

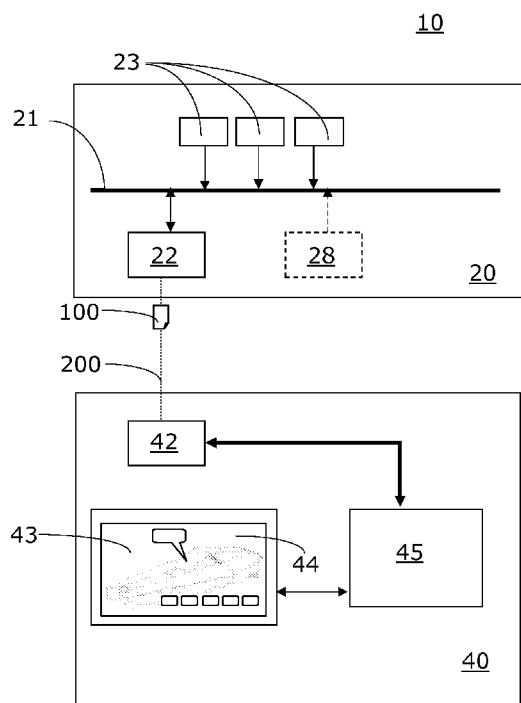


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[Continued on next page]

(54) **Title:** COMMUNICATION SYSTEM FOR USE WITH A VEHICLE**Fig. 1**

(57) **Abstract:** Communication system (10) for use with a vehicle (20) having a common bus (21) structure for data exchange between components of the vehicle (20), said system (10) comprising a first wireless communications transceiver (22) connectable to said vehicle's bus (21), said communications transceiver (22) being enabled to transmit a status message (100) via a trusted wireless channel (200). Said communication system (10) further comprises a portable device (40) which comprises a second wireless communication transceiver (42) for establishing said trusted wireless channel (200) together with said first communications transceiver (22), a display (43) serving as an interactive graphical user interface (44) for displaying multimedia user information and a virtual camera module (45) enabling said multimedia user information (101) to be context-sensitive.

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Communication system for use with a vehicle

Field of the invention

[0001] The invention relates to a communication system for use with a vehicle having a bus structure for data exchange between components of the vehicle and a wireless communication transceiver enabled to transmit a status message to a portable device.

Background of the invention

[0002] A large number of communication systems and associated remote controls or portable devices related to vehicles are known in the art. The most common portable devices for vehicles employ a simple one way communication system, i.e. the portable device usually comprises only a transmitter and the vehicle a paired receiver which are capable of establishing a wireless channel. Usually the portable device sends a preferably encrypted signal to the vehicle, said signal being received by the vehicle's receiver and is decrypted and if the signal is confirmed to be

authentic, the corresponding action is taken, such as opening/ closing the doors, activating/ deactivating the alarm, etc.

[0003] Certain communication systems for vehicles employ a two way communication between the vehicle and transceiver. There are several
5 reasons for this such as security or the capability of transmitting information from the vehicle to the portable device. For the first case, the security of the entire communication system can be increased by employing a two way communication and instead of a static, even though encrypted, command for an operation, a dynamic command is computed by the portable device in
10 collaboration with the vehicle by means of cryptography. This is especially important in the so-called keyless entry systems where a conventional key is completely abandoned. The second reason for a two-way communication channel is to be able to provide some sort of information about the vehicle on the portable device. Said information is in prior art applications the
15 location of the vehicle for example or the inside temperature, etc. This information is usually transmitted to the portable device in the form of, preferably encrypted, status messages.

[0004] However, no communication system is known in the art that is able to provide multi-media user information on said portable device related
20 to status messages received from a vehicle, said multi-media user information being in the same time also so-called context sensitive. Most importantly there is a lack of communication systems for use with a vehicle that are able to provide really relevant, helpful, user friendly and accurate assistance to the user in case of a failure of the vehicle without the
25 involvement of phone calls to customer service centers, trips to repair/ diagnostic shops, etc.

[0005] It is thus an objective of the present invention to provide a communication system for use with a vehicle that is able to provide the user

with relevant, accurate and context-sensitive multi-media user information on a portable device.

[0006] The present invention achieves the above mentioned objectives by providing a communications system that can establish a trusted wireless channel between a first wireless communications transceiver of a vehicle and a second wireless communications transceiver of a portable device and by providing a virtual camera module enabling the portable device to display context-sensitive multi-media user information.

[0007] The main advantage of the present invention is the comfort and security provided to the user, in that the system is capable of providing really essential information in a user-friendly manner on a portable device. A further advantage is that the system is capable of providing said information without the involvement of any additional support personnel, which is particularly important when the vehicle is in an area where a call to technical support would not be practically feasible, e.g. in a boat in the middle of the ocean without mobile communication signals.

[0008] The context-sensitiveness of the information brings the intrinsic advantage that the information provided to the user is not some sort of general guideline that applies in all scenarios and is often completely useless or, on the opposite side, completely overwhelming due to a huge amount of information. Instead the information provided by the system of the present invention is customized to the particular situation/ context the user with the portable device and the vehicle is in that particular moment.

[0009] In a preferred embodiment, the context-sensitiveness enables the portable device to display textual information related to a current event or incident together with visual or graphical information related to this event or incident.

[0010] Due to the fact that the portable device is connectable via a trusted wireless channel to the bus of a vehicle, the portable device becomes part of the vehicle's communication system. The invention thus provides for an extended or expanded vehicle communication system.

5 [0011] Further characteristics and advantages of the invention will in the following be described in detail by means of the description and by making reference to the drawings. Which show:

- 10 Fig. 1 A block diagram of the communication system according to the present invention;
- Fig. 2 A schematic view of the display of the portable device showing the interactive graphical user interface displaying multimedia user information;
- 15 Fig. 3 A block diagram showing the portable device connecting to a service station via an open network;
- Fig. 4A A block diagram showing further components of a virtual camera module, according to the present invention;
- 20 Fig. 4B A block diagram of the preferred embodiment of an image and data processing unit of a virtual camera module according to the present invention;
- Fig. 4C A block diagram showing the subcomponents of an orientation and positioning unit;
- 25 Fig. 5 A schematic perspective view of the communication system in use, with the display of the portable device showing context-sensitive multimedia user information based on the orientation and position of the portable device with respect to a vehicle.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0012] The present invention shall be described in relation to preferred embodiments as shown on the figures.

5 [0013] Figure 1 shows a structural block diagram of the communication system 10 of the present invention. The communication system 10 is made up of two main structural entities: a vehicle 20 and a portable device 40. One should note that the type of vehicle 20 does not play any role and does not affect in any way the essence of the present invention. The example
10 shown in the figures, i.e. the vehicle 20 being a boat, is meant to depict one particular deployment of the communication system 10 and is by no means intended to limit the possible use of the communication system 10.

[0014] In order to enable the advanced features of the present invention, the vehicle 20 must have a bus 21 for data exchange (e.g. a so-called common bus) between components of the vehicle 20. However, most
15 modern vehicles already use a bus as a data carrier between components. This bus 21 carries data related to parameters of the vehicle 20, parameters which are detected/ measured by an array of sensors 23. These sensors 23 can be of various types ranging from sensors to measure temperature,
20 pressure, ignition timing to more advanced sensors like satellite navigational devices and any other sensors that a vehicle 20 is fitted with.

[0015] A second essential component of the vehicle 20 is the first wireless communication transceiver 22, which is connectable to the vehicle's bus 21. Based on data that is available from the bus 21 (e.g. data recorded
25 by all the sensors 23 of the vehicle 20), the first wireless communications transceiver 22 will send out status messages 100 which contain data related to the current status of the vehicle 20. These status messages 100 are

transmitted by the first wireless communications transceiver 22 via a trusted wireless channel 200 which will be described in further paragraphs.

[0016] The second structural entity of the communication system 10 according to the present invention is a portable device 40. One should note that the type of this device does not play any role as long as it comprises the necessary components and the present invention should not be limited in any way by the type or shape of the embodiment depicted on the figures. However, in the preferred embodiment, the portable device 40 is a handheld device such as a mobile phone, personal digital assistant (PDA) or the like.

The reason why this is preferred is that in this case the user does not have to purchase and carry an additional device since in the preferred embodiment various existing mobile phones and PDAs can be adapted to be compatible with the communication system 10 of the present invention. In most cases the above mentioned adaptation comprises only the step of loading customized software on the portable device 40 and preferably no hardware modifications are needed. Naturally such a software-only adaptation is possible only in cases where the portable device 40 already comprises all the hardware components required. In a further embodiment of the present invention, a custom built portable device 40, which comprises both the hardware and software components, which the communication system 10 of the present invention requires, is used to integrate in the communication system 10. The above-mentioned required components will be described in the following paragraphs in connection with the figures depicting these.

[0017] As shown on figure 1, the portable device 40 comprises a second wireless communication transceiver 42 which is capable of establishing a trusted wireless channel 200 with the first wireless communications transceiver 22. The mechanism for establishing a trusted wireless channel 200 preferably follows a commonly known handshake based protocol where both endpoints, in this case the first wireless communications transceiver 22

and the second wireless communication transceiver 42, must authenticate themselves before a trusted wireless channel 200 is established. This handshake protocol substantially increases the security of a trusted wireless channel 200 since no sensitive data is transmitted and no commands are
5 accepted from neither side as long as the trusted wireless channel 200 is not established thus preventing unauthorized devices to jeopardize the integrity of the communication system 10.

[0018] After being established, said trusted wireless channel 200 is then used to transmit data between the vehicle 20 and the portable device 40 via
10 the first wireless communications transceiver 22 and the second wireless communication transceiver 42, respectively.

[0019] One should note that the particular communication technology used, i.e. infrared, radio frequency, etc. does not change the concepts herein presented in any way. It is however preferred that the first wireless
15 communications transceiver 22 and the second wireless communication transceiver 42 use a communication technology that is standard in the field of portable devices so that a larger number of existing portable devices can be employed in the communication system 10 of the present invention. Such communication technologies include the IEEE 802.11 standard (commonly
20 known as WiFi), Bluetooth or Infrared, this enumeration being non-exhaustive.

[0020] A further essential component of the portable device 40 is a display 43 serving as an interactive graphical user interface 44 for displaying multimedia user information 101. The display 43 does not have any
25 particular size or type requirements that would affect the inventive concept of the communication system 10, however, in the preferred embodiment, the display 43 is a color, high-resolution touch-sensitive display, these extra features making the display 43 and the interactive graphical user interface 44 it implements much more user-friendly and versatile. Generally speaking,

the interactive graphical user interface 44 has the role of displaying multimedia user information 101 and allowing the user to interact with the portable device 40, thus indirectly with the vehicle 20, and to access further features/ information. The interactive graphical user interface 44 may also
5 be used to request assistance in case of defects or failures of the vehicle 20. A touch-sensitive display 43 definitely makes these operations easier but these same operations can also be performed with alternative means of input such as a keyboard, a trackball mouse or the like.

[0021] A very important aspect of the multimedia user information 101
10 provided is that it is context-sensitive, i.e. the information provided is continuously adapted to the current context. Context, in relation with the present invention, refers to a multitude of parameters recordable either by the vehicle 20 or by the portable device 40. A non-exhaustive list of parameters that commonly form the context as referred to in this description
15 is:

- status message 100 received from the vehicle 20 via the trusted wireless channel 200. As described before, this status message 100 is based on a variety of parameters recorded by sensors 23 of the vehicle 20 or by a CPU of the vehicle and thus
20 these status messages 100 are a very reliable description of the vehicle's 20 current condition, settings, geographical position or general status;
- current orientation and/ or position of the portable device 40 with respect to the vehicle 20, meaning that the multimedia user
25 information 101 shown on the interactive graphical user interface 44 is adapted as the portable device 40 faces different angles with respect to the vehicle 20. For example, if the portable device 40 faces the engine of the vehicle 20, then the display 43 will show multimedia user information 101 related to

the engine. More details of this feature will be discussed in detail in relation with the figures describing the interactive graphical user interface 44 and the module that is responsible for it, that is the virtual camera module 45;

- 5 - parameters recorded by the portable device 40 itself such as absolute orientation of the portable device 40 (portrait or landscape mode), acceleration/ vibrations detected, etc.

[0022] Also shown on figure 1 is the virtual camera module 45, part of the portable device 40. In an alternative embodiment, this virtual camera
10 module 45, or at least the physical part of such a virtual camera module 45 may be an external device which is connectable to the portable device 40. This module 45 is essential to provide the multimedia user information 101 of the interactive graphical user interface 44 in a context-sensitive manner. This virtual camera module 45 in connection with the second wireless
15 communication transceiver 42 is responsible for gathering and processing the parameters listed above and, after processing these parameters, to provide the corresponding input for the interactive graphical user interface 44 and to process user interaction with the interactive graphical user interface 44.

20 [0023] Figure 2 shows a schematic view of the display 43 of the portable device portable device 40 showing the interactive graphical user interface 44 displaying multimedia user information 101. This figure depicts the preferred embodiment of the display 43 as being a touch sensitive display that allows the user to simply point on a portion of the screen
25 surface to perform various actions. Figure 2 shows, as an example, a "screenshot" of the interactive graphical user interface 44 displaying an image of the vehicle 20 and providing additional information to various parts of the vehicle in the form of an overlay 102 over the image of the vehicle 20 comprising, among others, selectable callouts, i.e. the user, by touching the

display 43 in the respective spot, is offered with further multimedia user information 101 related to the thus selected part of the vehicle 20. The above-mentioned multimedia user information 101 can be of various types:

- 5 - maintenance information – the information provided aids the user in maintaining the vehicle 20 and/or the related communication system 10 as a whole by providing all the data needed for these purposes. To give an example, the latest oil change in the engine of the vehicle 20;
- 10 - statistical data – like the speed, consumption, state of the vehicle 20 etc;
- navigational - route traveled by the vehicle 20 shown on a map or satellite image, or further navigational aids like a compass or the like;
- 15 - diagnostic information – in case of a failure of the vehicle 20, helpful and relevant diagnostic data is transmitted by the vehicle 20 via the trusted wireless channel 200 and as a reaction multimedia user information 101 with said diagnosis data is being provided on the display 43.

[0024] Generally speaking, the interactive graphical user interface 44
20 and the multimedia user information 101 it provides is a complex combination of an on-board computer of a vehicle 20 with one or more of the following: a navigational system, an electronic user guide, a diagnostic device, a remote control, access key and/or a communication device.

[0025] As shown on figure 3, to provide further assistance to users/
25 occupants of the vehicle 20, in a further embodiment of the present invention, the portable device 40 further comprises an additional transceiver 49 connectable to an open network 301 and capable of forwarding said status message 100 to a corresponding transceiver 302 of a central service

station 300 for receiving diagnostic and diagnostic and update information from said service station 300 based on the forwarded status message 100. Such a further assistance is needed when the limits of information and intelligence built in the portable device 40 are reached and the involvement of a service station 300, and probably human technical support with advanced knowledge, is thus inevitable. By providing the portable device 40 with this additional functionality, i.e. the possibility to connect to a service station 300 via an open network 301, the involvement of the technical support is made transparent to the user of the portable device 40, who doesn't need to worry how and where the multimedia user information 101 is computed, as long as it is provided. That means that in the preferred embodiment, even if technical support from a service station 300 is involved, the multimedia user information 101 is provided to the user of the portable device 40 without any additional steps required by the later and without him/her noticing any difference in the way the multimedia user information 101 is presented. This is achieved by the possibility of the service station 300 to send back diagnostic and update information based on the forwarded status message 100, said diagnostic and update information being directly processable by the portable device 40.

[0026] In yet another embodiment, the additional transceiver 49 is not an integral part of the portable device 40. In this case, the portable device 40 comprises a communication interface for connecting it to the additional transceiver 49.

[0027] Figure 4A shows further details of an advanced embodiment of the virtual camera module 45 according to the present invention. The central component of the virtual camera module 45 is an image and data processing unit 47 which centralizes all data from other components of the virtual camera module 45 and also interfaces with other modules of the portable device 40 such as the second wireless communication transceiver 42, the interactive graphical user interface 44 or the additional transceiver 49. The

main functional operations the image and data processing unit 47 performs are:

- acquiring data from components of the virtual camera module 45:
 - image data recorded by a video camera 46;
 - 5 - data related to the orientation and/or position of the portable device 40 in respect to the vehicle 20;
 - cardinal points indicated by a compass 50;
 - geographical location provided by a satellite positioning receiver 51; and
 - 10 - data describing the forces the portable device 40 is subject to as detected by an accelerometer 52.
- analyzing status messages 100 received from the vehicle 20 via the trusted wireless channel 200 by the second wireless communication transceiver 42;
- 15 - processing all the available data and, if said data is considered to be insufficient, requesting further assistance by connecting to a service station 300 via an open network 301, by forwarding the status message 100 and in response receiving back diagnostic and update information 303. To provide this further assistance, the virtual camera module 45
- 20 communicates with the additional transceiver 49;
- after having all necessary data, the image and data processing unit 47 computes the multimedia user information 101 for the interactive graphical user interface 44 to be sent to the display 43;
- during all operations, the image and data processing unit 47 constantly
- 25 monitors user input on the interactive graphical user interface 44 received from the display 43 and the image and data processing unit 47

constantly gives commands to other components of the communication system 10 accordingly.

[0028] The video camera 46, part of the virtual camera module 45, has the role of providing the image and data processing unit 47 with live video recording or still pictures to be analyzed. When the video camera 46 is pointed towards the vehicle 20 or a certain part of the vehicle 20, the image and data processing unit 47 processes the images and detects various components of the vehicle 20 and instantly computes the multimedia user information 101 related to the components of the vehicle 20 detected on the images taken by the video camera 46. This multimedia user information 101 is then transformed by a Graphical Processing Unit GPU of the image and data processing unit 47, described in following paragraphs, into an overlay 102 presented on the display 43 "above" the rendering of the image taken by the video camera 46.

[0029] The image and data processing unit 47 is aided, in the processing of the images taken by the video camera 46 and especially in the correct correlation of these images with the vehicle 20, by the additional orientation and positioning unit 48. This orientation and positioning unit 48 gives the orientation of the portable device 40 and thus of the video camera 46 with respect to the vehicle 20 which enables the image and data processing unit 47 in the recognition of which part of the vehicle 20 is currently being inspected, i.e. of which part of the vehicle 20 is a picture or video taken, thus increasing the accuracy and the relevance of the multimedia user information 101 provided on the interactive graphical user interface 44 as shown on the display 43. The operation of the entire virtual camera module 45 is depicted on figure 5 and will be discussed in detail in relation with that figure.

[0030] As shown on figure 4B, the image and data processing unit 47 preferably comprises a powerful electronics with a Central Processing Unit

CPU, a Graphical Processing Unit GPU and an input output I/O interface to connect the additional components of the virtual camera module 45. In most modern portable device 40 these components are usually encapsulated in one single integrated circuit IC but dedicated ICs for each is not excluded either. In the preferred embodiment of the image and data processing unit 47, the CPU is responsible for all non graphical computations and of giving control instructions to the attached components to arbitrate the data flow between these. On the other hand, the GPU performs only graphical computations to construct the multimedia user information 101 to be fed to the interactive graphical user interface 44 in the form of input compatible with the display 43. The I/O then provides an interface compatible with all components connected to the image and data processing unit 47 to enable a flawless flow of data between these. The I/O interface preferably implements standard data communication protocols and data encoding and encryption techniques.

[0031] A block diagram of a particularly preferred embodiment of the orientation and positioning unit 48 is illustrated on figure 4C. As shown on this figure, the orientation and positioning unit 48 comprises a compass 50 which detects the cardinal orientation of the portable device 40. Due to size and reliability concerns, it is preferred that the compass 50 to be a solid state compass that indicates the cardinal orientation in form of digital data. The solid state compass 50 is preferably built out of two or three magnetic field sensors that provide data for a microprocessor. Using trigonometry the correct heading relative to the compass 50 is calculated. An additional component of the orientation and positioning unit 48 is a satellite positioning receiver 51 which is able to precisely determine the geographical location of the portable device 40. This information is later used by the image and data processing unit 47 described above to provide a localization of the multimedia user information 101 according to the geographical location of the portable device 40. The orientation and positioning unit 48 also

comprises an accelerometer 52 which is used to detect the forces the portable device 40 is subjected to. These forces might reveal vibrations due to a faulty operation of the vehicle 20, i.e. if the user places the portable device 40 directly on an engine of the vehicle 20 for example, the vibrations will be transmitted to the portable device 40 and thus to the accelerometer 52 which will detect these and the image and data processing unit 47 will analyze these and if needed correction measures are taken, i.e. for example the ignition timing of the engine is corrected to avoid these vibrations, and/or corresponding multimedia user information 101 is shown on the display 43. A further use of the accelerometer 52 is to detect the orientation of the portable device 40 by detecting the direction of gravitational force on the portable device 40. In this case, the orientation of the interactive graphical user interface 44 automatically changes as the orientation of the portable device 40 changes, i.e. if the portable device 40 is held in portrait mode, the interactive graphical user interface 44 will also be displayed in portrait and not landscape mode. The data provided by the accelerometer 52 is also used in conjunction with data provided by the satellite positioning receiver 51 and the compass 50 in order to even better aid the image and data processing unit 47 in providing the interactive graphical user interface 44 in a context-sensitive manner, which in this case can be even better adapted according to the position/orientation of the portable device 40 with respect to the vehicle 20.

[0032] In a further embodiment, the vehicle 20 also comprises an additional orientation and positioning unit 28, which is similar in construction to the orientation and positioning unit 48 of the portable device 40. In this further embodiment, the status message 100 sent by the vehicle 20 to the portable device 40 is also based on positioning and orientation of the vehicle 20, data supplied by the additional orientation and positioning unit 28, thus enabling an even more precise detection of the orientation/ position of the portable device 40 in respect with the vehicle 20.

[0033] Finally figure 5 shows a "snapshot" of the communication system 10 in operation as it is intended to be used. The portable device 40 is pointed towards the vehicle 20 and a so called coverage area 46.1 is being captured by the video camera 46 and rendered on the display 43. From the images captured, and the orientation and positioning data, the overlay 102 containing multimedia user information 101 corresponding to components of the vehicle 20 detected on the image being taken is rendered on the display 43 "on top" of the actual images taken. The portion selected by the user by pointing on an area of the display 43 is indicated with a pointing finger as this preferred embodiment of the display 43 is a touch-sensitive display. In response to this interaction of the user with the interactive graphical user interface 44, i.e. selecting a detected component of the vehicle 20 on the display 43, additional multimedia user information 101 is being computed by the image and data processing unit 47 based on: a status message 100 received via the trusted wireless channel 200; in some cases diagnostic and update information 303 received from a service station 300 via an open network 301; the actual images and attached orientation and/or positioning information. In the preferred embodiment, as depicted on figure 5, the display 43 of the portable device 40 continuously follows the movement of the video camera 46 of the portable device 40 and the multimedia user information 101 instantly adapts itself to the variation of the input received from the video camera 46 but also from the orientation and positioning unit 48 and if one is present from the additional orientation and positioning unit 28.

[0034] The example on figure 5 shows a situation when the user points the video camera 46 of the portable device 40 towards a back of the vehicle 20 and retrieves multimedia user information 101 about a propeller by using the interactive graphical user interface 44. This multimedia user information 101 can aid the user in: diagnosing a failure of the vehicle 20; viewing

statistical information; navigation tasks; or simply in identifying various components of the vehicle 20.

[0035] It is transparent to the user how and from where the multimedia user information 101 is fetched from, i.e. the experience as perceived from the user is constant regardless of the number of components employed in the computation of the multimedia user information 101 and regardless whether a service station 300 is contacted. This ads a very lean and consistent user experience improving the overall value of the entire communication system 10.

[0036] Since the communication between the vehicle 20 and the portable device 40 is via a trusted wireless channel 200, the portable device 40 can also be used to give various commands/ instructions to the vehicle 20 such as opening the doors, starting the engine setting the air conditioner, etc.

[0037] It will be understood that many variations could be adopted based on the specific structure hereinbefore described without departing from the scope of the invention as defined in the following claims.

Claims:

1. Communication system (10) for use with a vehicle (20) having a bus (21) structure for data exchange between components of the vehicle (20), said system (10) comprising:

- 5 - a first wireless communications transceiver (22) connectable to said vehicle's bus (21), said communications transceiver (22) being enabled to transmit a status message (100) via a trusted wireless channel (200),

said communication system (10) further comprising:

- 10 - a portable device (40) comprising
- a second wireless communication transceiver (42) for establishing said trusted wireless channel (200) together with said first communications transceiver (22),
 - a display (43) serving as an interactive graphical user interface (44) for displaying multimedia user information (101),
 - a virtual camera module (45) enabling said multimedia user information (101) to be context-sensitive.
- 15
2. Communication system (10) according to claim 1, **characterized in that** said status message (100) is based on data obtained from said bus (21).
 - 20 3. Communication system (10) according to one of the claims 1 or 2, **characterized in that** said context-sensitive multimedia user information (101) is related to the status message (100).
 - 25 4. Communication system (100) according to one of the claims 1 to 3, **characterized by that**

- said virtual camera module (45) further comprises an orientation and positioning unit (48) capable of indicating said current orientation and/or position of the portable device (40) with respect to said vehicle (20); and
 - 5 - said context-sensitive multimedia user information (101) is related to a current orientation and/or position of the portable device (40) with respect to said vehicle (20), as indicated by the orientation and positioning unit (48).
5. Communication system (10) according to one of the previous claims,
10 **characterized in that** said virtual camera module (45) comprises or is connectable to a video camera (46) for capturing video and/or still pictures to be rendered on the display (43), an image and data processing unit (47) for producing an overlay (102) on the display (43), wherein said overlay contains said multimedia user information (101)
15 related to said status message (100) and to a current orientation and/or position of the portable device (40) with respect to said vehicle (20).
6. Communication system (10) according to claim 4, **characterized in that** said orientation and positioning unit (48) further comprises a compass (50) or is connectable to a compass (50).
- 20 7. Communication system (10) according to claim 4, **characterized in that** said orientation and positioning unit (48) further comprises an accelerometer (52).
- 25 8. Communication system (10) according to claim 7, **characterized in that** said context-sensitive multimedia user information (101) is also related to forces the portable device (40) is subject to, said forces being detected by the accelerometer (52).

9. Communication system (10) according to claim 4 to 8, **characterized in that** said orientation and positioning unit (48) further comprises a satellite positioning receiver (51).

10. Communication system (10) according to claim 9, **characterized in that** said context-sensitive multimedia user information (101) is also related to the absolute geographical position of the portable device (40), said absolute geographical position being detected by the satellite positioning receiver (51).

11. Communication system (10) according to one of the previous claims, **characterized in that** said display (43) is a touch-sensitive display.

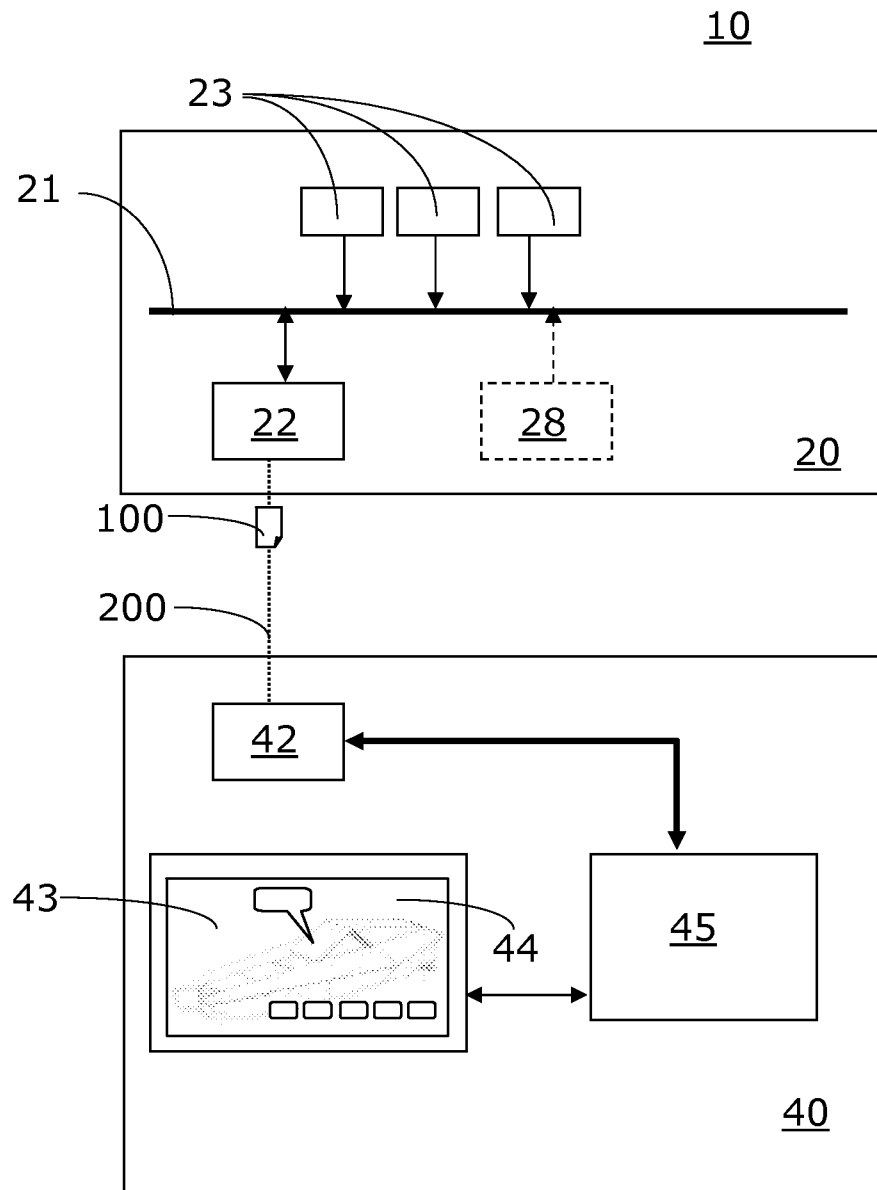
12. Communication system (10) according to one of the previous claims, **characterized in that**

- said vehicle (20) further comprises an additional orientation and positioning unit (28); and

- said status message (100) is also based on data obtained from said additional orientation and positioning unit (28).

13. Communication system (10) according to one of the previous claims, **characterized in that** said portable device (40) is connectable to or further comprises an additional transceiver (49) connectable to an open network (301) and capable of forwarding said status message (100) or related information to a corresponding transceiver (302) of a central service station (300) for receiving diagnostic and/or update information from said service station (300) based on the forwarded status message (100).

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**Fig. 1**

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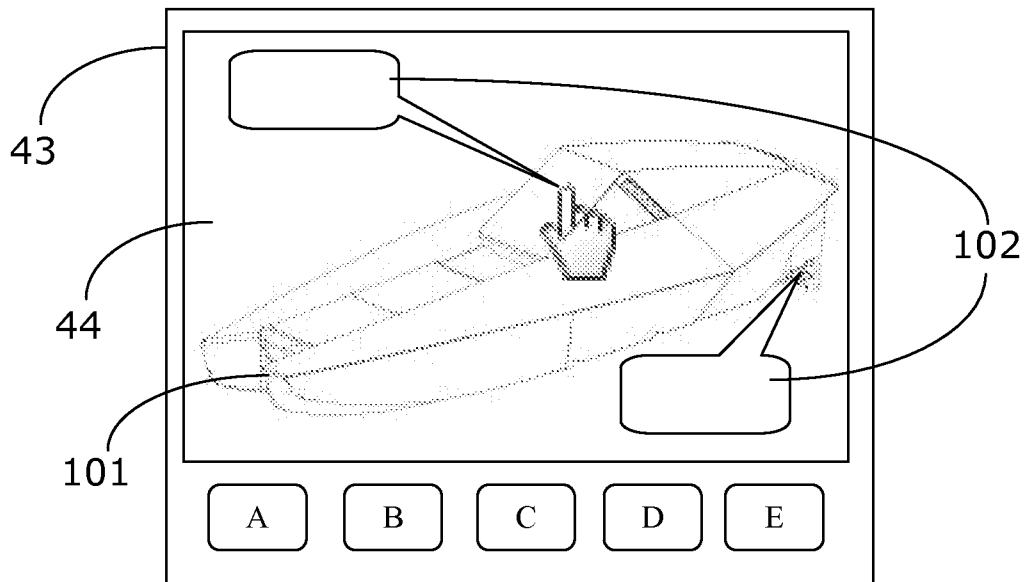


Fig. 2

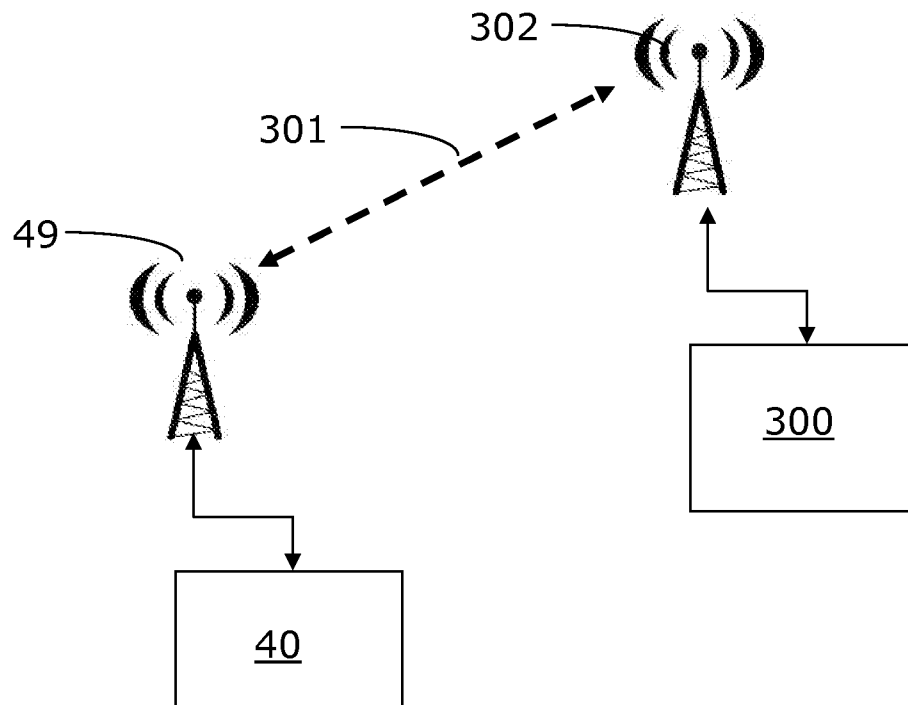


Fig. 3

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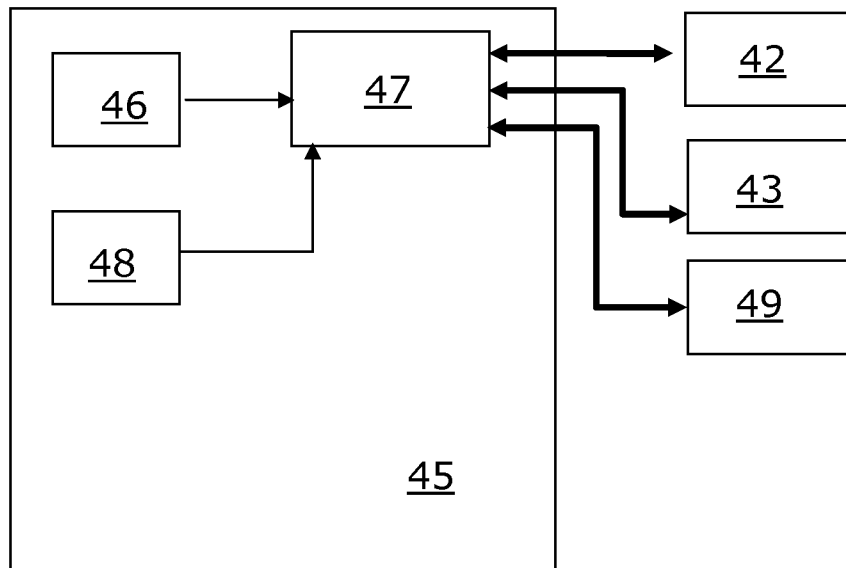


Fig. 4A

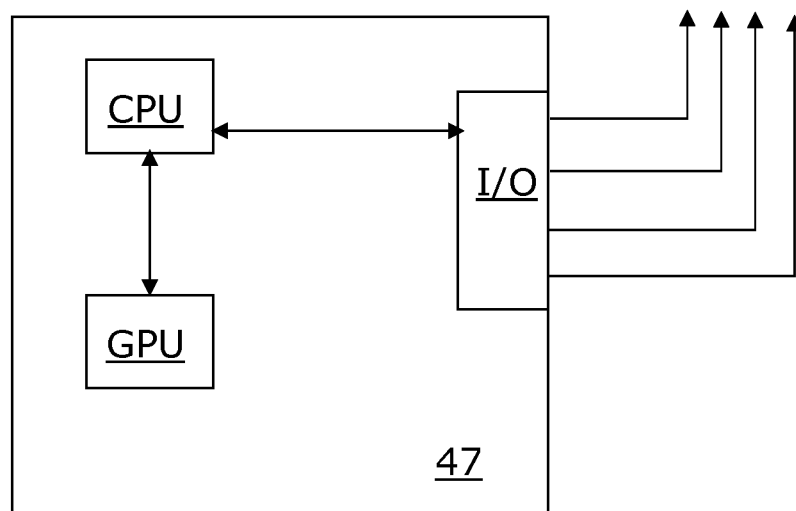
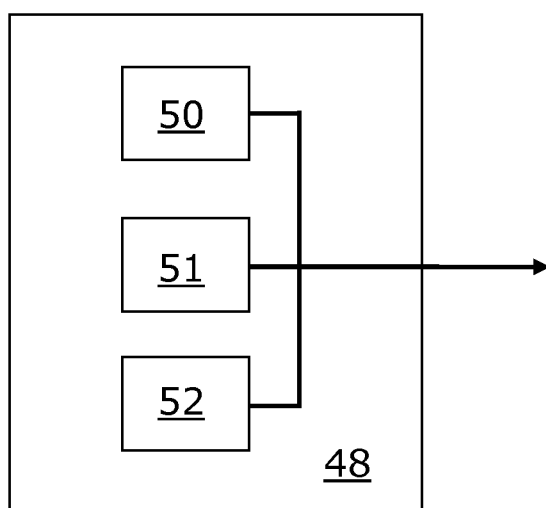


Fig. 4B

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**Fig. 4C**

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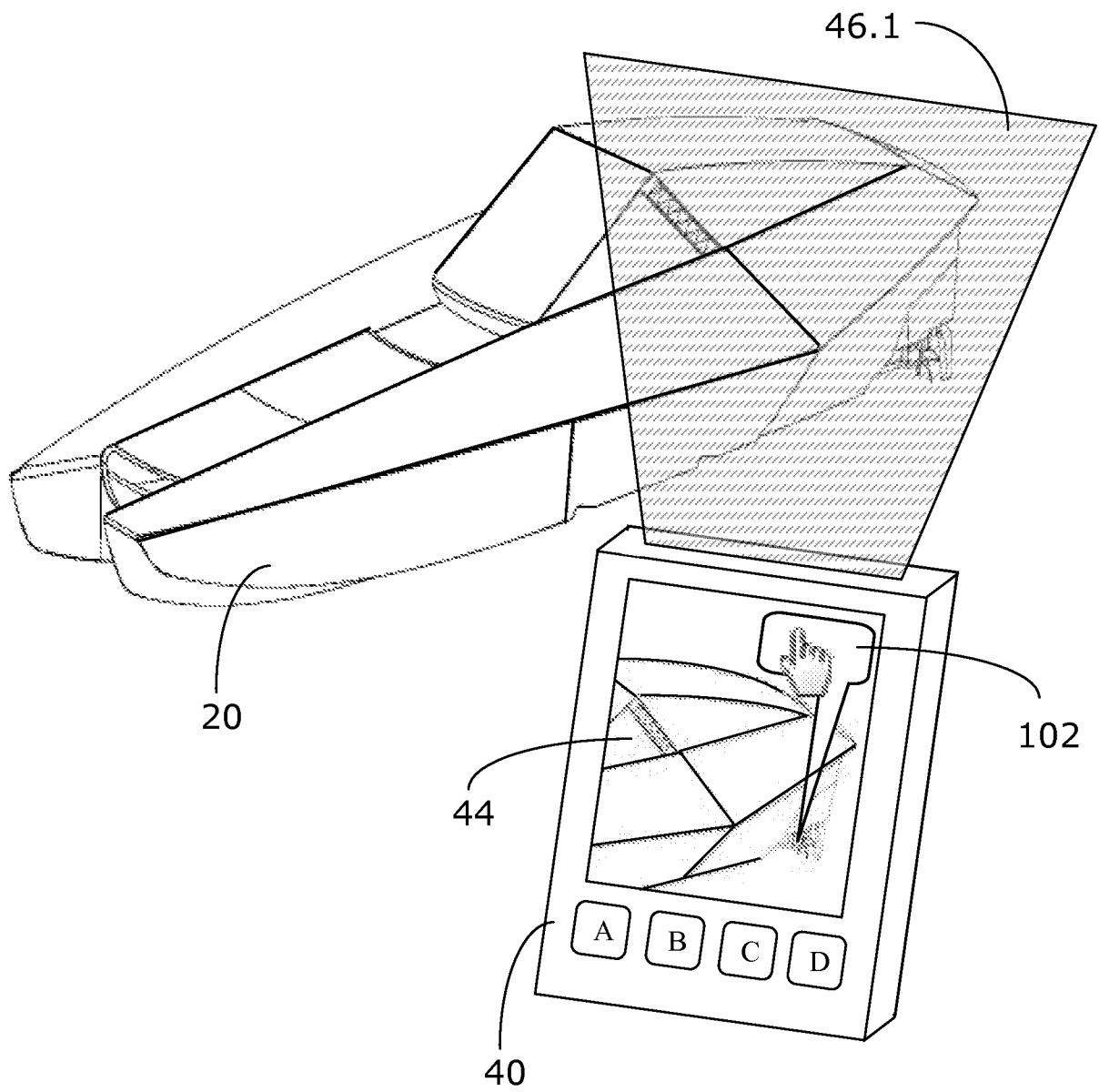


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2008/052771

A. CLASSIFICATION OF SUBJECT MATTER

INV. G07C5/08

ADD. G07C5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/142908 A1 (GRIER JEFF [US] ET AL) 29 June 2006 (2006-06-29) abstract paragraph [0006] paragraph [0013] - paragraph [0014] paragraph [0029] - paragraph [0043] -----	1-3
X	EP 1 284 472 A (DAIMLER CHRYSLER AG [DE]) 19 February 2003 (2003-02-19) abstract paragraph [0012] - paragraph [0024] -----	1-3
X	US 2005/131595 A1 (LUSKIN EUGENE [US] ET AL) 16 June 2005 (2005-06-16) abstract paragraph [0006] - paragraph [0009] paragraph [0021] - paragraph [0028] -----	1-3

☐

Further documents are listed in the continuation of Box C.

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See patent family annex.

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O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

8 document member of the same patent family

Date of the actual completion of the international search

26 November 2008

Date of mailing of the international search report

04/12/2008

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2008/052771

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
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			WO	2006071710 A1		06-07-2006
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