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(54) Device installable in a vehicle for generating a rescue request and automatic sending of information on the geographical position of the vehicle

In ein Kraftfahrzeug einbaubare Vorrichtung zum Generieren eines Not-Signals und zum Senden der geografischen Positions-Informationen des Fahrzeuges

Dispositif installable dans un véhicule pour la génération d'un signal d'alerte et l'envoi des informations de la position géographique du véhicule

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Description

[0001] The present invention relates to the sector of motor vehicles, both for private use and for commercial or public use. More specifically, the invention regards an apparatus that can be easily installed on currently existing vehicles, which is designed to provide the occupants with the possibility of making a request for rescue for medical care and/or mechanical assistance, both upon command and automatically in the event of accident, providing autonomously all the identifier information regarding the vehicle and its position to a purposely provided operating centre.

State of the art

[0002] Many devices have existed for some time for location and transmission of information on the state of vehicles, which use satellite systems (GPS) for location of the vehicle, accelerometric systems for determining possible collisions of the vehicle, and wireless-communication systems (typically for cellphones, for example, GSM) for sending the data on the position of the vehicle and information on possible accidents.

[0003] Some of these also enable direct communication with the occupants of the vehicle, either on the initiative of a centre that provides the service or on the initiative of the occupants themselves, for requests for rescue or in general for handling emergencies.

[0004] In these known devices, handling of emergencies or rescue is typically a function accessory to other main functions, such as, for example: antitheft functions, functions of tracking or management of the vehicles, or else collection of data of interest for the insurance companies.

[0005] The European Community has launched a project, referred to as "e-call", having the purpose of determining European standards for sending warnings for rescue either automatically (determining any possible impact with accelerometric systems and in particular surveying the possible activation of airbag devices) and on the initiative of the occupants of the vehicle itself.

[0006] These standards cover both the data that have to be transmitted and their format and the phone numbers to which these data are to be sent, this to enable a uniform coverage of the service all over Europe.

[0007] In addition, starting from 2011 all the vehicles sold in Europe will have to afford said function as option on new vehicles. These standards in fact refer to a device supplied as original equipment, integrated in the electronic system of the automobile, which, by determining via activation of the airbag a possible collision and the position of the vehicle either by means of a GPS detector supplied standard (as is already occurring in the case of higher-range vehicles) or else by means of a detector specifically integrated in the device itself, will be able to forward a request for help which can be handled in all European countries.

[0008] Up to now, instead, no device is known specifically oriented to the safety of the occupants of the vehicle and devised for being applied on already existing vehicles that are not equipped with the European system described above, said vehicles being very numerous in so far as the device meeting the European standard, as has been said, will be available only optionally and starting from year 2011.

[0009] The document US2002/0037707 A1 discloses the preamble of claim 1.

Description of the invention

[0010] The main purpose of the present invention according to the claim 1 is hence to provide a device presenting the peculiarities listed below.

- It is easy to install: it is sufficient to connect the supply (+12 or +24 V) and apply the self-adhesive device in a convenient and stable position on the windscreen.
- It is all-inclusive: it poses no requirements on equipment of the vehicle, such as, for example, the presence of airbags, satellite navigator, handsfree system, or the like.
- It can be set in conditions of minimum consumption when the vehicle is not moving thus absorbing the minimum energy from the battery of the vehicle and hence not limiting the duration in the time when the vehicle is stationary.
- It can enable other authorized persons (for example, the parents of the occupants of the vehicle) to locate the vehicle at any moment (consider, for example, concerns linked to the phenomenon of "Saturday night out": it is possible to have the confirmation that the vehicle has not been involved in an accident and know exactly where it is).
- It is preferably provided with two pushbuttons, one for call for rescue, the other for providing services useful for the driver (information on traffic or on the state of the road and the weather).
- It can receive calls from the centre (which knows the position of the vehicle) for "proactive" services, whereby the centre issues an advance warning on any problems or risks that may be present on the road to be travelled along.
- It transmits the data both via the voice channel (guaranteeing a maximum time of 40 s for the response from the centre) and by means of SMS (this being a system that is more robust than the former even in areas with poor GSM

coverage, albeit with times for delivery of the data that are longer and less certain). The device according to invention waits for confirmation from the centre of the data transmitted and repeats the event up to a maximum of three times in the case of lack of confirmation.

- It can provide the function of interactive Telepass with the operating centre in order to detect that the vehicle has passed through a toll gate to enter a motorway or exit therefrom in order to be able to provide specific services for the user according to whether he is travelling on the motorway or on normal roads.

[0011] The above has been obtained, according to the invention, by providing a device that can be installed on board a vehicle, which is designed to enable the occupants to use the services for rescue provided by the operating centre with which it communicates, the device comprising: wireless phone means for communication with an operating centre for supply of information and/or for rescue, means for reception of GPS signals, handsfree communication means, and means for detecting whether the vehicle has suffered an accident.

[0012] According to a peculiar characteristic of the invention, the rescue services are requested:

- automatically (by means of an internal crash sensor) in the case of an accident that has some degree of seriousness;
- manually (by pressing the SOS pushbutton).

[0013] In both cases, the invention forwards a request for rescue to the operating centre.

[0014] A better understanding of the invention will be obtained from the ensuing detailed description and with reference to the figures of the attached drawings, which illustrate, purely by way of non-limiting example, some preferred embodiments and variants thereof.

[0015] In the drawings:

Figure 1A is a block diagram of a first embodiment of the device according to the present invention;
Figure 1B, which is similar to the previous one, is a more detailed block diagram;
Figure 2 shows the principle of operation of the present invention;
Figure 3 shows an example of embodiment of the device to be installed on board the vehicle;
Figures 4A and 4B, which are similar to Figure 1A and 1B, regard a second embodiment of the invention, which comprises the Telepass function;
Figure 5 shows a variant of the invention having a particular shape; and
Figure 6 shows the device of Figure 5 whilst it is being located in the passenger compartment of a vehicle.

[0016] According to the invention, the transmission of the request for rescue, whether it be automatic via crash sensors or manual via a first priority emergency pushbutton, initially regards sending of data: information is sent regarding the vehicle, its position, and the type of request (automatic in the case of an accident and/or manual via pushbutton). Immediately after, the communication passes onto the audio channel.

[0017] The operator of the operating centre is able to display the data sent and set up a telephone contact with the persons on board the vehicle. This enables verification of the conditions of the persons and agreement upon the procedure and type of rescue operation.

[0018] A battery integrated in the device guarantees operation of the apparatus even when, during the accident, the main battery of the vehicle has been destroyed.

[0019] The second pushbutton enables interaction with the centre for provision of services, for example information services (Figure 2).

[0020] Technical characteristics of an experimental prototype

CASE:	High-strength ABS;
GSM/GPRS MODULE:	4-BAND TELIT GE863-GPS. Phyton engine GPRS Class 10;
GPS MODULE:	20 fast-tracking channels, indoor navigation capability;
CRASH SENSOR:	Three-axial accelerometer with end-of-scale of 10 g;
VOICE COMMUNICAT.:	Handsfree with integrated loudspeaker and microphone;
WARNINGS:	Three LEDs and acoustic warnings for warnings directed to the user and diagnostics;
BACK-UP:	Lithium back-up battery for guaranteeing operation for at least 15 minutes;
POWER SUPPLY:	+10 V to +16 V; protected in compliance with ISO 7637;
ABSORPTIONS:	Normal operation: ~ 20 mA Alarm operation: ~ 350 mA

(continued)

	Stand-by: ~ 3 mA;
ENCUMBRANCE (maximum):	135x70x30 mm (LxWxH);
TEMPERATURE:	Operation in normal conditions: -20°C; + 60°C; Operation in extreme conditions: -30°C; +80°C;
INSTALLATION:	Minimal installation: • connection of the two supply wires, • gluing of the device on the top part of the vehicle windscreen, • no installation of antennas, • activation in operating centre.

[0021] The device described, which can be installed on board an already existing vehicle, enables the driver and the passengers to use the rescue services, which will be provided by an operating centre with which it can communicate either automatically (following upon an accident) or manually (following upon operation of a purposely provided push-button).

[0022] The invention is designed to enable transmission of data and voice, preferably through a single channel. It is also possible to envisage operation through two separate channels, by providing a switch between the two channels that is sufficiently fast and reliable.

[0023] According to the invention, it is preferable for the GSM antenna and the GPS antenna to be integrated inside the device itself.

[0024] The fundamental requirements to guarantee use of the channels and forwarding of the warnings to the operating centre are:

- Guarantee of European roaming
- Use of the GSM/GPRS standard
- Practically simultaneous use of voice and data
- Safe mechanism of transport and routing

[0025] In the event of an accident involving the vehicle, the device according to the present invention forwards a request for rescue to the operating centre:

- automatically (by means of the internal crash sensor); or else
- manually (by the driver pressing a pushbutton).

[0026] As has already been mentioned, the transmission starts with sending of data comprising information on the vehicle, its position, and the data characterizing the accident.

[0027] Immediately after, the communication passes onto the audio channel.

[0028] The operating centre is then able to display the data sent and set up a contact with the driver so as to agree, where possible and necessary, upon the modes of rescue, and hence co-ordinate sending of rescue squads.

[0029] Figure 2 summarizes schematically the main functionalities of the invention.

[0030] With reference to Figure 1A, the device basically comprises:

- a GSM/GPRS communication module and corresponding antenna
- a module for receiving the signals of the GPS system and corresponding antenna
- a crash sensor
- a handsfree system
- a loudspeaker
- a microphone
- a pushbutton for manual calls
- a set of LEDs and buzzers
- a backup battery
- the necessary electronics for supply and control, preferably comprising a controller or microcontroller
- a second optional pushbutton, for providing information services.

[0031] According to a peculiar characteristic of the present invention, the device can be easily installed inside the passenger compartment of the vehicle. The pushbutton for manual calls, the warning LEDs, and the microphone are

preferably provided in the front part, at the centre of the dashboard or in the proximity of the driver so as to facilitate the call operations.

[0032] The device according to the invention can be connected to the vehicle through two supply conductors of the vehicle (battery positive and negative), and possibly also via an optional conductor for supply of the instrument panel of the vehicle.

[0033] It should be noted that it is preferable to envisage a backup battery for enabling sending of the data to the operating centre and dialogue with the operator of the centre, for at least 15 minutes, even in the case where, during the accident, the connection with the main battery of the vehicle fails.

[0034] The invention also comprises means for detection of the crash event. Said means are based simply upon control of the threshold of the value of the acceleration that the device (and hence the vehicle on which it is installed) undergoes. If the acceleration is greater than a pre-set threshold value (for example, $2g \sim 20\ m/s^2$), then a crash event is detected, which activates the communication with the operating centre.

[0035] Said communication with the operating centre, in the case of activation of the device, occurs preferably within 40 s, where said time is calculated starting from detection of the accident or pressure applied on the pushbutton of request for rescue.

[0036] Upon start of the call, the following data will be transferred to the operating centre:

- data regarding the call;
- data identifying the vehicle;
- data regarding the position of the vehicle.

[0037] The set of the data to be transferred to the centre has preferably the format indicated in Table 1 below.

TABLE 1

Item No.	Name	Dim.	Type	Unit		Description
1	Control	1 byte	Integer		M	Bit 7: 1 = Automatic activation Bit 6: 1 = Manual activation Bit 5: 1 = Test call Bit 4: 1 = Invalid position Bit 3: SPARE Bit 2: SPARE Bit 1: SPARE Bit 0: SPARE
2	Vehicle identifier	20 bytes	String		M	VIN according to ISO3779
3	Time stamp	4 bytes	Integer	UTC sec	M	Timestamp of the accident event
4	Location	4 bytes	Integer	milliarcsec	M	Latitude position (WGS84)
		4 bytes	Integer	milliarcsec	M	Longitude position (WGS84)
		1 byte	Integer	degree	M	Travelling direction (based on the last 3 positions)
5	Service Provider	4 bytes	Integer	IPV4	O	Service-Provider IP Address
6	Optional data	106 bytes	String	T.B.D.	O	Further data on accident event: e.g., characteristics of impact, position of vehicle, etc.
M = Mandatory O = Optional						

[0038] The total number of bytes to be transmitted in the worst case should not exceed 140 bytes.

[0039] As regards the position transmitted in the event of accident, this will be in any case the current position of the vehicle, even in the case where, on account, for example, of the vehicle turning over, the GPS data were no longer available. In this case, the not reliability of the position is signalled (bit 4 of the first data byte), and the last position detected in a valid way is transmitted within the Optional Data.

[0040] The pushbutton for sending a request for rescue has ample dimensions, and enables manual sending of calls. Preferably at least three LEDs are present for possible warnings to the user: both ones regarding the state of the device (including the GSM and GPS coverage) and ones regarding the state of the call in progress (Figure 3).

[0041] The invention is provided with handsfree communication means that enable the user to dialogue with the operating centre without having to use his or her hands and without having necessarily to approach the device itself.

[0042] Moreover present is a buzzer for signalling some information of major interest, such as, for example, a rescue call having been sent, etc. Operation of the buzzer is preferably obtained by sending a tone on the loudspeaker of the handsfree device.

[0043] A second embodiment, shown in Figures 4A and 4B, differs from the first embodiment described so far substantially in that it comprises a Telepass module constituted by an integrated Telepass device connected to the microcontroller, preferably by means of a serial port.

[0044] The Telepass device is preferably supplied by an internal battery.

[0045] It should be noted that in this second embodiment of the invention, the presence of the integrated Telepass module is not simply a design choice that is limited to providing the Telepass function already supplied by known Telepasses, but enables provision of additional services that are possible precisely because the device is able to detect whether the vehicle is on a motorway and on which motorway. In addition, according to the stretch of motorway involved, the operating centre may manage a possible rescue request via the motorway network itself by sending a warning directly to the body responsible for motorway, without the user having to abandon the vehicle to reach the nearest SOS post.

[0046] Also the services for information on the traffic may be specialized to a significant extent using the information proper to the motorway network specific for the stretch of road travelled along and the direction in which the user is travelling, thus overcoming the current imprecisions of GPS.

[0047] A variant of the invention, shown in Figures 5 and 6, is characterized by a peculiar shape of the body of the device, which in this case is provided with atop curvature specifically studied to adapt it to the curvature of the various windscreens in the case where it is intended, as is preferable, to install it in contact with the top edge of the windscreen.

[0048] In addition, the body of the device has two lateral flanges where the microphone and the loudspeaker of the handsfree device are respectively housed, which in this way are kept at a distance from one another, enabling a clear conversation preventing the Larsen effect even in a noisy environment (consider, for example, an accident occurring in bad weather conditions, people who are speaking aloud or are shouting, the radio that has remained on, etc.).

[0049] Moreover provided is a rear protuberance purposely studied for adapting to the different curvatures of the windscreen, which, thanks to its limited horizontal extension, enables an excellent adherence maintaining the flanges at a distance from the windscreen itself.

[0050] Said protuberances can be provided with appropriate means for engagement to a purposely provided slide that can be fixed to the vehicle, which enables the device to be rendered removable.

[0051] The pushbuttons are set in a position corresponding to the rear protuberance thus preventing the device from tilting when pressure is applied on the pushbuttons and providing, instead, an appropriate resting base when pressure is applied.

Claims

1. A device that can be installed on board a vehicle, for rescue request and automatic sending of information on the geographical position of the vehicle, said device comprising in combination:

   - GSM/GPRS communication means and corresponding antenna
   - means for receiving the signals of the GPS system and corresponding antenna
   - a three-axial crash sensor
   - handsfree communication means
   - at least one loudspeaker
   - at least one microphone
   - at least one pushbutton for manual calls
   - electronic components necessary for supply and control comprising at least one controller or microcontroller
   - a case;

   said at least one pushbutton for manual calls is accessible to the user;

said GSM/GPRS communication means being designed to communicate with a purposely provided operating centre designed to provide the rescue service and/or sending of useful information; wherein the rescue call starts with sending of data comprising information regarding the vehicle, its position and the data characterizing the accident, after which the communication passes onto the audio channel ; the device being **characterised in that** it is an all-inclusive device; wherein said GSM/ GPRS communication means and corresponding antenna, means for receiving the signals of the GPS system and corresponding antenna, three-axial crash sensor, hands-free communication means, loudspeaker, microphone, at least one push-button and electronic components being all accommodated into said case; said case is provided with self-adhesive fastening means for enabling installation thereof in a convenient and stable position on the windscreen.

2. The device according to the preceding claim, **characterized in that** it further comprises one or more LEDs and/or a buzzer and/or a backup battery.

3. The device according to the preceding claim, **characterized in that** it is designed to be installed in the passenger compartment of a vehicle and to be connected to the electrical wiring system of the vehicle by means of at least two purposely provided cables: a supply cable (+12 or +24 V) and a cable that can be connected to ground.

4. The device according to the preceding claim, **characterized in that** it is provided with self-adhesive means for enabling installation thereof in a convenient and stable position on the windscreen.

5. The device according to Claim 1, **characterized in that** said control electronics is designed to modify its energy absorption when the vehicle is not travelling; thus obtaining limitation of the energy absorption by the battery of the vehicle.

6. The device according to Claim 1, **characterized in that** said control electronics is designed to enable location of the vehicle when it is stationary.

7. The device according to Claim 1, **characterized in that** it comprises two pushbuttons for manual calls: one for rescue calls and the other for providing services and/or useful information to the driver.

8. The device according to Claim 1, **characterized in that** said control electronics comprises means for receiving calls from the operating centre.

9. The device according to Claim 1, **characterized in that** said control electronics is designed to transmit the data both via the voice channel and by means of SMS, wait for confirmation by the operating centre of receipt of the data transmitted, make up to at least three attempts in the event of lack of confirmation.

10. The device according to Claim 1, **characterized in that** the total amount of bytes to be transmitted in the worst case is equal to or less than 140 bytes.

11. The device according to Claim 1, **characterized in that** the position transmitted in the case of accident is in any case the current position of the vehicle, even in the event where, on account for example of the vehicle turning over, the GPS data were no longer available; in said case there being signalled non-reliability of the position (bit 4 of the first data byte) and there being transmitted the last position detected in a valid way.

12. The device according to Claim 1, **characterized in that** it further comprises an integrated Telepass module, which is connected to the microcontroller via serial connection or other connection of a known type.

13. The device according to Claim 1, **characterized in that** it has a body provided with lateral flanges designed to keep it at an appropriate distance from the microphone and the loudspeaker of the handsfree device, enabling a clear conversation free from the Larsen effect even in noisy environment.

14. The device according to the preceding claim, **characterized in that** a rear protuberance is provided, purposely designed for adapting to the different curvatures of the windscreen and, thanks to its limited horizontal extension, for enabling an excellent adherence keeping the flaps at a distance from the windscreen itself.

15. The device according to the preceding claim, **characterized in that** said pushbuttons for manual calls are set in a position corresponding to the rear protuberance, thus preventing the device from tilting when pressure is applied

on the pushbuttons and providing, instead, an appropriate resting base when pressure is applied.

16. The device according to Claim 1, **characterized in that** it has a body provided with a top curvature specifically designed to adapt it to the curvature of the various windscreens to facilitate installation thereof in contact with the top edge of the windscreen.

Patentansprüche

1. In ein Fahrzeug einbaubare Vorrichtung für eine Rettungsanforderung und zum automatischen Senden der geographischen Positionsinformationen des Fahrzeugs, wobei die Vorrichtung kombiniert Folgendes umfasst:

- GSM/GPRS-Datenübertragungsmittel und entsprechende Antenne
- Mittel zum Empfangen der Signale des GPS-Systems und entsprechende Antenne
- einen triaxialen Aufprallsensor
- Freisprechmittel
- mindestens einen Lautsprecher
- mindestens ein Mikrofon
- mindestens eine Taste für manuell ausgelöste Anrufe
- für Versorgung und Steuerung erforderliche elektronische Bauteile, die mindestens einen Controller oder Mikrocontroller umfassen,
- ein Gehäuse;

wobei die mindestens eine Taste für manuell ausgelöste Anrufe für den Benutzer zugänglich ist;
wobei die GSM/GPRS-Datenübertragungsmittel so ausgebildet sind, dass sie mit einer dafür vorgesehenen Einsatzzentrale kommunizieren, die so ausgebildet ist, dass sie für die Rettungsmaßnahmen sorgt und/oder nützliche Informationen sendet; wobei der Notruf mit dem Senden von Daten beginnt, die Informationen zum Fahrzeug, zu seiner Position und die den Unfall kennzeichnenden Daten umfassen, woraufhin die Kommunikation auf den Tonkanal wechselt; wobei die Vorrichtung **dadurch gekennzeichnet ist, dass** es sich um eine Komplettvorrichtung handelt; wobei die GSM/GPRS-Datenübertragungsmittel und die entsprechende Antenne, die Mittel zum Empfangen der Signale des GPS-Systems und die entsprechende Antenne, der triaxiale Aufprallsensor, die Freisprechmittel, der Lautsprecher, das Mikrofon, die mindestens eine Taste und die elektronischen Bauteile alle in dem Gehäuse aufgenommen sind; wobei das Gehäuse mit selbstklebenden Befestigungsmitteln versehen ist, damit es in einer passenden und stabilen Position an der Windschutzscheibe angebracht werden kann.

2. Vorrichtung nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** sie ferner eine oder mehrere LEDs und/oder einen Summer und/oder eine Reservebatterie umfasst.

3. Vorrichtung nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** sie dafür ausgebildet ist, im Fahrzeuginnenraum eines Fahrzeugs eingebaut und an das Bordnetz des Fahrzeugs mit mindestens zwei dafür vorgesehenen Kabeln angeschlossen zu werden: ein Zuleitungskabel (+12 oder +24 V) und ein Kabel, das an Masse angeschlossen werden kann.

4. Vorrichtung nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** sie mit selbstklebenden Mitteln zum Ermöglichen des Anbringens derselben in einer passenden und stabilen Position an der Windschutzscheibe versehen ist.

5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerelektronik so ausgebildet ist, dass sie ihre Energieaufnahme verändert, wenn das Fahrzeug nicht fährt; wodurch eine Begrenzung der Energieaufnahme durch die Batterie des Fahrzeugs erreicht wird.

6. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerelektronik so ausgebildet ist, dass sie eine Positionsbestimmung des Fahrzeugs ermöglicht, wenn es steht.

7. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie zwei Tasten für manuell ausgelöste Anrufe umfasst: eine für Notrufe und die andere zum Bereitstellen von Dienstleistungen und/oder nützlichen Informationen für den Fahrer.

8. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerelektronik Mittel zum Empfangen von Anrufen von der Einsatzzentrale umfasst.

9. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Steuerelektronik so ausgebildet ist, dass sie die Daten sowohl über den Sprachkanal als auch über SMS überträgt, auf eine Bestätigung der Einsatzzentrale über den Empfang der übertragenen Daten wartet und bei fehlender Bestätigung bis zu mindestens drei Versuche unternimmt.

10. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Gesamtmenge an zu übertragenden Bytes im ungünstigsten Fall kleiner gleich 140 Byte beträgt.

11. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die bei einem Unfall übertragene Position in jedem Fall die aktuelle Position des Fahrzeugs ist, selbst dann wenn, beispielsweise da das Fahrzeug umkippt, keine GPS-Daten mehr verfügbar waren; wobei in dem Fall eine Unzuverlässigkeit der Position (Bit 4 des ersten Datenbytes) gemeldet und die letzte gültig erfasste Position übertragen wird.

12. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie ferner ein integriertes Telepass-Modul umfasst, das über eine serielle Verbindung oder eine andere bekannte Verbindung mit dem Mikrocontroller verbunden ist.

13. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie einen Körper aufweist, der mit seitlich vorstehenden Elementen versehen ist, die so ausgebildet sind, dass er in einem geeigneten Abstand zum Mikrofon und zum Lautsprecher der Freisprechvorrichtung gehalten wird, wodurch eine gute Qualität der Unterhaltung ohne Larsen-Effekt sogar in einer lauten Umgebung ermöglicht wird.

14. Vorrichtung nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** eine rückseitige Vorwölbung vorgesehen ist, die dafür ausgebildet ist, sich an die verschiedenen Wölbungen der Windschutzscheibe anzupassen und aufgrund ihrer begrenzten waagerechten Ausdehnung ein ausgezeichnetes Haftvermögen zuzulassen, wobei die Klappen in einem Abstand zur Windschutzscheibe selbst gehalten werden.

15. Vorrichtung nach dem vorhergehenden Anspruch, **dadurch gekennzeichnet, dass** die Tasten für manuell ausgelöste Anrufe in einer Position entsprechend der rückseitigen Vorwölbung festgelegt sind, wodurch verhindert wird, dass die Vorrichtung kippt, wenn Druck auf die Tasten ausgeübt wird, und stattdessen eine geeignete Auflagefläche bereitgestellt wird, wenn Druck ausgeübt wird.

16. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** sie einen Körper aufweist, der mit einer oberen Krümmung versehen ist, die insbesondere so ausgebildet ist, dass sie an die Krümmung der verschiedenen Windschutzscheiben angepasst ist, damit ihre Anbringung in Berührung mit dem oberen Rand der Windschutzscheibe erleichtert wird.

Revendications

1. Dispositif pouvant être installé à bord d'un véhicule, pour la demande de sauvetage et l'envoi automatique d'informations concernant la position géographique du véhicule, ledit dispositif comprenant en combinaison :

   - des moyens de communication GSM/GPRS et une antenne correspondante
   - des moyens pour recevoir les signaux du système GPS et une antenne correspondante
   - un détecteur de collision triaxial
   - des moyens de communication mains libres
   - au moins un haut-parleur
   - au moins un microphone
   - au moins un bouton-poussoir pour appels manuels
   - des composants électroniques nécessaires pour l'alimentation et la commande, comprenant au moins un contrôleur ou microcontrôleur
   - un boîtier ;

   ledit au moins un bouton-poussoir pour appels manuels est accessible pour l'utilisateur ;
   lesdits moyens de communication GSM/GPRS étant conçus pour communiquer avec un centre opérationnel expressément prévu conçu pour fournir le service de sauvetage et/ou l'envoi d'informations utiles ; dans lequel

l'appel de sauvetage commence avec l'envoi de données comprenant des informations concernant le véhicule, sa position et les données caractérisant l'accident, après quoi la communication passe sur le canal audio ; le dispositif étant **caractérisé en ce qu'**il s'agit d'un dispositif tout inclus ; dans lequel lesdits moyens de communication GSM/GPRS et l'antenne correspondante, lesdits moyens pour recevoir les signaux du système GPS et l'antenne correspondante, ledit détecteur de collision triaxial, lesdits moyens de communication mains libres, ledit haut-parleur, ledit microphone, ledit au moins un bouton-poussoir et lesdits composants électroniques sont tous logés dans ledit boîtier ; ledit boîtier est muni de moyens de fixation autoadhésifs pour permettre son installation dans une position appropriée et stable sur le pare-brise.

2. Dispositif selon la revendication précédente, **caractérisé en ce qu'**il comprend en outre une ou plusieurs LED et/ou un avertisseur et/ou une batterie de secours.

3. Dispositif selon la revendication précédente, **caractérisé en ce qu'**il est conçu pour être installé dans l'habitacle d'un véhicule et pour être connecté au système de câblage électrique du véhicule au moyen d'au moins deux câbles spécifiquement prévus : un câble d'alimentation (+12 ou +24 V) et un câble qui peut être connecté à la masse.

4. Dispositif selon la revendication précédente, **caractérisé en ce qu'**il est muni de moyens autoadhésifs pour permettre son installation dans une position appropriée et stable sur le pare-brise.

5. Dispositif selon la revendication 1, **caractérisé en ce que** ladite électronique de commande est conçue pour modifier sa consommation d'énergie quand le véhicule ne se déplace pas ; en obtenant ainsi une limitation de la consommation d'énergie par la batterie du véhicule.

6. Dispositif selon la revendication 1, **caractérisé en ce que** ladite électronique de commande est conçue pour permettre une localisation du véhicule quand il est immobile.

7. Dispositif selon la revendication 1, **caractérisé en ce qu'**il comprend deux boutons-poussoirs pour appels manuels : un pour des appels de sauvetage et l'autre pour fournir des services et/ou des informations utiles pour le conducteur.

8. Dispositif selon la revendication 1, **caractérisé en ce que** ladite électronique de commande comprend des moyens pour recevoir des appels en provenance du centre opérationnel.

9. Dispositif selon la revendication 1, **caractérisé en ce que** ladite électronique de commande est conçue pour transmettre les données à la fois par le biais du canal vocal et au moyen de SMS, attendre une confirmation par le centre opérationnel de la réception des données transmises, effectuer jusqu'à au moins trois tentatives en cas d'absence de confirmation.

10. Dispositif selon la revendication 1, **caractérisé en ce que** le nombre total d'octets à transmettre dans le pire des cas est égal ou inférieur à 140 octets.

11. Dispositif selon la revendication 1, **caractérisé en ce que** la position transmise en cas d'accident est dans tous les cas la position actuelle du véhicule, même dans le cas où, en raison par exemple du renversement du véhicule, les données GPS ne seraient plus disponibles ; dans ledit cas, une non fiabilité de la position étant signalée (bit 4 du premier octet de données) et la dernière position détectée de manière valide étant transmise.

12. Dispositif selon la revendication 1, **caractérisé en ce qu'**il comprend en outre un module Telepass intégré, qui est connecté au microcontrôleur par le biais d'une connexion série ou autre connexion d'un type connu.

13. Dispositif selon la revendication 1, **caractérisé en ce qu'**il possède un corps muni de brides latérales conçues pour le maintenir à une distance appropriée du microphone et du haut-parleur du dispositif mains libres, en permettant une conversation claire dépourvue d'effet Larsen même dans un environnement bruyant.

14. Dispositif selon la revendication précédente, **caractérisé en ce qu'**une protubérance arrière est prévue, conçu spécifiquement pour l'adaptation aux différentes courbures du pare-brise et, grâce à son extension horizontale limitée, pour permettre une excellente adhérence en maintenant les rabats à une distance du pare-brise lui-même.

15. Dispositif selon la revendication précédente, **caractérisé en ce que** lesdits boutons-poussoirs pour appels manuels sont placés dans une position correspondant à la protubérance arrière, en empêchant ainsi le dispositif de basculer

quand une pression est appliquée sur les boutons-poussoirs et en fournissant, au contraire, une base d'appui appropriée quand la pression est appliquée.

16. Dispositif selon la revendication 1, **caractérisé en ce qu'**il possède un corps pourvu d'une courbure supérieure spécifiquement conçue pour l'adapter à la courbure des différents pare-brises pour faciliter son installation en contact avec le bord supérieur du pare-brise.

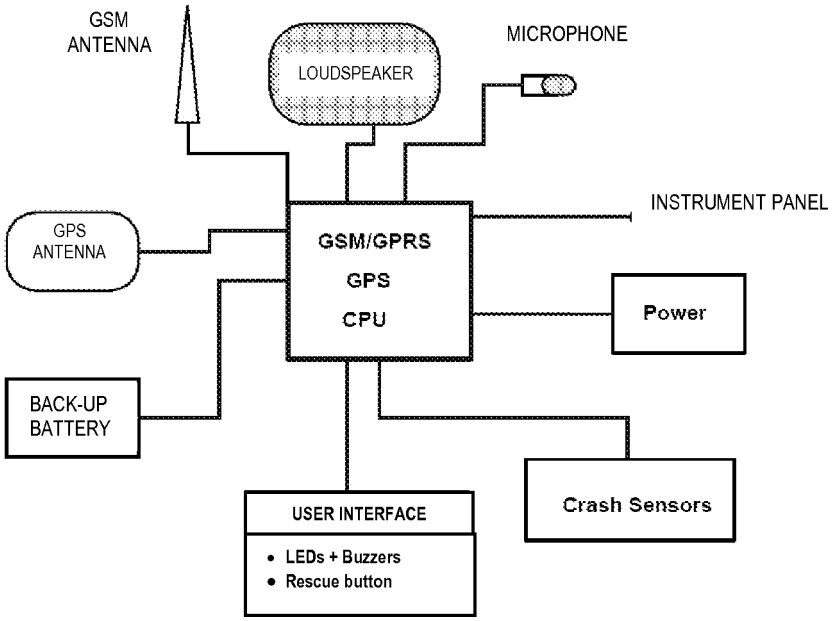

GSM
ANTENNA
LOUDSPEAKER
MICROPHONE
INSTRUMENT PANEL
GPS
ANTENNA
GSM/GPRS
GPS
CPU
Power
BACK-UP
BATTERY
USER INTERFACE
• LEDs + Buzzers
• Rescue button
Crash Sensors

FIG. 1A

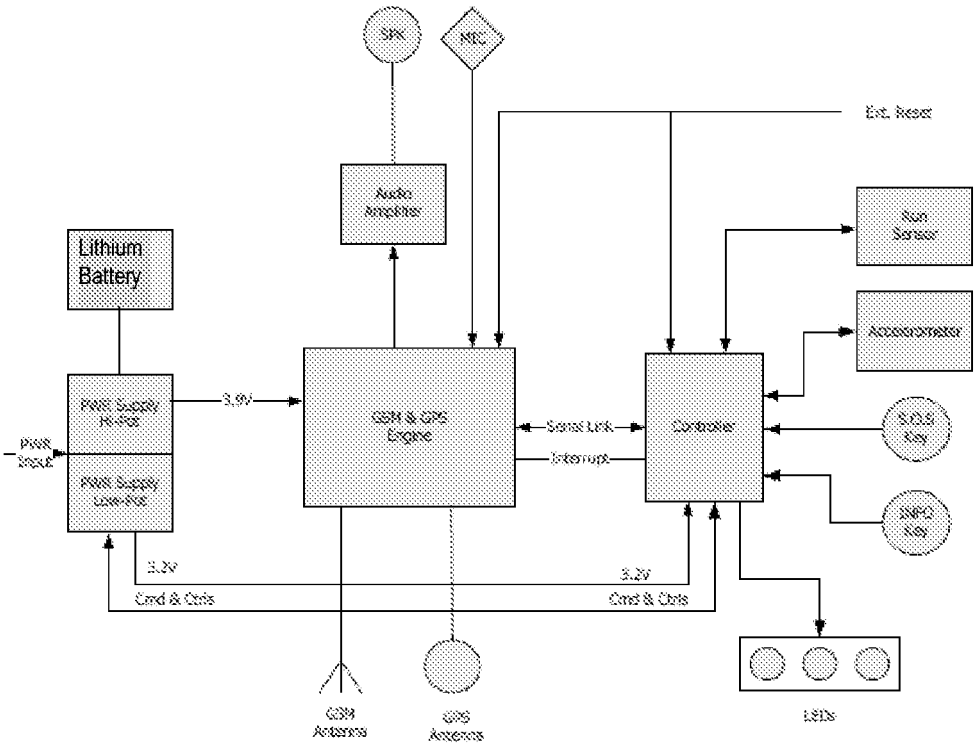

SPK
MIC
Ext. Reset
Audio Amplifier
Lithium Battery
Sun Sensor
Accelerometer
Power Supply Hi-Pwr
Power Supply Low-Pwr
3.9V
GSM & GPS Engine
Serial Link
Interrupt
Controller
SOS Key
INFO Key
3.3V
Cmd & Ctrls
3.3V
Cmd & Ctrls
GSM Antenna
GPS Antenna
LEDs

FIG. 1B

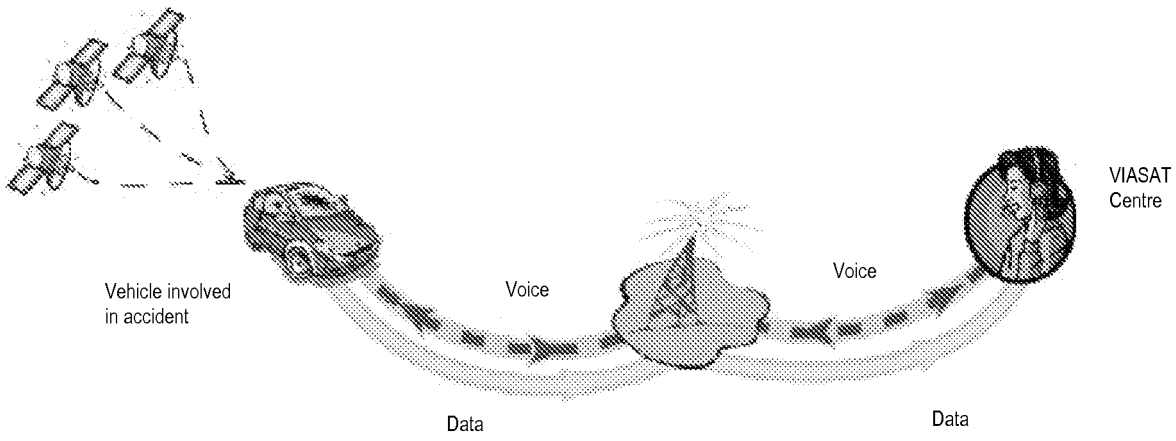

Vehicle involved
in accident
Voice
Voice
VIASAT
Centre
Data
Data

FIG. 2


ON
CALL
SOS

FIG. 3

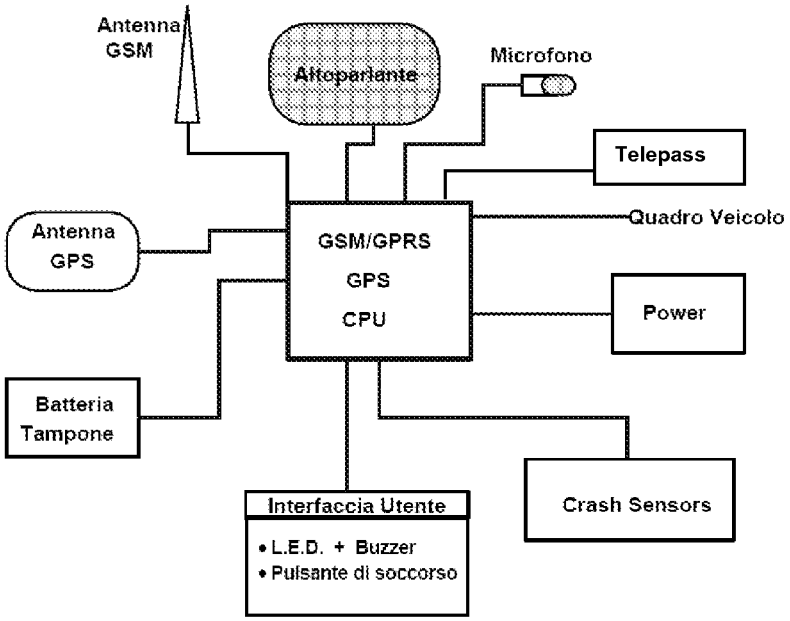

Antenna GSM
Altoparlante
Microfono
Telepass
Antenna GPS
GSM/GPRS
GPS
CPU
Quadro Veicolo
Power
Batteria Tampone
Crash Sensors
Interfaccia Utente
• L.E.D. + Buzzer
• Pulsante di soccorso

FIG. 4A

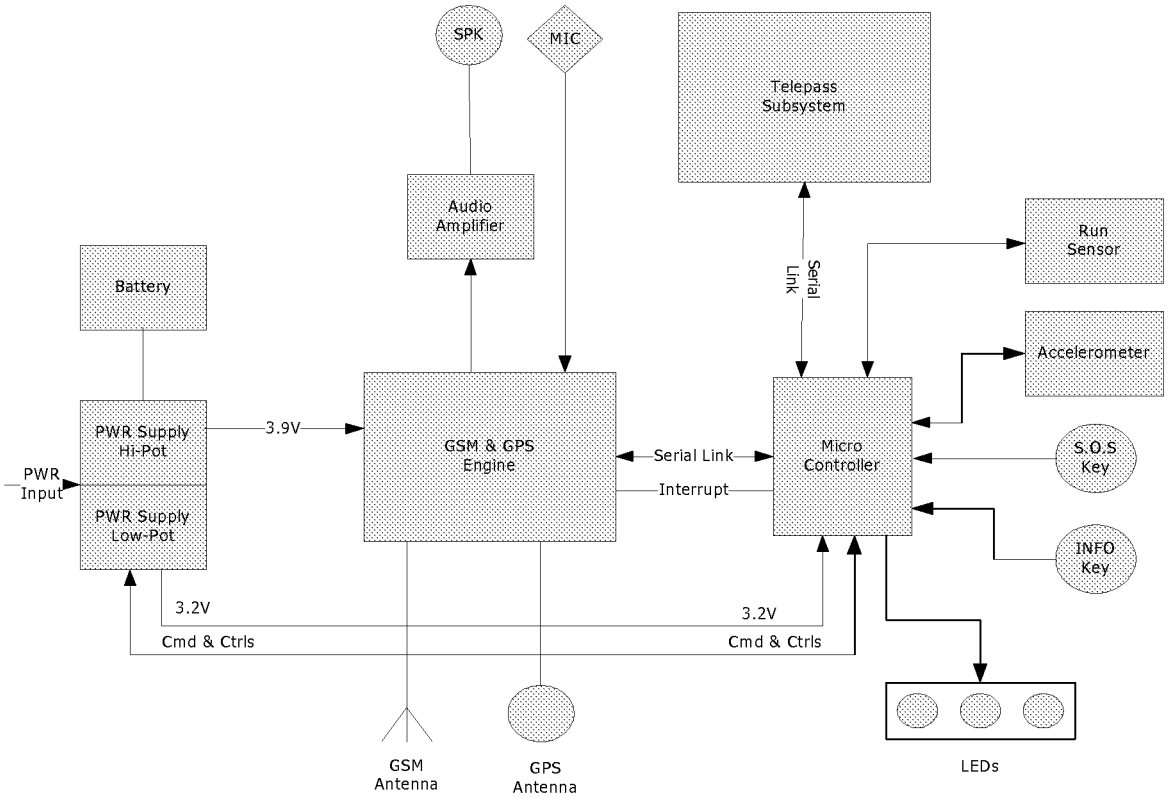

SPK
MIC
Telepass Subsystem
Audio Amplifier
Run Sensor
Serial Link
Battery
Accelerometer
PWR Supply Hi-Pot
3.9V
GSM & GPS Engine
Serial Link
Micro Controller
S.O.S Key
PWR Input
PWR Supply Low-Pot
Interrupt
INFO Key
3.2V
3.2V
Cmd & Ctrls
Cmd & Ctrls
GSM Antenna
GPS Antenna
LEDs

FIG. 4B

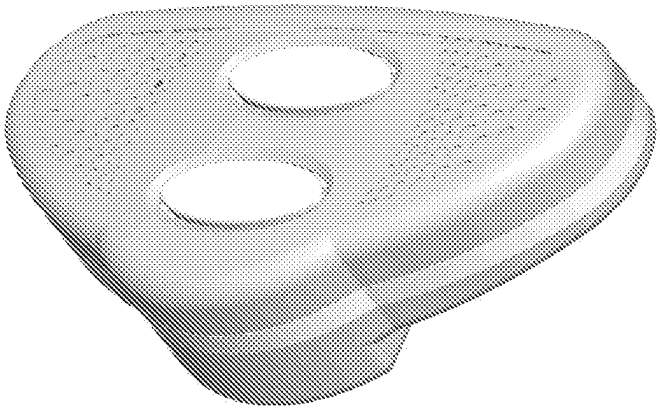


FIG. 5



FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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