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(54) **MONITORING AND SECURITY SYSTEM AND METHOD**

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(57) **ABSTRACT**

A system and method simplifying, combining and improving vehicle diagnostic monitoring and reporting, automatic vehicle emergency event notification, personal emergency distress notification, vehicle and personal location notification, vehicle and personal threat notification and remote vehicle operation (door locks, lights, horn and other systems). System and method include a device within the vehicle, coupled to the vehicle's monitoring systems, with a wireless communication capability, providing two way communication of data via a hand-held device or key fob, and a remote call center capable of storing, analyzing and assessing services required and communicating back the results of that assessment. Services would include roadside mechanic assistance, towing, informed Public Safety Answering Point (PSAP) notification (including assessment of severity of emergency) and threat notification.

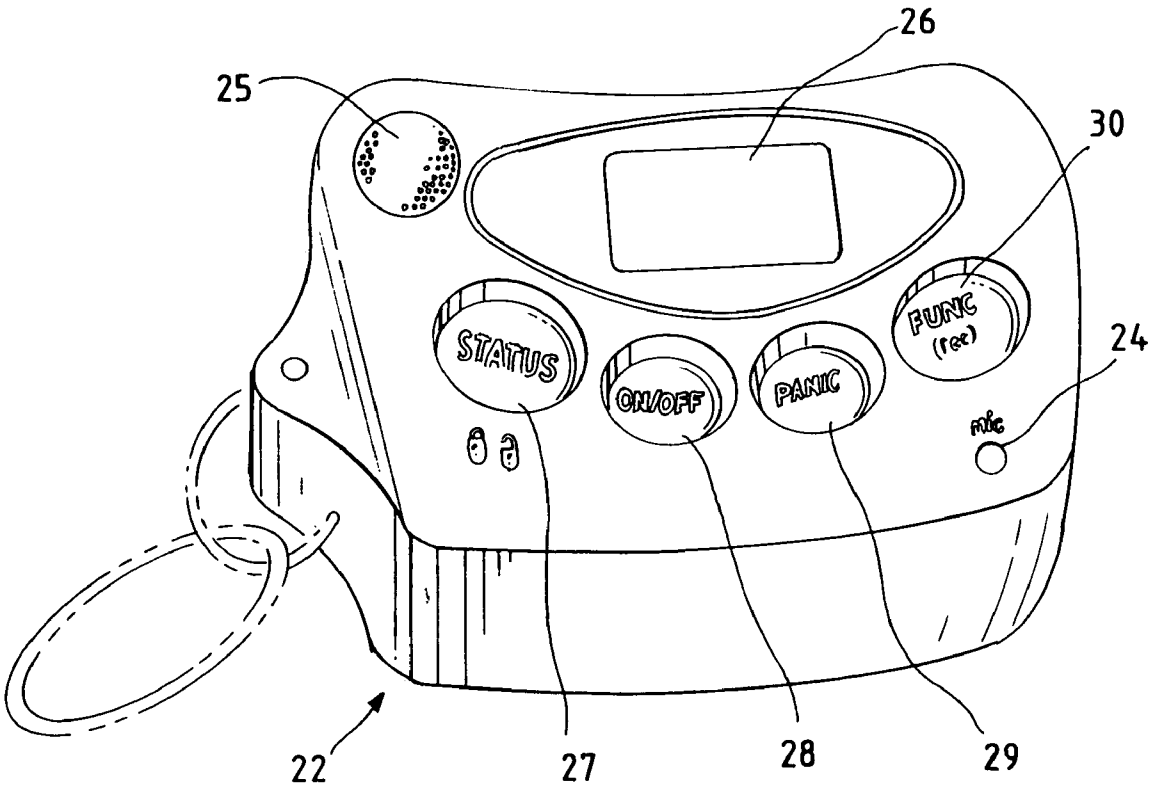


FIG. 1

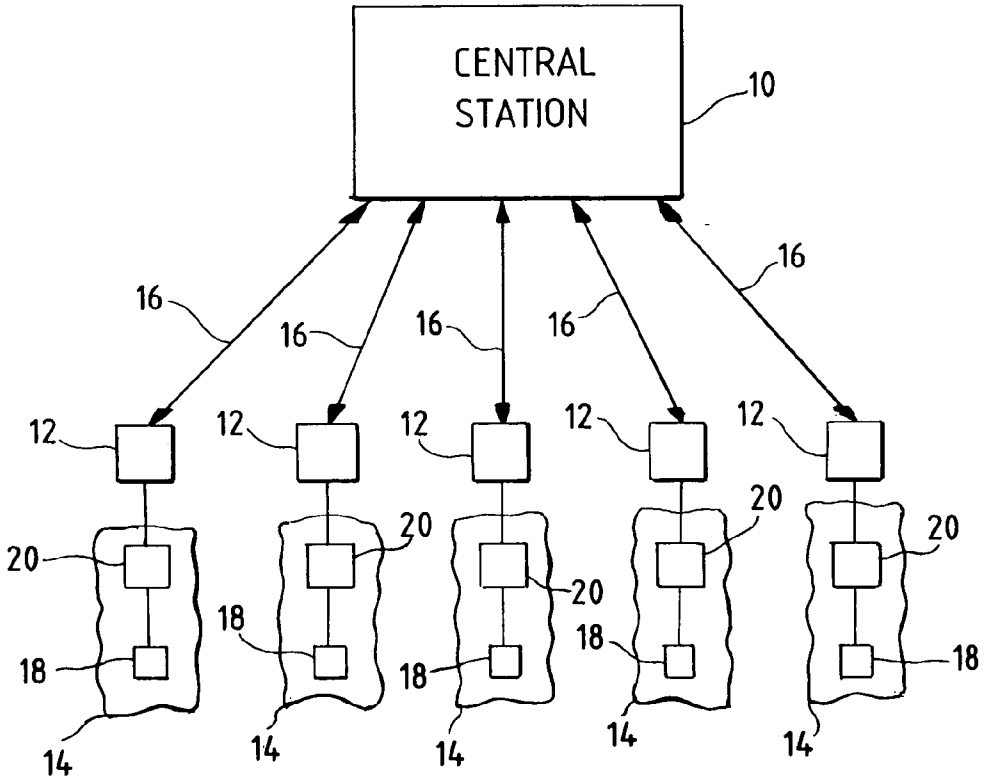
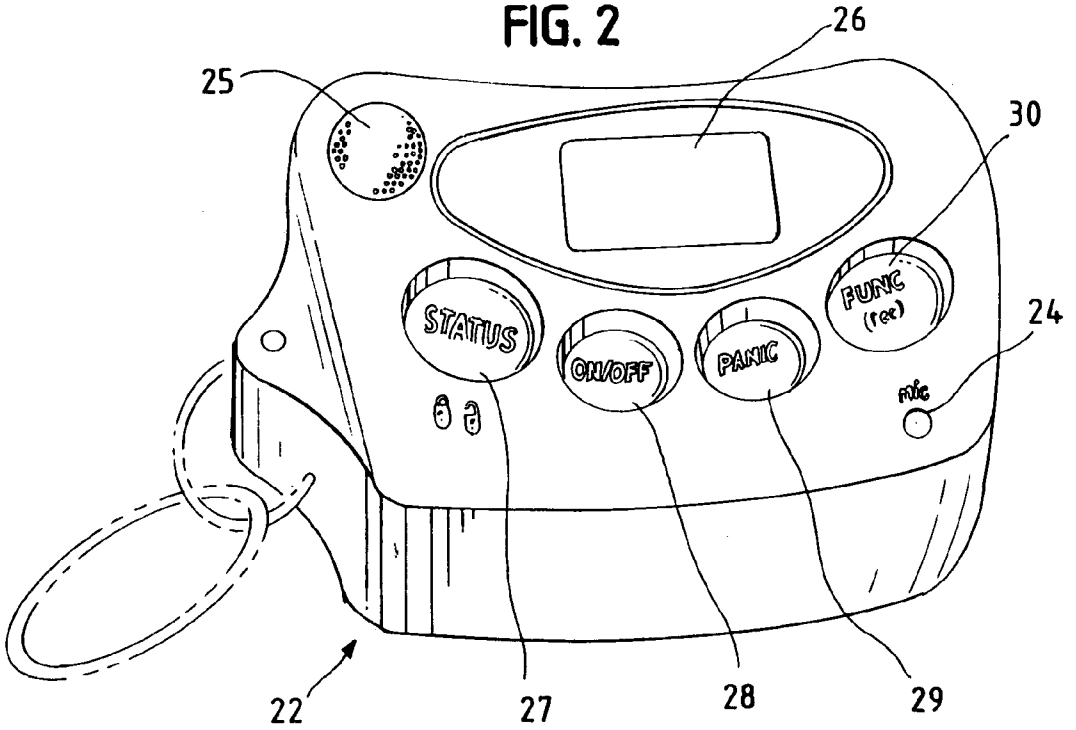

CENTRAL STATION
10
16
12
20
18
14

FIG. 2


25
26
30
24
STATUS
ON/OFF
PANIC
FUNC
mic
22
27
28
29

MONITORING AND SECURITY SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to a combining of vehicle diagnostic monitoring and reporting, automatic vehicle emergency event notification, personal emergency distress notification, vehicle and personal location notification, vehicle and personal threat notification and remote vehicle operation (door locks, lights, horn and other systems).

[0003] 2. Description of the Related Art

[0004] Motor vehicles contain complex mechanical systems that are monitored and regulated by on-board computer systems often known as electronic vehicle control units (VCUs).

[0005] Such VCUs monitor various vehicle systems including powertrain performance, crash sensors, air bag deployment and the like, and store codes associated with behaviors that can subsequently be used to diagnose vehicular systems issues.

[0006] These codes are generally used to trigger a message on the vehicle console, for example: "check engine,""service engine soon," or "change oil." The service center, once engaged, will then attach diagnostic equipment that deciphers these codes providing more detail regarding said issues and their solutions.

[0007] A remote diagnostics service in addition to emergency service, remote vehicle access, directions and other services are now an available option on "OnStar" equipped vehicles. The emergency and location based services, although extremely useful to an individual person regardless of their proximity to their vehicle, are limited to the vehicle and its location, and are unavailable when the user is outside or away from the automobile.

[0008] There are devices that fulfill the emergency and location based services, such as products and services from "Life Alert" and "Wherify," but these products are unable to communicate with the user's vehicle and notify the service of an in-vehicle emergency event such as a crash or an airbag deployment and they certainly do not provide other vehicle diagnostic monitoring and reporting functions.

[0009] There also exist wireless communication devices and protocols both in and outside of the vehicle. Mobile, cell or PCS technology phone systems abound providing long distance wireless communication capabilities. In addition there are other wireless communication protocols that provide for short range communications using radio frequency protocols. One such example being the "Bluetooth" protocol.

[0010] In vehicle use of the "Bluetooth" protocol is at present being used to provide "hands-free" use of mobile phones or communication with portable music or "MP3" devices.

[0011] As a result, an individual wanting services and devices that provide vehicle diagnostic monitoring and reporting, automatic vehicle emergency event notification, personal emergency distress notification, vehicle and personal location notification, vehicle and personal threat notification and remote vehicle operation must currently purchase a number of separate devices and services to accomplish this. In general, however, a user doesn't want to carry or pay for multiple devices or services. A user wants a small personal device that comfortably fits into their pocket that integrates their wants and needs. Automotive OEM's want product offerings to compete with GM but do not want to take on the burden and expense of building an "OnStar" type infrastructure and do not want to license a GM branded product.

SUMMARY OF THE INVENTION

[0012] In view of the foregoing and other problems of the conventional methods and structures, an object of the present invention is to provide a method and structure to combine prior and new art into an integrated and affordable personal system and service available to all automobile owners and their families.

[0013] Accordingly, the present invention is directed to an interactive monitoring and security system comprising a central station, a plurality of portable remote user stations and a plurality of system equipped vehicles. The central station has capabilities for both wireless communication with each of the user stations and for processing data received from the user stations. The remote user stations, in turn, are each capable of wireless communication with the central station and with one of the vehicles. Finally, each vehicle in the system includes a microprocessor control unit that monitors various vehicle systems. The control unit may also include a wireless communications interface or, alternatively, is wired to the interface to both transmit and receive data to and from the associated user station.

[0014] The invention is also directed to the method of operating such a monitoring and security system.

[0015] In a first aspect of the present invention, therefore, the remote user station will establish secure communications with the vehicle, when in close proximity to the vehicle. It will receive encoded information transmitted by the vehicle on-board control unit and route this data to a central station which will collect, process and or act upon that information. The transmission between the remote user station and on-board unit will preferably utilize "Bluetooth" (or other RF technology, as appropriate). Transmission between the remote user station and the central station will utilize an appropriate mobile, cellular or PCS communication protocol.

[0016] The central station will be able to establish secure communications with the remote user station which will receive encoded information and route this data to the vehicle on-board unit, when in close proximity to the vehicle, which will act upon this code as necessary.

[0017] The user will also be able to send a call to the central station with the remote station device regardless of the user's proximity to the vehicle. The device will allow the call center to determine its location (GPS tracking).

[0018] The user will be able to record a brief message that can be stored and played back at user's convenience.

[0019] This system and method benefits the vehicle manufacturer and service provider by enhancing customer loyalty

and providing timely emergency response and feedback to solve engineering and manufacturing problems. The system and method benefits the users by providing a small personal device that comfortably fits into their pocket that integrates their wants and needs, within and away from their vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The novel features which are characteristic of the present invention are set forth in the appended claims. However, the invention's preferred embodiments, together with further objects and attendant advantages, will be best understood by reference to the following detailed description taken in connection with the accompanying drawings in which:

[0021] **FIG. 1** is a schematic representation of one preferred embodiment of the interactive monitoring and security system of the present invention; and

[0022] **FIG. 2** is a perspective view of one preferred embodiment of the portable remote user station made in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0023] Referring now to the drawings, and more particularly to **FIGS. 1-2**, there are shown preferred embodiments of the method and structures according to the present invention. As illustrated in **FIG. 1**, one preferred embodiment of the invention comprises a central station **10**, a plurality of portable remote user stations **12**, and a plurality of suitably equipped vehicles **14**.

[0024] The central station **10** includes a call center to receive audio communications and data transmitted from each of the remote stations **12**. The central station also includes data processing capabilities for analyzing various data received from the remote stations **12**. All of the audio and data transmissions between the central and remote stations is effected over convention wireless communications networks, illustrated schematically as lines **16**. The central station **10** can also locate each of the remote user stations **12** via GPS.

[0025] The remote stations **12** may take many forms. These devices are most preferably hand-held and completely transportable on the user's person. Two preferred embodiments comprise a cell phone and a key fob. The remote stations **12** can wirelessly communicate with the central station **10** and, using Bluetooth or other radio frequency technology, each can wirelessly communicate with one of the vehicles **14** in the system. The remote stations also include GPS functionality and a storage capacity for retaining vehicle data and audio messages inputted by the user. Preferably, the portable remote stations **12** also have one or more function buttons and a display for text messaging.

[0026] The vehicles **14** employed in the preferred embodiments of the invention include a microprocessor control unit **18** which is operatively associated with various vehicle systems and functions. These systems and functions may include engine performance parameters, fuel and oil levels, airbag readiness and deployment, tire pressure, odometer and speedometer readings, and many others. The vehicle systems and functions are monitored by control unit **18** which can store relevant vehicle data and transmit this data to the remote user stations through an integral or separate communications interface **20**. A preferred from of communications interface **20** is a conventional Bluetooth transmitter and receiver.

[0027] **FIG. 2** illustrates one preferred portable user station in the form of a key fob **22**. The fob **22** may include a microphone **24**, a speaker **25**, a visual display **26**, and a variety of function buttons **27-30**. These function buttons may establish a communication link with the central station, send out an emergency signal, lock and unlock the vehicle and perform many other functions well known in the art.

[0028] It will be appreciated by those skilled in the art that various changes and modifications can be made to the illustrated embodiments without departing from the spirit of the present invention. All such modifications and changes are intended to be covered by the appended claims.

What is claimed:

1. An interactive monitoring and security system comprising:

a central communication and data processing station;

a plurality of portable remote user stations in communication with the central station; and

a plurality of vehicles, each vehicle having a control unit that monitors vehicle systems and a communications interface operatively connected to the control unit, each vehicle communications interface being in wireless communication with one of the portable remote user stations.

2. The system of claim 1 wherein the portable remote user station is a key fob.

3. The system of claim 1 wherein the portable remote user station is a mobile phone.

4. The system of claim 1 wherein vehicle data is transmitted to the central station via the communications interface and the portable remote user station, the data is processed at the central station, and a response instruction signal is transmitted from the central station to the vehicle via the remote user station and the communications interface to thereby implement vehicle function in response to the vehicle data.

5. The system of claim 1 wherein the central station and remote user stations may exchange verbal communications.

6. The system of claim 1 wherein the remote user stations are adapted to transmit a security signal to the central station.

7. The system of claim 1 wherein the central station is adapted to determine the location of one or more of the remote user stations.

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