as transporting medical equipment in an emergency situation.

**Technologies:**

Power Electronics (Wide Bandgap, [SiC](#))

Ultra-Low Power Microcontroller: [STM32U3](#)

## Thales



### Explanations & benefits (for fireman, citizen, authorities)

Thales proven technologies for smarter emergency response, come from decades of experience in **defense and critical missions**. **Built for the most demanding environments**, our solutions are perfectly suited to **civilian rescue operations**, where **speed, accuracy** are non-negotiable.

- **For Rescue Forces**

We strengthen **operational resilience** with **real-time access to the right information**—delivered via **integrated ground and air systems**, including digital platforms, drones, and mobile control centers.

- **For Citizens**

We enable **precise geolocation of searched smartphones in risk zones**, creating a **direct communication channel** between civilians and emergency responders for faster alerts and safer evacuations.

- **For Authorities**

Our smart platforms provide a **centralized, secure system** to detect threats, simulate evolution and coordinate responses—all backed by **responsible AI** and **end-to-end cybersecurity**.

### Techno used

We bring the full strength of our expertise in critical systems — with four essential contributions:

- **AI-Powered Systems**

- Digital Platforms that:

- Fuse multi-source data (drones, satellites, field sensors) and detect anomalies (e.g. early fire signs)
- Simulate risk evolution and recommend optimal response strategies

- Mission systems that:

- Enable real-time information exchange and analysis, between sensors from 'air & ground' while orchestrating drone missions.
- Manage and control drones from decentralized mobile command center, such as the R4 vehicle.

- **Long-Range Surveillance Drones (UAS 100)**

- Real-time monitoring of critical zones
- High-res imagery and secure communications
- Equipped with optronic turret, day/night vision, thermal vision, communication relay, RADAR, LIDAR, gas sensor etc.

- **Search & Rescue Solution (Mobisearch)**

- Detects and geolocates searched mobile phones in high-risk areas
- Sends alert and evacuation messages
- Allows direct exchanges between searched people and rescue teams

- **Cybersecurity Built In**
  - Full end-to-end protection ensures **data integrity and availability**
  - In partnership with Renault Group: **Detect & Respond**, a solution to mitigate onboard and offboard cyber threats

# Other contributors

## Green communication



### Explanations & benefits (for fireman, citizen, authorities)

Green Communications offers digital resilience solutions that can be deployed in less than two minutes to restore connectivity and services when existing infrastructures are damaged by natural disasters, terrorist attacks, cyber-attacks or power outages.

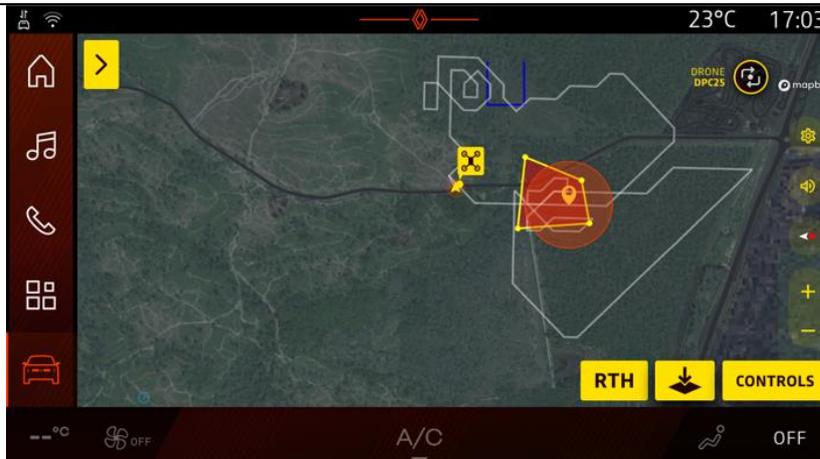
Our Noah's ark of emergency digital services operates completely independently of any telecoms, cloud or power infrastructure, and offers self-sufficient, battery-powered network solutions with embedded digital services for voice, chat, video, file exchange and much more.

Green Communications is a French company whose products have been deployed in various sectors for 15 years, including defense. The solution is based on deep technologies, including large-scale mesh networks, edge computing and distributed systems.

### Techno used

- Large scale direct Mesh network (> 30 routing hops).
- Low power and high-performance edge computing
- Distributed applications working without any central server, providing continuity of services in mobility and with split/merge capabilities.
- Embedded blockchain to record all mission data, ensuring its integrity.
- The entire system is contained in ultra-light software for integration in low-capacity end devices.

## HawAI.tech



### Explanations & benefits (for fireman, citizen, authorities)

Our technology enables real-time and automated drone mission planning. This approach significantly streamlines the preparation phase while facilitating the coordination and simultaneous deployment of multiple drones within a single mission.

The tool leverages various layers of information to generate specific waypoints for each drone involved.

Furthermore, users retain the ability to modify any generated trajectory afterward.

### Techno used

The technology deployed in this context is based on an advanced data fusion framework, enabling the coherent and comprehensive integration of all relevant information required for planning the trajectories of various drones involved in wildfire response missions. This approach is designed to aggregate and correlate data from multiple sources—such as topographic surveys, satellite imagery, meteorological information, onboard sensors, and field reports—in order to enhance situational modeling and support informed decision-making.

The drone trajectories are then generated using artificial intelligence algorithms specifically developed to ensure physical feasibility in accordance with each drone's technical capabilities (e.g., autonomy, speed, payload, maneuverability). These algorithms are not only designed to guarantee the viability of the proposed flight paths, but also to optimize operational efficiency by taking into account a wide array of user-defined constraints. Such constraints may include intervention priorities, hazardous zones, designated air corridors, as well as environmental and civil safety regulations.

In the context of wildfire management, this technology enables more precise coordination and improved responsiveness of aerial assets by dynamically adapting drone trajectories to evolving fire conditions and operational demands. It contributes to enhancing the accuracy of interventions, reducing risks for ground teams, and strengthening the overall effectiveness of surveillance and firefighting strategies.

## Peripheral



### Explanations & benefits (for fireman, citizen, authorities)

Firefighters often intervene in complex or degraded environments. The presence of danger, smoke and a lack of orientation in the environment can slow down manoeuvres and put personnel at risk. When travelling by vehicle or on foot, understanding and analysing operational information or vital alerts requires stopping and using a map or tablet to receive and analyse the information. This interrupts movement, and interpretation is a source of error, especially under heavy mental load and stress PERIPHERAL solves this problem by providing guidance and alert information, error-free, individually and without interrupting movement or causing a cognitive load.

it do not interrupt cognitive task, no need to stop walking or moving.

it is visual so it can make several countries / language work together

the flickers perceived by the brain; no training, no set up, no focus is needed

it is egocentric information, no error is possible

it is inside the mask, it works whatever the weather or outside conditions ( smoke, fog, etc..)

### Techno used

- We can understand how the brain works by simplifying two modes: cognitive processes and automatic processes. Cognitive processes are conscious, slow and require a lot of energy. Automatic processes are unconscious and manage body movements, emotions and vigilance in particular.
- Although they are linked, these processes share the same 'bandwidth' in the brain, so if you want to listen properly you must not move your body so that the maximum bandwidth is available for the cognitive processes in the cortex. Conversely, doing sport allows the brain to "aerate", which hampers conscious thought.
- One of the automatic mechanisms is that of vigilance: a person or an object that could hit you, or a detail that catches your attention, provokes an automatic reaction and in particular the need to look at the area of interest. Peripheral vision is constantly analysed by the automatic mechanisms of vigilance, and when they detect an element deserving attention an attentional capture causes a movement of the head.
- PERIPHERAL is a technology that uses these neurological mechanisms, which take place in subcortical neural networks. By triggering visual elements recognised by the brain, it is possible to guide and alert a moving person
- an insert in put inside existing google, the insert weight 60 grams. Lecronic capture the direction of the gaze and make leds flickers in the direction of the targert, perceived by the user.

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## Partners

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### About Software République:

The Software République is defined as an open innovation ecosystem dedicated to intelligent, secure, and sustainable mobility. It was created in April 2021 by six founding members: Atos, Dassault Systèmes, Orange, Renault Group, STMicroelectronics and Thales. The Software République builds collective projects focused on tomorrow's mobility through its unique horizontal collaboration model. The ecosystem stands out for its innovative approach, combining established companies and startups from different backgrounds to bring to market products and services that meet the new challenges of the connected vehicle, the smart city and energy. These projects are based on the complementary expertise of its partners in data analysis, artificial intelligence, cybersecurity, connectivity, and virtual twins, and on the ambition to invent a new model of innovation while keeping people and the environment at the heart of its motivations. Further information can be found at <https://softwarerepublique.eu/en/>