INNOVATION | DESIGN | INDUSTRIALIZATION | PRODUCTION

VEHICLE & ASSET TRACKING PRODUCTS CATALOG 2024

www.vemsolutions.it

INNOVATION I DESIGN I INDUSTRIALIZATION I PRODUCTION

Vem Solutions is an Italian and Bulgarian Company with 50 years of experience in the Research and Development, systems and processes engineering and electronics manufacturing sectors.

Our mission has always been to design, develop and manufacture telematics devices and intelligent sensors equipped with IoT technologies, telematics platforms and services for the B2B/B2B2C world and apps for smartphones and tablets.

Our Company is also focused on the research and development of hardware, firmware and software as well as IT platforms, and offers effective and innovative solutions for our Customers.

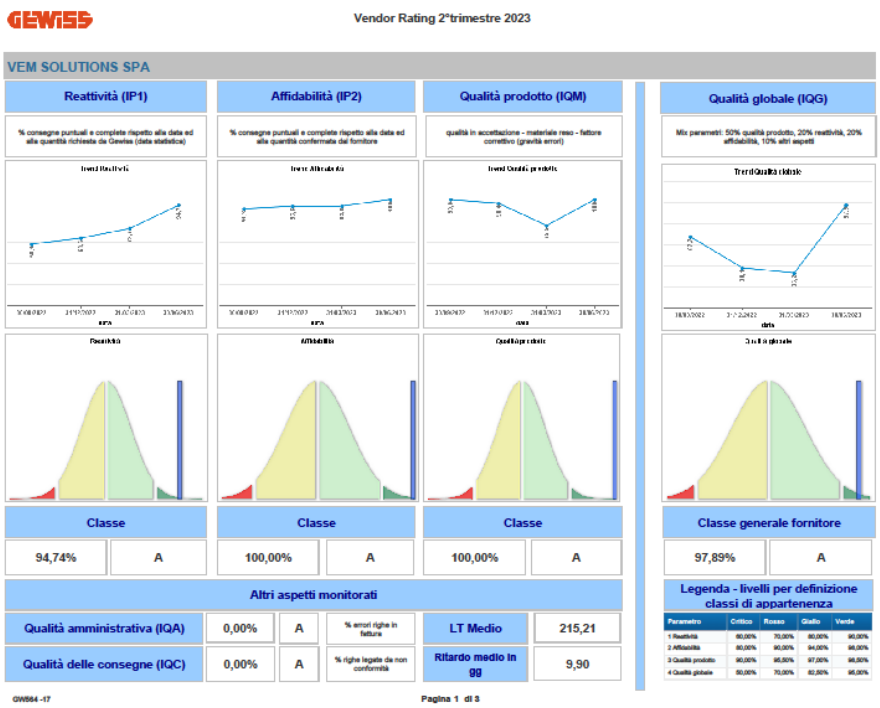
The R&D team is constituted on more than 20 engineers, over both locations. The Agile methodology is largely used, to better address the Customer satisfaction

Vem Solutions has a deep and large capability to develop Platform of Data Ingestion and related Services to manage the large volume of data acquired by the field IOT devices. The resources working on these projects are located both in Italy than in Bulgaria and they are strongly specialized into IOT projects, like: Data Modelling, Platform Architecture, Intelligent Transport System.

Third Parties Engineered Devices

Vem Solutions is normally working in order to integrate on his own Platform devices from other Manufacturers, in order to improve the Platform capability to work with different Over The Air protocols. This means also to create internal competence for Vem Customers to support them about devices purchased on the Market, like Teltonika or Queclink or Ruptela.

ABOUT US



GEWISS

Vendor Rating 2°trimestre 2023

VEM SOLUTIONS SPA

Reattività (IP1)	Affidabilità (IP2)	Qualità prodotto (IQM)	Qualità globale (IQG)
% consegne puntuali e complete rispetto alla data ed alla quantità richiesta da Gewiss (data statistica)	% consegne puntuali e complete rispetto alla data ed alla quantità confermata dal fornitore	qualità in accettazione - materiale reso - fattore correttivo (gravità errori)	Mix parametri: 50% qualità prodotto, 20% reattività, 20% affidabilità, 10% altri aspetti

Classe		Classe		Classe		Classe generale fornitore	
94,74%	A	100,00%	A	100,00%	A	97,89%	A

Altri aspetti monitorati

Qualità amministrativa (IQA)	0,00%	A	% errori righe in fattura	LT Medio	215,21
Qualità delle consegne (IQC)	0,00%	A	% righe legate da non conformità	Ritardo medio in gg	9,90

Legenda - livelli per definizione classi di appartenenza

Parametro	Critico	Rosso	Giallo	Verde
1 Reattività	60,00%	70,00%	80,00%	90,00%
2 Affidabilità	80,00%	90,00%	94,00%	98,00%
3 Qualità prodotto	90,00%	95,00%	97,00%	98,00%
4 Qualità globale	60,00%	70,00%	82,00%	95,00%

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Pagina 1 di 3

Vem Solutions is organized with an internal efficient Supply Chain, able to coordinate internal production as well as externals supplier plants.

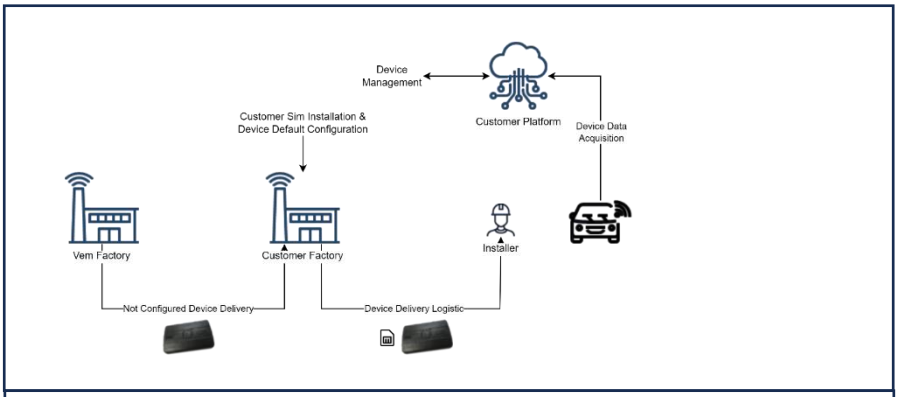
VEHICLE AND ASSET TRACKING

Family	Key Features	Versions	Market	Device
SlimBox 2G	Telematic Box self installing. IP65, Tri-axial Accelerometer 16g multi-range and Gyro. Up to One position per second. Binary and extremely compact Over The Air Protocol. Multi GNSS with integrated antennas. Internal Backup Battery. 2G or 4G versions available	SlimBox2.4_2F SlimBox2.4_OBD SlimBox2.4_SAFE SlimBox2.4_OBD_CAN SlimBox3.2_MOTO	Insurance Tolling Smart Connect Consumer Light Fleet Motorcycles	
SlimBox 4G		SlimBox4.0_2F SlimBox4.0_OBD_CAN		
SosCall 4G	Telematic Insurtech Device for Windscreen installation. LTE/Cat1 Penta-Band. Tri-axial Accelerometer 16g multi-range and Gyro. Binary and extremely compact Over The Air Protocol. Multi GNSS with integrated antennas. Internal Backup Battery. Integrated speaker and microphone for remote assistance. Integrated Emergency and voice volume control buttons. Bluetooth LE integrated	SosCall4.0	Insurance	
BluBox 4G	Smart Connect BlackBox. LTE/Cat1 Penta-Band. Tri-axial Accelerometer 16g multi-range and Gyro. Binary and extremely compact Over The Air Protocol. Multi GNSS with integrated antennas. Internal Backup Battery.	BluBox4.0	Smart Connect Insurance Fleet	
BluTrack 8	Fleet and Asset Self-Powered and long autonomy Tracker. LTE/CatM1 - NB-Iot Low Power Band. Binary and extremely compact Over The Air Protocol. Multi GNSS with integrated antennas. Bluetooth LE integrated. One push integrated button for device activation	BluTrack8.0	Smart Connect	
RunTracker 4G	BlackBox device for professional Fleet applications. LTE/Cat1 Penta-Band. Binary and extremely compact Over The Air Protocol. Multi GNSS with integrated antennas. SAEJ1939 CAN-BUS protocol, Tachograph protocol remote data download and Real Time data. Wide possibility of external connections to vehicle	RunTracker6.3	Truck Fleet	
Sherlock	IoT device for bike/e-bike. NB-IoT - LTE/CatM1 connectivity. Multi Constellation GNSS. Bluetooth LE 4-2 for local connection with Customer APP. Internal rechargeable battery	Sherlock2.0	Consumer Smart Connect	

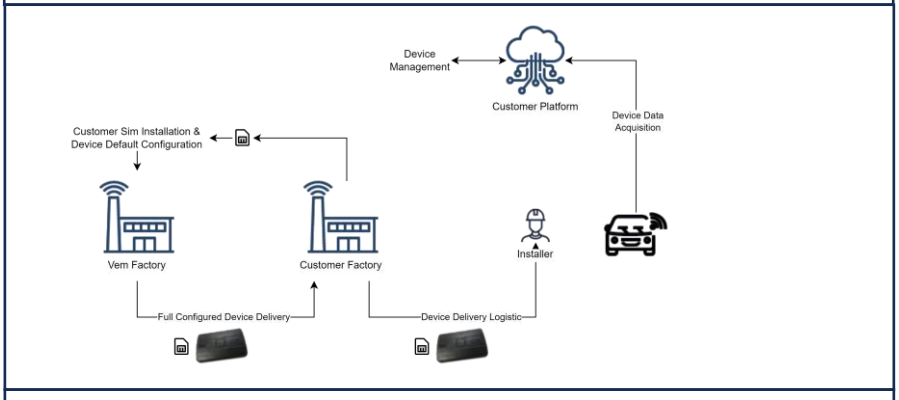
Device/Service Commitment Vem Policies

Different Commitment models can be choosen by the Customer, like:

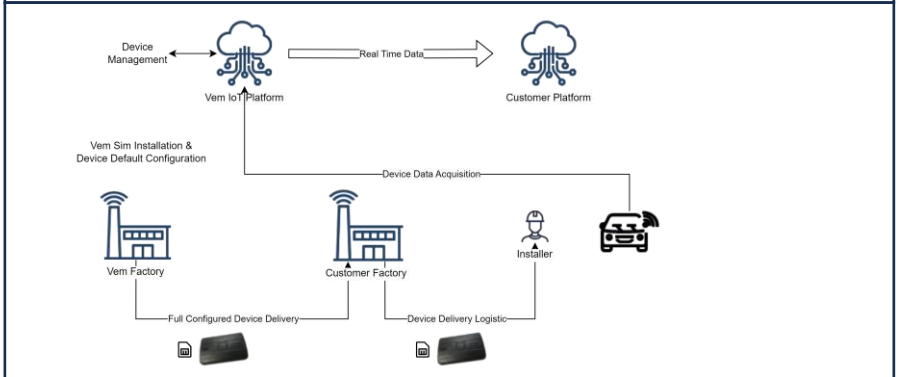
Unmanaged Commitment Model



Managed Commitment Model



Data as Service Commitment Model

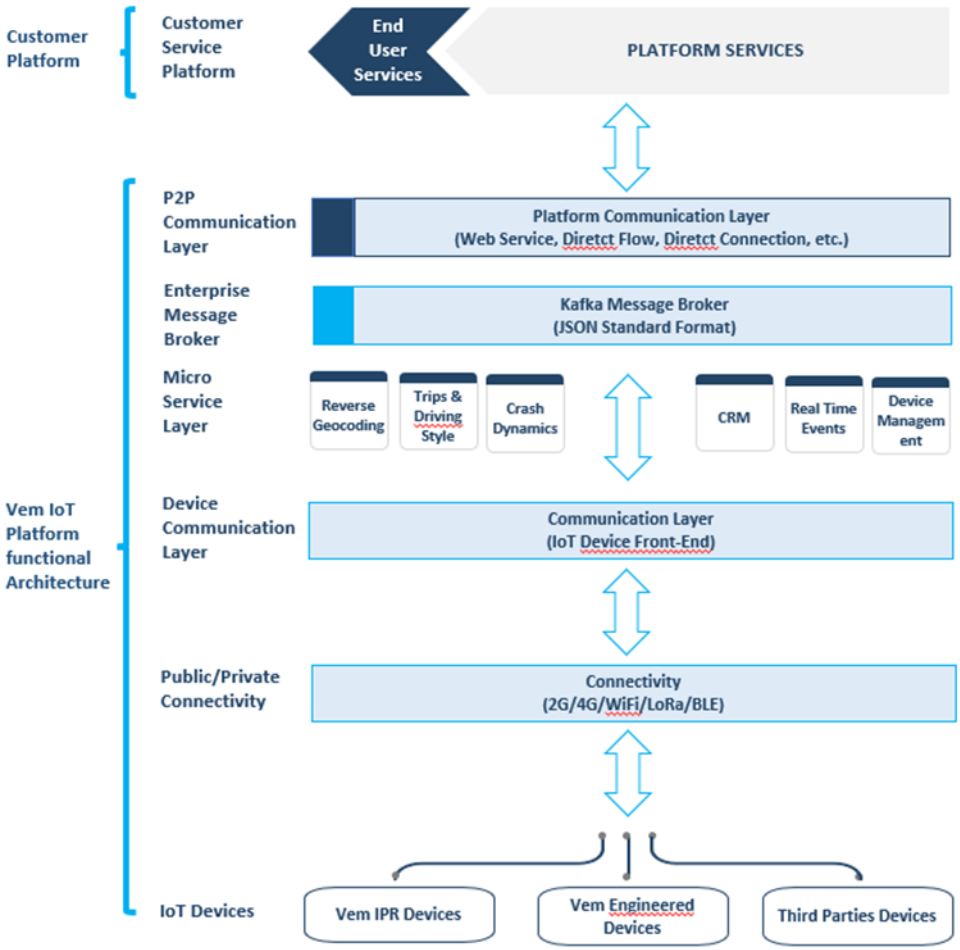


eUICC Device/Service Commitment by Vem

eUICC (Embedded Universal Integrated Circuit Card) has been dubbed the next evolution of the SIM card, because it offers users the ability to change service provider over-the-air (OTA), without needing to physically change the embedded SIM card itself.
Thanks to a specific agreement with Wireless Logic, owner of Conexa, a carrier-grade mobile network which provides secure, resilient and flexible connectivity anywhere in the world.

With this facility, Vem can supply devices already equipped with an eUICC on board. The Customer can easily activate the Mobile Operator Profile preferred or change the last one with a new one in order to have the best performance in local context.

Vem IoT Platform



Vem IoT Platform is just involved into Data Ingestion and Data aggregation and analysis. Absolutely no Services is delivered to any End User, but just the routing of Field Data towards External Service Platforms.

Over The Air Protocol

The Over The Air Protocol embedded into Vem designed devices is a binary protocol really efficient and compact. It includes also the Fw Upgrade and Fw Configuration features.
This protocol is free and open for Customer Integrators that want to be totally indipendent regarding theri own platforms and services.

The Vem Binary Protocol is working on TCP/IP or UDP Internet protocols, but also in SMS for a restricted number of messages.

Vem Binary Protocol foresees a crypting policy, in case of specific requirement from Customers.

Vem devices have a large amount of on board memory, capable to store thounsands of events detected by the device.

The communication with the Platform is started following different strategies of configuration, like: once per day until one message per second.

The following main set of protocol messages are present:

Priority Events. Typically are alarms that are detected and immediately sent to the Platform, also via SMS if TCP/IP or UDP are not available.

Logistic events (Time or Distance Positions, hard breaking or hard cornering events). They are typically stored in memory and sent when the TCP/IP or UDP are availabe (never via Sms).

Detail data. Upload/Download of device data tables (like Vehicle Crash data, Configuration data, Fw image, etc).

MQTT Protocol

Vem device Fw is evolving to MQTT standard protocol. In this way no hard implementation will be necessary on Customer Platforms. Any MQTT Server will be able to support every data exchange with the devices in field.

SlimBox 2.4 Family (2G Device)

Small size, big performance

Device functionalities

SlimBox 2.4 is the small satellite tracking system. It has been designed to offer telematic solutions for the insurance market, as it has all the design and functional characteristics of an advanced "insurance box", with the advantage of extremely simplified installation. In fact, the device, thanks to the IP65 protection, can be installed anywhere in the vehicle: in the passenger compartment, on the windscreen, in the bonnet or in the trunk. The analytical data collected therefore becomes a fundamental tool for the development of vehicle usage statistics and also allows reconstruction of the dynamics of the impact, thanks to the interpretation of the data read by the **accelerometer and gyroscope present in the device**.

- "Insurance box" features and functionality
- Self-installing
- Trip data logging and crash management

Configurations

DESCRIPTION	CONNECTIONS
KIT SLIMBOX 2.4_2F	2 wires for connection to the vehicle battery
KIT SLIMBOX 2.4_OBD	OBD connector Power supply
KIT SLIMBOX 2.4_SAFE	Two-wire connection in the passenger compartment and emergency button
KIT SLIMBOX 2.4_OBD_CAN	OBD connector Power supply and CAN data acquisition

SlimBox 2.4

Functional features

Crash Allarm	Automatic alarm sending to the Operations Center in the event of detection of accelerometric events exceeding the thresholds
Event logging	Key On, Key Off, Time and/or distance tracking, Driving style events (brakes, accelerates, steering), backup battery status
Vehicle axes detection	Gravity vector acquisition and continuous monitoring of vehicle accelerations with rotation matrix calculation
Crash dynamics	Accelerometer data (up to -10 / + 10 seconds with ODR = 800Hz), gyroscopic data (up to -10/+10 seconds with ODR=800Hz) and GNSS position (down to -70 / + 30 seconds with updated at 5Hz). Ability to track more dynamics in sequence
Driving Style	The device records any events in which the accelerometer thresholds are exceeded with respect to the axes of the vehicle
OBD Data	OBD data reading and quantity calculation in compliance with the SAE J1979 standard
Country Change events	Determining and sending country exchange events on exchangeMobile Country Code
Tracking	Possibility to start the remote tracking function from the control unit with configurable time interval
Transmission frequency and sampling	Transmission of crash events and crash dynamics in real time over TCP/IP. Protocol sampling of positions up to 1 position/second and transmission of the position package every 10 seconds
Securitization Procedures	Device Self-diagnostics , with sending of anomaly events,
Keep Alive	A message is periodically sent to the Central, with a customizable interval.
Low vehicle battery	If the vehicle battery falls under a certain threshold, the device sends out a warning to the Central.
Roaming	Possibility of modifying the communication rate of events if the terminal is located in a country other than that of the SIM Manager.

Technical features

CPU	ARM Cortex M33, 32Bit, 768KB RAM, 1MB Flash, 240 DMIPS
Modulo GSM	Quectel MC60 GPRS/GSM
Antenna GSM	Antenna Multibanda per GSM, integrata interna
GNSS	Integrato nel modulo di comunicazione MC60
GNSS Antenna	Antenna patch interna, 25 x 25 mm
Accelerometro primario	±2/4/8/16G 16Bit @ 400Hz. FIFO Memory 8KB
Accelerometro secondario	±2/4/8/16G 16Bit @ 400Hz (opzionale)
Giroscopio	±125/250/500/1000/2000dps 16Bit @ 400Hz, con campionamento sincrono dei dati primari dell'accelerometro
Memoria	Flash NOR 16MB
Bluetooth Low Energy	BLE (opzionale) per connessioni ad accessori esterni
Led diagnostica	LED Red/Green integrato
Alimentazione	8 ÷ 32Vdc
Backup Batteria	Ni-MH, 700mAh @ 2,4V
SIM	SIM Holder 2FF (Opzionale Sim On Chip)
Temperatura Operativa	-20 ÷ +80°C
Dimensioni	108 x 63 x 13.5 mm (L x A x P)
Classe di Protezione	IP65
Rilevazioni segnali	K15 virtuale, distacco K30, rilevazione crash, storicizzazione fino ad 8 dinamiche di crash, memorizzazione fino 8K di eventi geolocalizzati
Protocollo Over The Air	Protocollo binario compatto. Include l'aggiornamento Fw e parametri di configurazione
Installazione	Interno abitacolo e sopra batteria del veicolo, tramite bi-adesivo e fascette serra cavo
Omologazioni	CE, RED, ECE-R10

Miniature insurance device for motorcycles. (2G, BLE, 2 Wires)

Device functionalities

SlimBox 3.2 Moto is the new localization system designed by VEM for insurance and safety applications, now in its two-wheeler version. It provides all the features of a very advanced insurance box. For example, it can send a "Motorcycle on the ground" alarm and detect the acceleration trend in the last seconds before a crash. Installing the device is very straightforward.

SlimBox 3.2 Moto uses the "TCP13" standard on-air protocol, a communication protocol developed by VEM to allow communication with multiple specialized Operations Centers. It has an IP65 level of protection, suitable for installation on motorcycles, and offers a particularly efficient power management while still retaining full functionality.

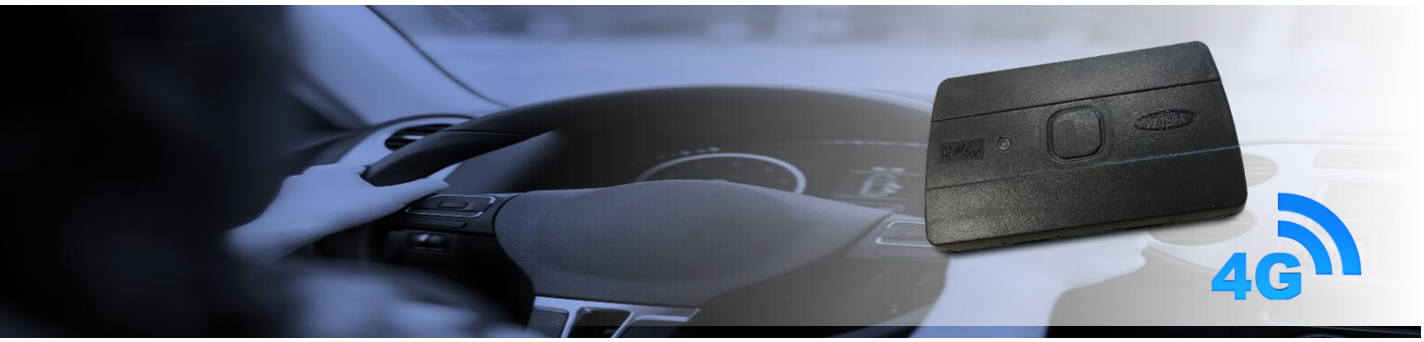
Functional characteristics

Id/Vehicle association	A unique device ID is associated with the Vehicle ID. This association is formalized by a Contract and lasts for an indefinite period of time, regulated by the Contract.
Routes	Panel On/Off events, position events in which time and distance are parameterized and transmitted at specific time interval or when the panel is switched off.
Panel On/Off	Determined by combining accelerometer readings and power supply variation readings.
Tracking	At the request of the Operations Center, the device can be placed in tracking mode, with real-time updates every n seconds.
Crash and "Motorcycle on the ground" event detection	Crash detection is achieved through the real-time analysis of the accelerometer data. The crash event is complemented by the accelerometer trend (10sec@800Hz) and by the positions detected by the GNSS. The device allows the recording of multiple crashes. The "Motorcycle on the ground" event is detected when the device records a variation of one of the accelerometer angles of the device, which remains higher than 60° for at least 30 seconds with a stationary vehicle.
Accelerometer Calibration	The accelerometer is only calibrated to determine the vertical position of the vehicle. The accelerometer is only used to detect the crash event and the "Motorcycle on the ground" event.
Msg format towards Central	TCP13 protocol message with GNSS position. Identification of GSM cells + Identification of adjacent cells.
Keep Alive	A Keep Alive message every 24h, in absence of other messages. The interval as a parameter can be configured.
Detected alarm events	Primary power supply cut or restored. Low primary power supply. The detected events are transmitted in real time to the Operations Center, or stored in the internal memory if there is no signal.
Network GSM registration	The device is constantly registered on the GSM network, except in the following conditions
GNSS Usage	GNSS sensor active when the vehicle is in motion, in state of alarm, or at the request of the Center.
Low Power Consumption	When the panel is off, the device switches off the GNSS, which however remains on the network and can be contacted by the Operations Centermfor about 48 more hours. After this time, the GSM is also turned off and then periodically turned on to send the Keep Alive message. In the event of prolonged periods of inactivity of the vehicle is advisable, depending on the type of battery, to disconnect the terminals in order to safeguard the charge.
Wake CPU mode	When the vehicle is stationary, the device enters the low-power mode. The CPU wakes up periodically thanks to its internal RTC, from a wake up event provided by the accelerometer or upon connection/disconnection of the primary power supply.
Autonomy when not powered	In case of cable cutting, the device is able to maintain communication with the Operations Center for 20 minutes, with fully operational GSM and GNSS.
Requests from the OC	Request for single position, request for tracking for n minutes, with one position every n seconds (parameters defined by the OC). Commands can only be received if the device is registered to the GSM network.
Activation/Testing	Standard activation sequence: • Connection of the primary power supply; • Waiting for GSM connection; • Waiting for GNSS fix; • Panel status change (start up); • Automatic activation request to the OC; • Verification of the presence of a contract connected to the device and activation from the OC; • Activation sequence with two-color led diagnostics;
Operation statuses	• Waiting for activation: the device does not perform any operation other than the Activation procedure. • Active: normal operational status, in presence of a valid contract at the OC. • Maintenance: status requested by the OC. In this status, the device only sends the periodical Keep Alive message and the messages related to the connection/disconnection of the primary power supply • Inactive: status requested by the OC. In this state the device does not perform any operation, except periodically registering to the GSM network.
Event memory	The device stores events that it is not currently able to send, up to a maximum of 4096 events. Buffer overruns will result in the loss of the oldest events.

Technical characteristics

CPU	ARM Cortex M4, 32Bit, 384KB RAM, 1MB Flash, 225 DMIPS
GSM Module	Quectel, Quad-band GSM/GPRS Modem
GSM Antenna	Internal Antenna Chip, Penta-band
GNSS Module	uBlox, TCXO, multi-constellation GPS/Glonass, Galileo, acquisition rate up to 18Hz
GNSS Antenna	Internal Antenna Patch, 25 x 25mm
Primary Accelerometer	±2/4/8/16G 16Bit. FIFO Memory 8KB
Secondary Accelerometer	±2/4/8/16g 16Bit
Gyroscope	±125/245/500/1000/2000dps 16Bit with synchronous sampling of primary accelerometer data
Memory	E²PROM 2KB, Flash 32Mbyte
Additional Memory	eMMC up to 32GB (optional)
Bluetooth	Bluetooth® 3.0 EDR, Bluetooth® LE 4.1
Data Security	Authentication and protection of data, CC class EAL5+/AVA_VAN5 (optional)
Power	8 ÷ 32Vdc
Backup Battery	Ni-MH, 750mAh @ 2,4V
SIM	On Chip SIM Card
Operating Temperature	-20 ÷ +80°C
Dimensions	108 x 63 x 13.5 mm (L x H x D)
Protection class	IP65
Device wiring	2 poles for direct battery connection with protection fuses
OTA Protocol	“Over The Air” protocol, including configuration, events and firmware updates
Transmission Frequency	TCP/IP transmissions (alarms and crashes) in real time. TCP/IP transmissions (historical events) every 15 minutes or upon Panel Off events.
Homologation	CE, RED, ECE-R10, CEI 79-56
Installation	Under the saddle, inside the fairing, top box, object holder.
Device on	Through connection to external power supply
Device off	CPU auto power off

Miniature satellite device for personal safety, vehicle safety and emergency in case of crash



Device functionalities

SlimBox 4.0 is the new, compact satellite locationing system created by Vem with the aim of providing telematics solutions for the insurance market. The device integrates all the following components: **4G MODEM, On-chip SIM Card, GNSS multi-constellation module, internal antennas, accelerometer and triaxial gyroscope for crash detection, a second accelerometer dedicated to the driving style, memories, a Bluetooth® connectivity and OBD Can Data.** The installation of this device is made easy by its extremely low thickness and by high IP65 protection level.

In addition to the typical installation inside the vehicle cockpit, it can be placed in the car or on the battery. Therefore, it is very simple to connect the device. Specialized workers will need a shorter amount of time to install it. The native features of the device make it possible to record, store, and communicate travel data and possibly crash data, and to track the position of the car accurately. The recorded analytical data becomes a fundamental tool to process vehicle usage statistics and also allows for the telematic reconstruction of crash dynamics. The base functionalities of the device can be extended using Bluetooth® connectivity and the optional accessories. It is possible to couple the device with other VEM devices (Blutrack 8.0) or with a multi-color (LED RGB) emergency button.

- Security and protection
- Bluetooth low Energy
- Two digital accelerometers and gyroscope
- CAN-OBD reading

Functional characteristics

Crash Allarm	Automatic alarm sending to the Operations Center in the event of detection of accelerometric events exceeding the thresholds (Light crash alarm and heavy crash alarm. Function approved with the Insurance Companies)
Event logging	Key On, Key Off, Time and/or distance tracking, Driving style events (brakes, accelerates, steering), backup battery status
Vehicle axes detection	Gravity vector acquisition and continuous monitoring of vehicle accelerations with rotation matrix calculation
Crash dynamics	Accelerometer data (up to -10 / + 10 seconds with ODR = 800Hz), gyroscopic data (up to -10/+10 seconds with ODR=800Hz) and GNSS position (down to -70 / + 30 seconds with updated at 5Hz). Ability to track more dynamics in sequence
Driving Style	The device records any events in which the accelerometer thresholds are exceeded with respect to the axes of the vehicle
OBD Data	OBD data reading and quantity calculation in compliance with the SAE J1979 standard (where present OBD connection)
Country Change events	Determining and sending country exchange events on exchangeMobile Country Code
Tracking	Possibility to start the remote tracking function from the control unit with configurable time interval
Transmission frequency and sampling	Transmission of crash events and crash dynamics in real time over TCP/IP. Protocol sampling of positions up to 1 position/second and transmission of the position package every 10 seconds
Securitization Procedures	Terminal Self-diagnostics , with sending of anomaly events, necessary for the management of the installed fleet
Keep Alive	A message is periodically sent to the Central, with a customizable interval.
Low vehicle battery	If the vehicle battery falls under a certain threshold, the device sends out a warning to the Central.
Roaming	Possibility of modifying the communication rate of events if the terminal is located in a country other than that of the SIM Manager.

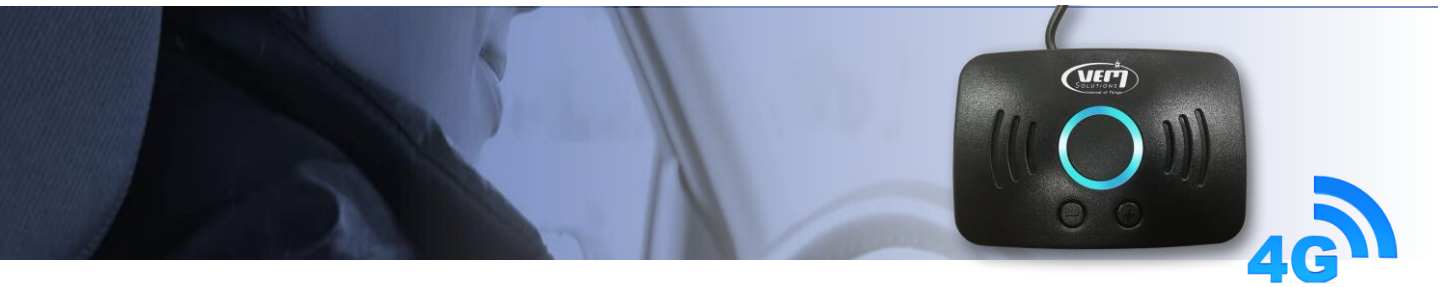
Complementary accessories

VCallBLE	Hands-free system with integrated RGB LED button. This accessory allows to initiate a voice call with the O.C. or to pair the hands-free system with the user's smartphone.
VKeyBLE	Transponder with Bluetooth® Low Energy technology and integrated accelerometer for driver authentication and security functions. Additionally, when used together with Viasat appS, it allows to locate the vehicle keys by using the last GPS location acquired by the smartphone or the controlled activation of the transponder LED.
VReléBLE	Relay activated by the satellite tracker to inhibit engine startup. This device employs the Bluetooth® Low Energy technology for a wireless communication with the satellite device. The physical activation of the relay only takes place if the vehicle Key On event also did.
BluTrack 8.0	Device for the redundant protection of the vehicle which allows it to be found if the tracker is removed. This device does not require installation as it is equipped with internal batteries which, combined with Bluetooth® technology, guarantee continuous operation of the device for at least 5 years.

Technical characteristics

CPU	
LTE Module	Quectel LTE Cat1/Fall back GPRS/GSM
LTE Antenna	Multiband antenna for LTE, internally integrated
GNSS Module	uBlox, TCXO, multi-constellation GPS/Glonass, Galileo …
GNSS Antenna	Internal Antenna Patch, 25 x 25mm
Primary Accelerometer	±2/4/8/16G 16Bit @ 800Hz. FIFO Memory 8KB
Additional Accelerometer	±2/4/8/16G 16Bit @ 800Hz (optional)
Gyroscope	±125/245/500/1000/2000dps 16Bit with synchronous sampling of primary accelerometer data
Memory	E^2PROM 2KB, Flash NOR 32MB, FLASH NAND optional
Buttons	1 button for device activation
Bluetooth Low Energy	BLE 4.2 for connections to external accessories
Diagnostic led	RGB led integrated
Power	8 ÷ 32Vdc
Backup Battery	Ni-MH, 300mAh @ 3,6V
SIM	SIM Holder 2FF (Optional Sim On Chip)
Operating Temperature	-20 ÷ +80°C
Dimensions	108 x 63 x 13.5 mm (L x A x P)
Protection Class	IP65
Device wiring	6 poles (GND, K30, K15, KL+, KL-, GPIO)
Board Signal	Virtual K15, K30 detachment, crash detection, logging of up to 8 crash dynamics, storage of up to 8K of geolocated events
Over The Air Protocol	Compact binary protocol. Includes Fw update and configuration parameters
Installation	Cockpit interior, trunk or battery depending on the vehicle wiring. Installation with double-sided tape and/or straps
Homologation	CE, RED, ECE-R97, CEI 79-56

Multifunction satellite device for personal safety, vehicle safety, emergency in the event of an accident or danger. Customized for Generali with RGB LED multicolor emergency button and proprietary Real Coaching functionality



Device functionality

SosCall 4.0 is a localization and communication system with a compact and customized design. The device integrates all components: MODEM, SIM card, multi-constellation GNSS module, internal antennas, accelerometer and triaxial gyroscope for crash detection, second accelerometer reserved for driving style, memories, hands-free, Bluetooth® Classic and Low Energy . It also has a multicolored emergency button (RGB LED), capable of highlighting incorrect driver behavior; it can signal with sounds or voice messages situations of potential road hazard (Black Point, Red Point, Traffic), environmental (Weather) or particular points of interest (Speed cameras, Limited Traffic Zones and parking lots).

Pressing the emergency button puts the user in communication with the Operator who locates the vehicle and provides the assistance requested. In the event of a crash, automatic geo-localized alarm to the Operations Center and activates the hands-free contact to provide support and rescue directly on site. The device records data, this allows the processing of vehicle usage statistics, the automatic diagnosis of system anomalies and allows the telematic reconstruction of the crash dynamics. Through the Bluetooth® Classic module, the integrated handsfree can be managed from the customer's phone to offer hand-free functionality during normal use of the vehicle.

Features	SosCall 4.0
Voice Call assistance	√
Crash alarm	√
eCall function[1]	√
Distance data, driving style, anomalies	√
Dynamic crash reconstruction at both Key On and Key Off	√
Remote tracking	√
Security procedures	√
Bluetooth® Classic for hands-free functions with smartphone (HFP profile)	√
Bluetooth® Low Energy for connection with accessories or smartphone authentication	√
Real Coaching (driving education via multicolored LEDs)	√
Map data dynamically loaded on board	√

[1] Device compliant with the functions envisaged by the European Standard (Minimum Set Data via "in band" modem).

Functional characteristics

Ecall assistance	Request assistance via key press or automatically in the event of a crash.
Crash alarm	Automatic sending of geo-referenced alarms to the control unit and subsequent voice call with the operator
Driving style recording	The device collects the accelerometric variations above the threshold with respect to the X and Y axes of the vehicle
Event logging	Key on, key off, tracking, crash, driving style, anomalies events
Vehicle axle determination	Self-determination of the vehicle axes deduced from the continuous analysis of vehicle acceleration and deceleration and from the static acquisition of the gravitational vector
Incident dynamics	Accelerometric data (up to -10 / + 10 seconds with ODR = 800Hz), gyroscopic (up to -10 / + 10 seconds with ODR = 800Hz) and GNSS position data (up to -70 / + 30 seconds with 4Hz update) . Ability to record multiple dynamics in sequence.
Driving Style	The device records the exceeding of accelerometric thresholds and generates light and sound feedback to the driver according to the methods specified by Generali. At each Key On, the device signals the previous evaluation of the driving style developed by Generali.
Country Change Events	The device reports country change events in real time to the Central
Remote tracking	Continuous tracking of the vehicle, to facilitate recovery operations
Securization Procedures	A special Central service analyzes the problems manifested by the device or detects if it is not communicating with the necessary regularity.
KeepAlive	Message sent periodically to the Control unit with a configurable period. It is used to check if the device is properly connected to the vehicle.
Low vehicle battery	If the vehicle battery is below a minimum threshold, the device sends a signal to the control unit
Affiliate cellular mobile	By contract, the control unit identifies the mobile phone number from which commands can be generated
Roaming	The device is enabled for data / voice transmission for all EU28 countries
Cartography	The device, when equipped with cartography, is able to provide the following warnings to the driver: ➢ presence of dangerous roads (Red Point and Black Point); ➢ presence of speed cameras; ➢ exceeding dynamic speed limits (modulated in relation to historical distance data, traffic data and weather conditions); ➢ ZTL entrance and exit signs and parking lots;

Matching accessories

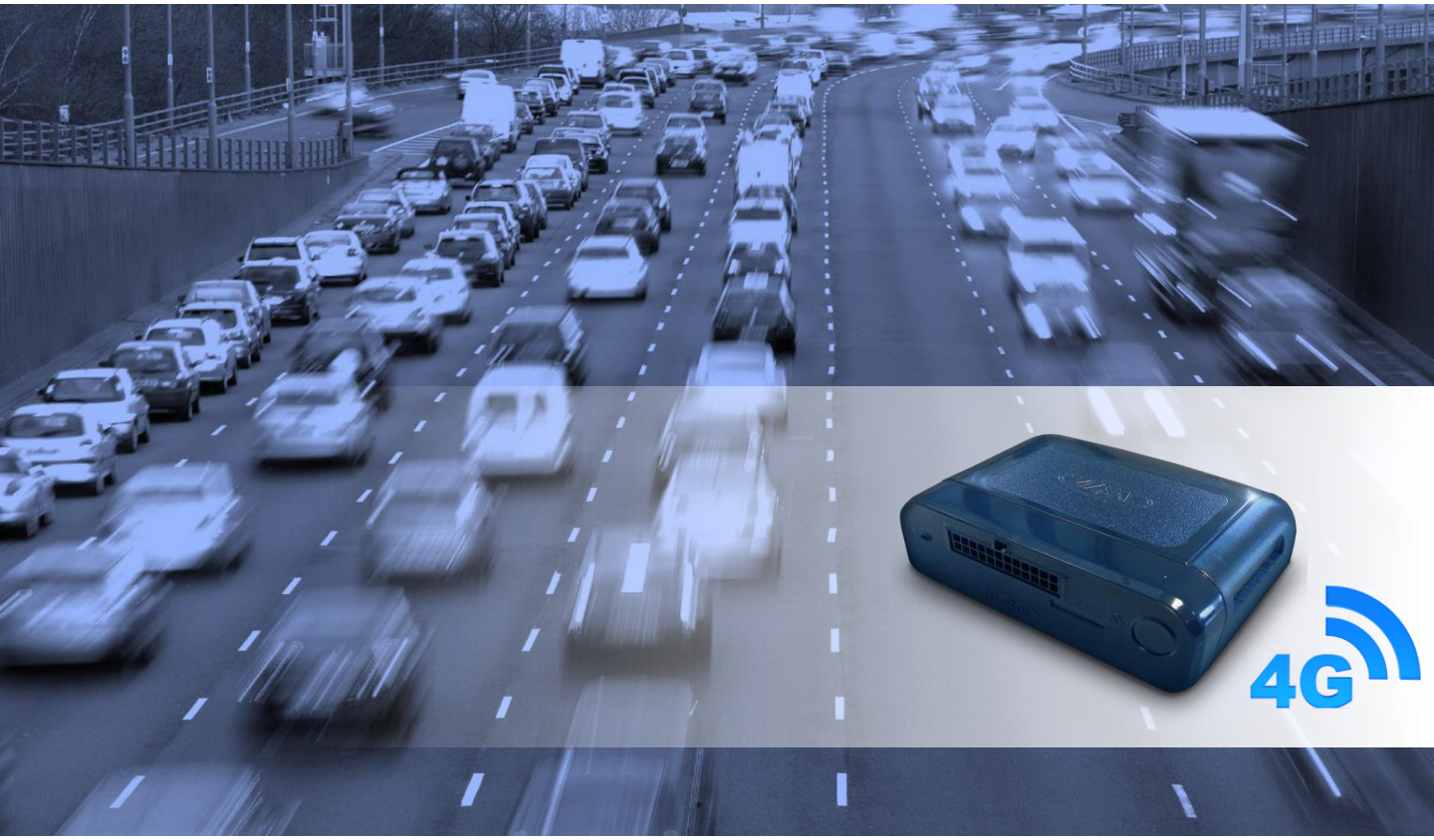
BluTrack6.1BLE	Device for the redundant protection of the vehicle which allows the vehicle to be found in the event that the locator mounted on the windshield is removed. This device does not require installation as it is equipped with internal batteries which, combined with Bluetooth® Low Energy technology, guarantee continuous operation of the device for at least 5 years.

Technical features

Microprocessor	ARM Cortex M4, 32Bit, 384KB RAM, 1MB Flash, 225 DMIPS
GSM module	Quectel, Modem Quad-band GSM/GPRS
GSM antenna	Internal Antenna Chip, Penta-band
GNSS module	uBlox, TCXO, multi constellation GPS / Glonass, Galileo, with acquisition rates up to 18Hz
GNSS antenna	Internal Antenna Patch, 25 x 25mm
Primary Accelerometer	± 2/4/8 /16g at 16Bit. 8KB FIFO memory
Secondary Accelerometer	±2/4/8/16g a 16Bit
Gyroscope	± 125/245/500/1000 / 2000dps at 16Bit. With synchronous sampling with the primary accelerometer data
Memories	E^2PROM 2KB, Flash 32Mbyte
Additional memory	eMMC with capacities up to 32GB (optional)
Buttons	1 emergency button (with acoustic feedback via PWM) 2 service function keys
Voicecall	Microphone and speaker integrated into the case
Bluetooth	Bluetooth® 3.0 EDR, Bluetooth® LE 4.1
Data Security	Class CC authentication and data protection EAL5 + / AVA_VAN5 (optional)
Diagnostic and driving style LEDs	Integrated RGB LED on button for driving behavior feedback
Alimentation	8 ÷ 32Vdc
Backup battery	Ni-MH, 750mAh @ 2,4V
SIM	SIM Holder (SIM On Chip opzionale)
Operative temperature	-20 ÷ +80°C
Dimensions	99 x 68 x 30.6 mm (L x A x P)
Degree of protection	IP40
Vehicle side wiring	4 poles with flying connector and safety against accidental release (GND, K30, K15, GPIO)
Signal	Derived from supply voltage variation, linear and angular accelerations detected by internal sensors
OTA protocol	"Over The Air" protocol including configuration, events, firmware updates, map data updates
Frequency transmission	Transmissions via TCP / IP (alarms and crashes) in real time. Transmissions via TCP / IP (historical events) every 15 minutes or at Panel Off event.
Floating Car Data transmission	1 position / second recording and transmission via UDP every 30 seconds (OPTIONAL)
Omologation	CE, RED, ECE-R10, CEI 79-56
Installation	Fastening to windshield with double-sided tape and use of the attachment carrier.

BluBox 4.0

From VEM experience the new generation of satellite solutions. Sophisticated and compact design, new accessories, web application to provide security, protection and comprehensive support



Device functionalities

BluBox 4.0 is an innovation in the field of **satellite tracking systems**, designed and developed by VEM to ensure the increased performance of **safety and security**, available on the market, of the vehicle insured and person. The project represents a complete innovative device **with 4G, Bluetooth, CAN-BUS and I/O**. It provides the possibility of accessories Beacon BLE, PMD BLE (Private Mode Dongle - Private mode), REB BLE (Remote Engine Block), DAC BLE (Driver Authentication Control)

- Security and protection
- Bluetooth low Energy
- Two digital accelerometers and gyroscope
- Volumetric sensor
- BLE authenticator
- BLE starter relay
- Kit V-Call
- CAN-OBD reading

Functional features

Data recording and download	
Communication protocol	GPRS protocol, link duration configurable for Floating Car Data, events in real time (continuous) or packet (transmission every N minutes)
Trip recording	Key on/Key off/Time tracking/position/anomaly events
Crash dynamics recording	Acceleration and position data. Compliant to CEI 79/56ABC Norm (optional)
Automatic crash alarm*	Alarm sent to Control Room including position. Crash threshold adjustable.
Displacement alarm	Alarm sent to Control Room upon movement detection by accelerometer and GPS system
Emergency alarm (button)	Rescue request sent to the Control Room
Roaming/Home event	The device signals to the Control Room if the SIM's registration changes from "Home" to "Roaming" and vice versa.
Anti jamming lock/unlock	In presence of jamming the device if properly wired locks the engine for 4 minutes (time adjustable).
Control Room Commands	
Tracking	Continuous tracking of the vehicle position to ease recovery.
Engine Lock/Unlock	The Control Room can lock/unlock the starting while engine is off.
Check Procedures	
Keep Alive	Message sent periodically to the Control Room (adjustable timing). It is used to check if the device is properly connected to the vehicle.
Vehicle battery low	If the vehicle battery falls below the safety level the device sends a message to the Control Room and disables anti-theft functions
Cable cut	In case of cable tampering the device sends a message to the Control Room. It may be set to be managed as a simple record event or by an Operator.

Technical features

Microprocessor	NXP ARM7 (LPC2387)
GSM Module	GSM/GPRS Quad Band
GPS Module	Ublox MAX-6Q
Accelerometer	Digital, three-axis, range 2/4/6/8/16g Sampling frequency 100/400Hz
GSM Antenna	On-Board
GPS Antenna	Integrated, with LNA
CAN Interface	1 CAN-BUS Port High Speed
Serial Interface	1 Serial Port RS 232
Inputs	3 digital input (perimetric/tamper/spare)
Outputs	2 MOSFET outputs (engine lock/optical-acoustic signals)
Backup battery (rechargeable)	300 mAh NiMH
Diagnostic LED	Two-colors (housing front)
Audio Channel	For hand-free set
Power supply	7 ÷ 36 Vdc
Operating temperature range	- 30 ÷ +70° C
Outer dimensions	100x72x30 mm
Communication	Via GPRS with TCP/IP or UDP protocols
Installation	By bracket with warranty seal
Testing and activation	Testing by diagnostic LED, automatic activation
K-Key Kit (optional)	Automatic Lock/Unlock, Automatic authentication
Emergency button (optional)	Request for assistance to Control Room
vCall (optional)	Hand-free set for voice calls to control Room

Self-powered GNSS locator for the protection of cars, microcars or other private or corporate assets

Device functionalities

It is a tracking system designed for the protection and location detection of vehicles. It is a self-powered device, which can be discreetly placed on board the vehicle to ensure that it is concealed from the eyes of potential thieves. In case of theft of the vehicle, the Operations Center is able to detect the position of the vehicle at the request of the customer. It is a particularly suitable solution when it is not necessary to have continuous monitoring of the asset. Easy to install, thanks to its compact size, it has an autonomy of about 3 years in its standard configuration, guaranteed by the internal long-lasting batteries.

The BluTrack 8.0 uses an innovative communication system, based on the advantages of LTE-CatM1 / NB-Iot signals, in addition to advanced GNSS ones, to detect the position of the vehicle. If the GNSS signal is weak or absent (for example indoors or inside a garage), at any time, the system is able to receive from the NB-IoT provider (telephone operator) the exact position detected by the cell at the device is connected to. In this way the position is always updated and guaranteed by the telephone provider, without necessarily having to communicate with the device.

Furthermore, through a series of automatic security procedures, the Operations Center is able to constantly check the battery status and correct operation, in order to guarantee the functionality of the system, diagnose and, therefore, signal the need to replace the primary battery. At the request of the Customer, the Operations Center can interrogate the device and locate the vehicle on which it is installed, defining the exact position and coordinating the actions for the recovery of the vehicle in the event of theft.

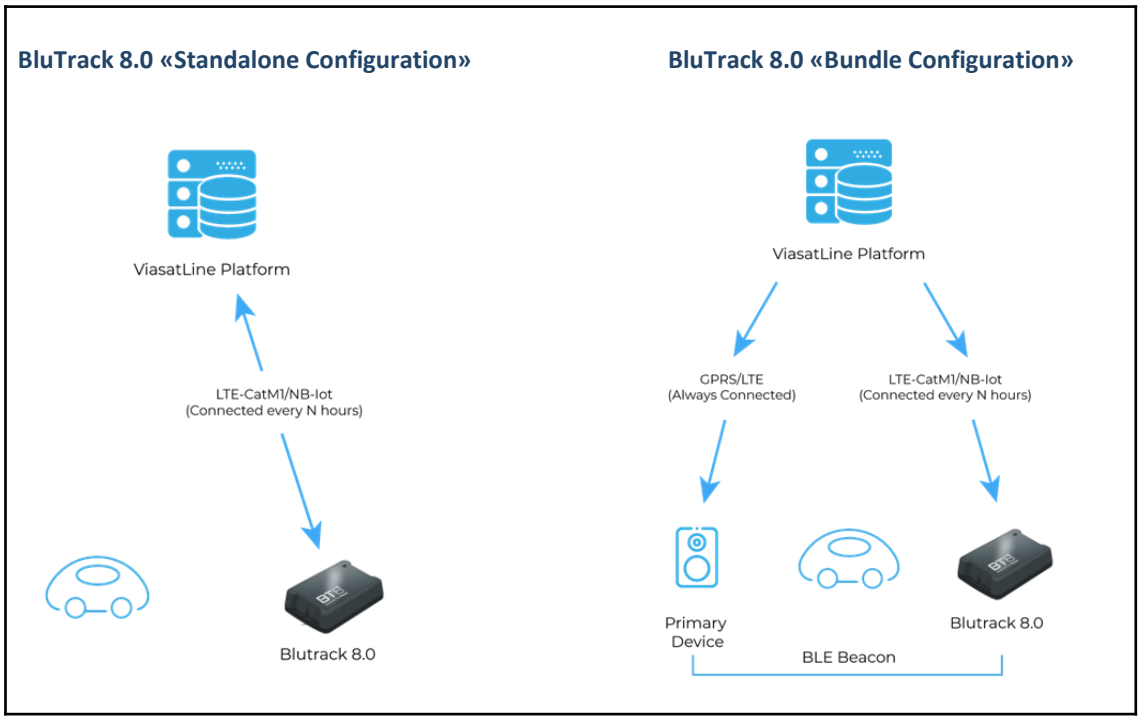
Functional features

Features	"Standalone"	"Bundle"
Operational autonomy	40 months calculated on standard configuration parameters.	24 months calculated on standard configuration parameters.
Vehicle ID / Association	Unique device ID associated with the vehicle ID.	The association is created with a Contract and lasts for an indefinite period of time, as set forth in the Contract
Keep Alive to Platform	Every 24 hours (remote configuration may change).	Every 24 hours (remote configuration may change).
Tracking	At the request of the Center with configurable interval and duration.	Automatically if the local BLE connection is lost
Message format in the control panel	TCP13 protocol message with localization via LTE (Keep Alive) cells TCP13 protocol message with localization via GNSS / LTE cells (Tracking)	
LTE registration on the network	Every 6 hours, on the Auto Wakeup event, the device can read the monitoring requests from the platform. **(remote configuration may change).**	Only in the event of a Keep Alive event or in the event of a lack of BLE signal
GNSS use	GNSS always disabled except in case of tracing activation.	
Platform request	Tracking Request for N minutes, with a position every N seconds (parameters set by the Center).	
BLE use	Not used	Used to monitor the presence of the primary device. In case of absence, the device starts tracking on the Platform
Test/Activation	Activation sequence: • when the button is pressed, the device turns on the red / green LED for a few seconds and sends an Msg to the Center with the request for activation. The Center checks for the presence of a contract and sends an activation message to the device (status change from "Waiting for activation" to "Active") • the device receives the command and changes the LED to green for a few seconds.	
Operating states	• Waiting for activation (factory status). The device does not perform any operations except the activation procedure. • Active. Normal operating state when a valid contract is at the Center. • Maintenance. Status required by the Center. In this state, the device only performs periodic Keep Alive and Primary Power Failure or Restore Messages. • Disabled. Status required by the Center. In this state, the device does nothing except periodic registration on the LTE network.	
Event memory	The device stores the events that is temporarily unable to send up to a maximum number of 1000 events. Any buffer overflows clear older events.	

Technical features

Microprocessor	32-bit dual core (Arm Cortex M4F & Arm Cortex M0+), 150MHz, Ram 288KB, Flash1MB
LTE-CatM1/NB-Iot module	Quectel (BG77) Standard Multi Band
GPS/GNSS module	µBlox ZOE-M8G, –167 dBm sensitivity, Standard BeiDou, Galileo, GLONASS, GPS / QZSS
GNSS internal antenna	Internal multifunctional patch antenna on PCB
LTE antenna	Integrated multiband antenna
Internal sensors	Internal Accelerometer / Tamper
Diagnostic LEDs	RGB color LED on the front
Primary Power Source	Self-powered with six internal non-rechargeable primary batteries (Li-SoCI2) "AA" size
Backup Power Source	Absent
Power Source Control	Primary power source monitoring
SIM Card	SIM 2FF, or SIM on chip (optional). SIM installed as standard and not accessible from the outside
BLE	Standard 5.0
Box	IP65
Operative temperature	-30°C ÷ +70°C
External dimensions	118 x 80 x 30 mm
Installation	The work does not require a specialized installer
Certifications	CE/RED
Device starting	Through button on the front
Device disconnection	Through authorization sent by the Operations Center

Configurations Available



"Standalone" Configuration	**Business**	In this configuration, the device is installed on the vehicle as pure Stolen Vehicle Tracking, following the FNOL (First Notification of Lost).
	Tracking	In this case, the Platform issues a tracking request for the device.
		In this configuration, the device will receive the tracking request on its Keep Alive connection or in correspondence with the auto wakeup
		After receiving a tracking request, the device starts tracking, sending a GNSS-based position every N seconds (typically 30 seconds to 60 seconds)
		Tracking stops at the request of the platform
	Service Timings	**Timing example:** 2 hours for FNOL + 6 hours (worst case) for auto wakeup or Keep Alive from device. Monitoring begins 8 hours after the vehicle has been stolen
"Bundle" Configuration	**Business**	In this configuration, the device is installed on the vehicle as a secondary device along with a primary device, equipped with a BLE beacon function. The model is a stolen vehicle detection with a low FNOL
	Primary device	Primary device: **Slimbox3.1**
	Tracking	In this case the "online tracking" is guaranteed by the Primary Device (because it is always connected)
		The primary device is also a BLE beacon, visible only to Blutrack8.0
		The Blutrack8.0 periodically reads the presence of the BLE beacon. In case of forced removal of the primary device, Start an autonomous tracking to the Platform
	Service Timings	**Timing example (no Primary device removal):** 2 hours for FNOL. Monitoring of the main device starts 2 hours after the vehicle is stolen
		Timing example (Primary device removal and destruction): The detection of the secondary device within 30 min after the removal of the primary device

RunTracker 6.3 (4G)

The new version of RunTracker, ideal for the advanced management of road transport fleets

Device functionalities

RunTracker 6.3 is able to communicate quickly via the 4G module which, as standard, guarantees coverage throughout the EMEA area. The on-board device is specific for the management of truck fleets that offers innovative and more competitive web-based services for fleet management, personal safety and traceability of transported goods. Furthermore, the RunTracker 6.3 terminal allows you to manage the management of fleets dedicated to companies operating in the urban hygiene market (it provides reports and information on locations, routes, stops, in general on the daily life of your vehicles).

The Central Unit has been designed to increase the life of the backup battery and to integrate the GSM and GNSS antennas with the possibility of including an external GNSS antenna.

The Serial and Can ports have been doubled.

Inside the device there is the Bluetooth Low Energy communication module (4.2) to allow connectivity with sensors on the vehicle. The Central Unit is fitted with a GSM / 4G communication module. The functionality of the device covers the SAE J1939 standard. It also supports tachograph data download with remote authentication or onboard authentication for old trucks and real-time tachograph driving status.

The internal accelerometer and gyroscope allow the detection of crash events and store in the internal memory the dynamic values sampled at 400 or 800 Hz.

The accessory base includes multiple optional devices that allow you to monitor fuel consumption and temperature in the load compartment, set up and manage missions via the navigator display, obtain tax benefits through the recovery of excise duties on fuel, perform tachograph data download with remote authentication or on-board authentication. It is integrated with route optimization software and, as usual, to protect cargo from theft and to protect personnel (in case of danger or robbery). A special cover is available to achieve an IP65 degree of protection.

On board device

RunTracker Central Unit	Multistandard GNSS satellite locator 4G LTE Cat1, 3G UMTS / HSPA (+) and 2G GSM / GPRS / EDGE communication system Integrated GNSS / GSM antennas (optional external GNSS antenna) 1 triaxial accelerometer ±2/±4/±8/±16g and 1 triaxial accelerometer ±2/±4±8/±16g with gyroscope NiMh rechargeable internal backup battery (1000 mAh) Ext. Rechargeable lead-acid buffer battery (opt) GSM/LTE SIM card 2 Can High Speed ports 3 RS 232 ports, 1 RS 485 port, one wire 1 Serial tachograph connection (D8) Analog and digital inputs / outputs / power outputs Internal relay for engine block LEDs and 1 buzzer for status notification Bluetooth BLE 4 connection temperature probes

Devices accessories

Display/Navigator (Tablet/Garmin)	Tablet System or Navigator Display for managing messages and missions sent by the Fleet Manager. Navigator with visual and voice guidance. Receiving traffic information.
Fleet / Security Keys Kit	Driver authentication and / or recognition system through contact Rolling Code keys.
K-Key Kit	Automatic authentication device including 2 foreign keys and 1 transponder.
RFID	Driver authentication and identification device through RFID tag.
HPS709VA2 siren	Anti-theft siren to protect the load compartment doors.
Hyper frequency module	Vehicle cabin intrusion detection system.
Temperature module	Temperature detection and control system up to 4 probes.
FMS Central Unit	System that collects data from the vehicle's internal CAN bus.
Consumption detection system for excise duty recovery	Counter that allows the detection of fuel consumption for the recovery of excise duties on vehicles with power take-offs.
Passive RFID tag reader	System for reading passive RFID tags from antenna or wrist (LF or UHF).
Active BLE identification	Active tag reading system for trailer identification and temperature/humidity BLE sensors detection
Humidity probe	Detection of temperature, humidity and dew point

Functional features

Path recording	Key on / Key off events / Time and distance tracking
Dynamic accident recording	Accelerometer data / position / I / O status 10 sec. pre-crash / 10 sec. post-crash at 400Hz 4 sec. pre-crash / 4 sec. post-crash at 800Hz
Crash alarm	Sending alarm to the Operations Center with configurable threshold.
Device configuration	Remotely: through LTE and SMS.
Engine start block	From Operations Center: specific action requested by the operator. Locally (ITL): if a GSM Jamming attack is detected or if the engine is started without authentication. The motor lock / unlock command sent by the Operations Center prevails over any local action of the Device.
Movement alarm with panel off	Alarm sent to the Operations Center if it detects movement from the accelerometer and GPS.
Anti-Jamming	The device detects any distorted fraudulent reception of the GSM signal. If the vehicle's engine is off, the device blocks the start and activates the siren once.
Border event	The device notifies the change of country based on the GSM signal.
Cables cut and low battery alarm	It sends an alarm to the Operations Center if the main power supply is disconnected and / or if the vehicle battery voltage drops below a certain threshold.
Activation of outputs	From the Operations Center: specific action requested by the operator. Locally: local double block compliant with the European Directive.
Emergency alarm	By pressing the button, the device sends an SOS alarm to the Operations Center.
Maintenance	If in maintenance mode, the device sends alarms to the Operations Center according to the configuration. When the maintenance mode begins or ends it is indicated in the Operations Center and can be requested from the Center itself or from the web application.
Double Keep Alive	Message sent periodically to the Operations Center, regardless of vehicle operation and / or only with the key off.
Alarm for unauthorized start-up	The device sends a warning to the Operations Center if the engine is turned on without authentication. The operator of the Center will start tracking the device and will contact the Customer for all necessary checks.
Robbery alarm	The device sends a report to the operations center when the transponder authentication is lost while the key is active. This feature is useful in case of car theft.
Emergency start alarm	By pressing the hidden button, the device allows the vehicle to depart even without authentication,but sends a warning to the Operations Center.
Low device battery	If the backup battery of the device is below the minimum threshold, the device sends an alert to the Operations Center.
Perimeter alarm	One or more switches can be connected to appropriate inputs on the device. In this way the Device, in the absence of authentication, will send a warning to the Operations Center when the switch is opened.
Volumetric alarm	Through the Hyper frequency module, the Device, when authentication is not present, is able to detect potential intrusions into the vehicle and send a warning to the Operations Center.

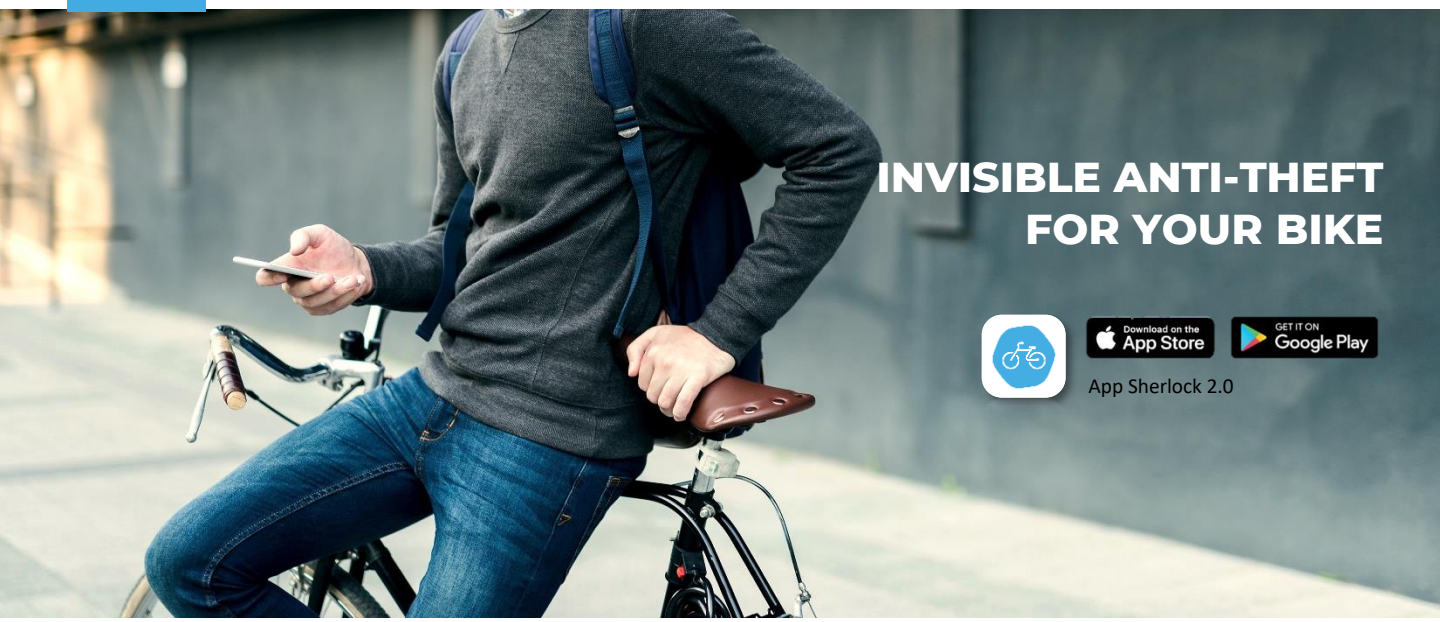
Functional features

Reporting of operational states	Through diagnostic LEDs and buzzer.
Speed threshold alarm	The device sends an alarm whenever a speed threshold (configurable) is exceeded and when the threshold returns to normal.
Stop / movement alarm	The device sends an alarm whenever it remains stationary with the engine running for a long time (configurable) and when it moves again.
Driving Style	By connecting to the FMS port or through FMS devices, the data necessary to determine the driver's driving style and fuel consumption are acquired and aggregated.
Virtual Key	Through the accelerometric sensor, the GPS and the vehicle battery voltage it is possible to determine the ignition status of the engine without physical connection to the ignition panel signal.
UPD and SMS trasmission	It is possible to configure alarms to the Operations Center to be transmitted in UDP mode and as an SMS backup in the absence of a connection to the main line.
Display/Navigator	The device manages the communication between the Operations Center and a display with navigation functions and Missions / Messages / Notifications / Traffic Info functions.
Diagnostic events	The device records and transmits various information relating to its operation (power supply voltages, GPS signal quality and number of satellites received, GPS antenna status, backup battery voltage and temperature, etc.).
Auto download history	Recording of events in the internal memory and subsequent download to the Operational Center for every N stored samples.
Temperature registration	Recording of the temperature of 4 probes and transmission to the Operations Center of the alarms in case of exceeding the set thresholds. The probes can be wired or Wireless BLE
Excise data registration	Storage and transmission of the data necessary for the recovery of excise duties for power take-offs.
External battery charger management	Allows you to manage the charge of an external lead-acid battery.
Chronotachograph	Data download of the Tachograph Memory and of the Driver Card with remote authentication or with authentication on board using the Company Card. Real-time driver status report.
Trailer identification	Identifies and manages the attachment / disconnection of trailers with active BLE Tag.
Container detection	Transport detection of roll-off lifts and containers with UHF passive tags
Detection for waste collection	LF and / or UHF passive tagged waste container detection
Humidity sensor	Humidity and temperature monitoring of 1 digital probe with timed recording and transmission of alarms for over-thresholds.
TPMS system	Tire temperature and pressure monitoring with timed recording and related alarms.
Urban hygiene equipment diagnostics	The device sends a report of diagnostic events related to the equipment of the trucks used for urban hygiene.
Weighing System	Monitoring of the transported weight with timed recording and transmission of alarms.
Fuel dispenser	Authorization for refueling with recognition of the authorized driver and vehicle. Indication of the amount of fuel delivered into the vehicle and the level of fuel left in the pump tank

Technical features

Microprocessor	ARM Cortex M4, 32-bit, 384 KB of RAM, 1 MB of program flash memory, 64 MB of external flash, 2 KB of eeprom
GSM module	Quectel EG91-EX, 4G LTE Cat1, 3G UMTS/HSPA(+) and 2G GSM/GPRS/EDGE
GNSS module	uBlox ZOE M8Q, GPS/GLONASS /GALILEO/ EGNOS
Accelerometer + Gyroscope	3 axis LSM6DS3 ± 2 / ± 4 / ± 8 / ± 16g + integrated gyroscope ± 125 / ± 245 / ± 500 / ± 1000 / ± 2000 dps 3 axis LIS2DW12 ± 2 / ± 4 / ± 8 / ± 16g
Bluetooth BLE module	Bluetooth BLE 4.2
GSM antenna	Integrated, Pentaband
GPS antenna	Integrated patch antenna (external antenna available as an option)
Serials interfaces	3 RS 232 serial ports / 1 RS 485 serial port / 1 Onewire serial port / D8 serial port
Inputs	4 GP analog inputs / 2 GP positive and negative digital inputs / 2 GP AI-O (analog input and output) / 1 GP pulse counter input / 1 digital input with LED for help button / 1 digital input for hopping code
Outputs	1 Relay output for motor block - 2 MOSFET O.D. outputs
Backup battery	1000 mAh NiMH rechargeable
Diagnostics LED	Bicolor (Red, green)
Power supply	7 ÷ 36 Vdc
Operating temperature	-20 ÷ +85°C
External dimensions	120x105x45 mm (LxWxH)
Communication to the Operations Centre	Through LTE with UDP / IP protocol or via SMS
Installation	Fixed installed and concealed on board
Test and activation	Through LTE call from the Operations Center
FW update	OTA through LTE
CAN interface	2 High Speed ports
Archives memory	More than 30.000
Temperature interface	4 probes for digital temperature sensor
Certifications	CE, ECE-R97, 79/56

Sherlock 2.0

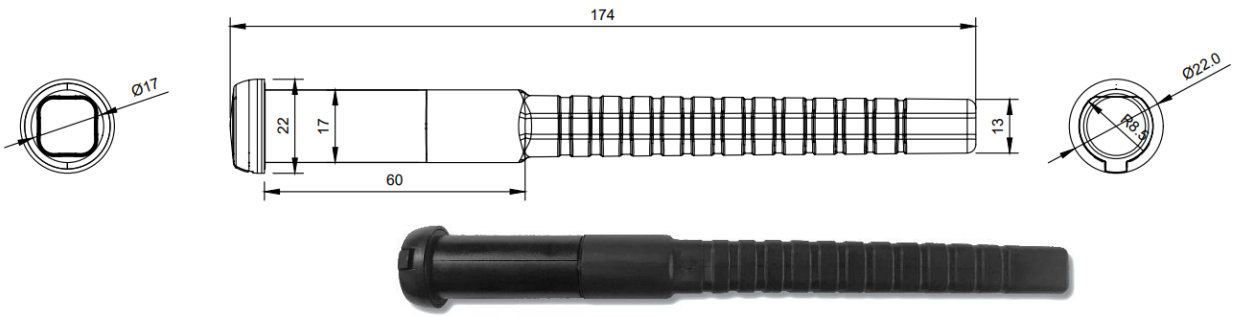


Device Functionality

Sherlock 2.0 is the new generation IoT device that allows you to monitor your bike and track its movements in case of theft. Thanks to its small diameter and low consumption, it can be hidden inside the handlebar and activated / deactivated (Lock / Unlock) through its Mobile App, as if it were a "virtual lock". Once activated, any suspicious movement is detected by the device and communicated to the Mobile App through which it will be possible to track all movements, until the bike is found. In addition, a 'tracking code' will be generated to share rescue activities.

- Easy concealment
- Long-lasting, rechargeable battery
- GNSS / LTE localization and Narrow Band communication
  low consumption
- Dual Mode: Anti-theft and Mobility
  (configurable tracking frequency)

The Device



Functional characteristics

Concealment	Inside the bike / e-bike handlebar or in other positions that guarantee invisibility. More information can be found in the User Manual
Anti-theft mode	In Anti-theft mode, the device remains in stand-by (low consumption) until it wakes up following motion detection by the accelerometric sensor. After the validation of the event, the device begins its "theft tracking". The positions transmitted by the device can be viewed on the Mobile App or on a website with authorized access using the "tracking code" generated by the system.
Alarm events	In case of detection by the accelerometric sensor of a movement higher than a preset threshold, the alarm is activated. The user receives an immediate push notification on their Mobile App.
Theft tracking	Position sending with frequency depending on the state of battery charge
Mobility mode	In Mobility mode, the device is always active (high consumption) and begins its "tracking mobility". The positions transmitted by the device can be viewed on the Mobile App
Mobility tracking	Position sending with configurable frequency. Frequency configurable by the user via Mobile App
LTE network registration	Immediate recording in case of alarm event detection.
Location	Use of GPS / GNSS in mobility / theft tracking mode. LTE triangulation support
Local control	Mobile App (Sherlock) • Theft Tracking frequency, depending on the state of battery charge • Mobility Tracking frequency, configurable from Mobile APP • Lock/Unlock
Remote control	Mobile App “rent” • Lock
Operational autonomy	Long-lasting batteries
Reload	Via USB Type-C connector

Technical features

Microprocessor	ARM Cortex M0 + ARM Cortex M4
Communication module	LTE NB2/CatM1, SIM on Chip, Antenna Penta Band
GNSS	GPS / GLONASS / BeiDou / Galileo, Ceramic Antenna Chip
Interface	LED, USB Type C charging connector
Internal sensors	High sensitivity triaxial accelerometer
Power supply	LI-ION 11.1 V, 200 mAh rechargeable battery
Charging method	USB port - full charging time 2 hours
Power supply control	External battery charger (not included)
Case	ABS and flexible rubber. Splash and Dust Resistant
Operating temperature	-10°C ÷ +60°C
Size	Front cap: diameter 17 mm - radius 8.5 mm; Rigid central body: 60 mm x 17 mm; Head: max diameter 22 mm x h 7 mm; Flexible Body: side 13 mm with rounded corners x h 107 mm.
Weight	50 g
Installation	Insertion in the handlebar of the bike, or hidden in the case of precious objects
Omologations	CE, FCC
Switch on the device	Always on
User interface	Mobile application available on IOS 10.0 or higher, Android 6.0 or higher
Service activation	By reading data matrix from a mobile application
Accessories	Twin camouflage cap and micro USB charging cable

Awake

Concept, project to be made

Wrist wearable device to prevent sleep apnea while driving

Functionalities

It is a wrist wearable device, which can detect sleepiness and predict drowsiness several minutes in advance. This is possible thanks to a software algorithm, based on the detection and intelligent elaboration of photoplethysmographic data acquired through a dedicated PPG sensor. If a sleepy state is identified with the prediction of an upcoming sleepiness, the device will send an alarm signal, via the BLE connection, to the connected device or smartphone. In addition, it will emit a vibration to alert the user to the potential dangerous situation.

- Bluetooth BLE 5.0
- USB
- Biometric data
- Fleet Management
- Time/Date
- Battery Management

Concept, project to be made

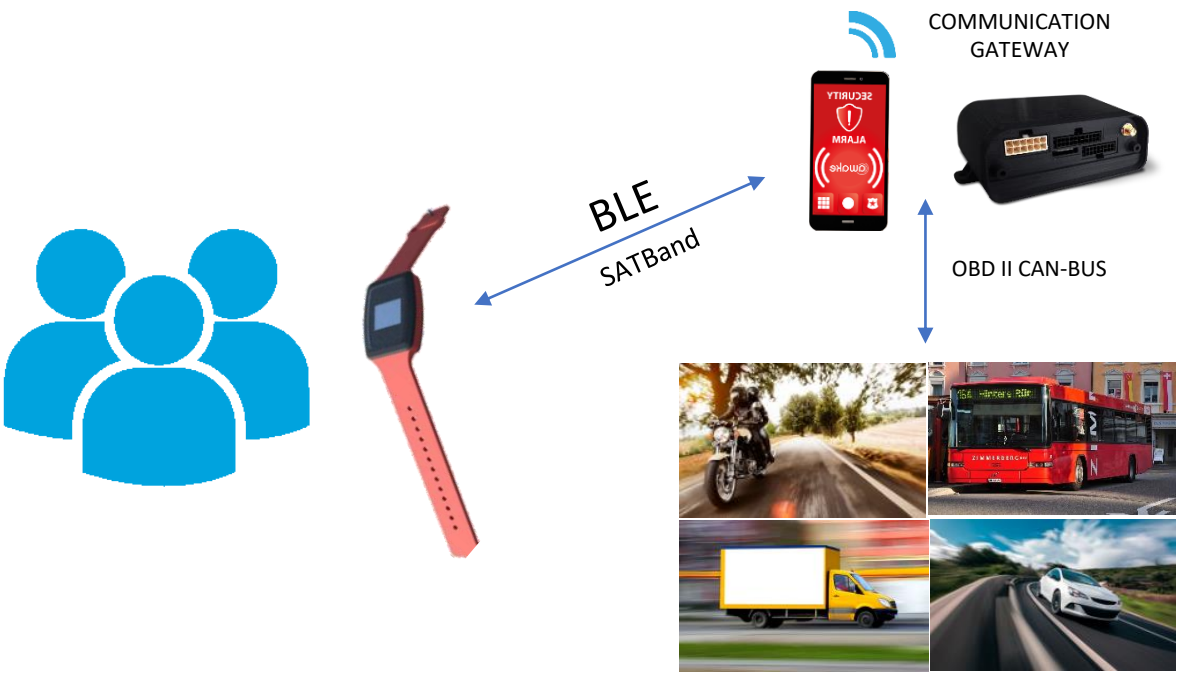
Processing of biometric parameters (partner's proprietary algorithm)

The device is set up, as processing and storage power, to manage new algorithms for the detection and interpretation of biometric parameters, for example:

Blood Pressure
Blood Oxygen Saturation
Heartbeat
Temperature

Human Machine Interface (HMI)

Graphic display	Displaying information about functionalities
Date & Time	Displaying of time and day. Synchronization can take place, when available, via connection with the smartphone/device to which it is associated.
Smart notifications	Receiving and displaying notifications and alerts from the smartphone affiliated
Area Touch	The display can simulate buttons and has a slider with two scrolling directions to move between menus and pages, providing touch-type interactivity.



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