Title: METHOD FOR AN IN-VEHICLE APPARATUS, AN IN-VEHICLE APPARATUS AND A VEHICLE

Abstract: An in-vehicle apparatus can include a display configured to display data related to applications of a mobile device in communication with the in-vehicle apparatus and a communication interface operable to receive information data from the mobile device. The in-vehicle apparatus can also include a control unit operable to: receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located; if the speed exceeds a predetermined speed threshold, determine, based on received information data, at least one application associated with the mobile device that is to be blocked; and send a signal to the mobile device to instruct the mobile device to block output of data corresponding to the at least one application for display on the display.

Store a predetermined speed threshold and a list of applications, each application being associated with one or more mobile device models

Receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located

Receive information data from the mobile device

Retrieve identification information of applications in the list associated with the mobile device based on the received information data

Predefined speed encoder?

Control the display of display data related to those applications for which the identification information was received
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Description

Title of Invention: METHOD FOR AN IN-VEHICLE APPARATUS, AN IN-VEHICLE APPARATUS AND A VEHICLE

Cross Reference
[0001] This application is based on British Patent Application No. GB 1321040.6 filed on 29 November 2013, the disclosure of which is incorporated herein by reference.

Field
[0002] The present disclosure relates generally to an in-vehicle apparatus, a method for an in-vehicle apparatus and a vehicle.

Background
[0003] Vehicles may allow a user to connect or pair their mobile device, e.g., a mobile phone, with an in-vehicle device to allow the user to gain access to the mobile device via the in-vehicle device. For example, the user is able to make calls from their mobile phone, which is controlled by the in-vehicle device. Furthermore, some vehicles are fitted with hands-free systems that allow the user to use their mobile phone while driving without having to remove their hands from the controls of the vehicle. Additionally, other devices may be connected to the in-vehicle device, for example, a mobile device that allows the user to play-back music stored on the mobile device through the vehicle's sound system. The user may also be able to control the mobile device using the in-vehicle device.

[0004] JP 2009-281991 describes an in-vehicle apparatus that stores a table defining relationship between a driving status, information type (e.g. video or picture) and display status for displaying the data generated by a digital device. The apparatus provides a user with a display status that is suitable for the current driving condition. For example, when a vehicle is being driven at high speed, and the information type is video, the apparatus turns to a non-display mode. However, mobile devices that might be paired with the in-vehicle apparatus have a variety of different specifications and the control of the display based on the vehicle's speed is dependent on the vehicle specification.

Citation List

Patent Literature
[0005] PTL 1: JP2009-281991A

Summary
[0006] Particular aspects and embodiments are set out in the accompanying claims.
[0007] Viewed from a first aspect there can be provided an approach which allows an in-vehicle device to control the output from a connected mobile device to a display of the vehicle based upon the current speed of the vehicle and a classification category of the
connected mobile device. Thus the ability to replicate some or all of a display from a connected mobile device can be suspended for a given type or class of mobile device when a vehicle reaches a threshold speed. In some examples, the controlled output is a terminal mode output of a connected smartphone.

Viewed from another aspect, there can be provided an in-vehicle apparatus comprising: a display configured to display data related to applications of a mobile device in communication with the in-vehicle apparatus; a memory having stored therein a record comprising the identification information of at least one application, each application being associated with one or more mobile device models; a transceiver operable to receive model information data from the mobile device; and a control unit operable to: receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located; retrieve from the memory the identification information of the at least one application in the record associated with the mobile device based on received model information data; and control the display on the in-vehicle display of the display data related to the at least one application identified by the retrieved identification information, when the detected speed of the vehicle exceeds a predetermined speed threshold. Thereby speed and device model selective control of mobile device-originating display data can be effected.

In some examples, the memory has stored therein the predetermined speed threshold. Thus a speed threshold can be conveniently accessed.

In some examples, the predetermined speed threshold and the application record are stored in a different area of the memory. Thereby updates to either data set can be performed independently of the other, thus providing for updates based upon a device model release or alteration and updates based upon a vehicle preference alteration to be performed independently.

In some examples, the display on the in-vehicle display of the at least one application identified by the retrieved identification information is allowed when the detected speed of the vehicle exceeds the predetermined speed threshold. Thus a pass list of allowed applications for high speed travel can be provided.

In some examples, the display on the in-vehicle display of the at least one application identified by the retrieved identification information is prohibited when the detected speed of the vehicle exceeds the predetermined speed threshold. Thus a stop list of disallowed applications for high speed travel can be provided.

In some examples, the control unit is operable to generate a control signal for the mobile device comprising instructions for the mobile device to control the transmission of the display data related to an application from the mobile device to the in-vehicle apparatus. Thus control of display output is achieved by controlling the source of the display signals.
In some examples, the control unit is operable to interrogate display data received from the mobile device to determine the identity of an application in the display data. Thus control of display output is achieved by intercepting a display signal received from the mobile device.

In some examples, the apparatus further comprises a speed detection unit operable to detect the speed of the vehicle. Thereby the apparatus can directly obtain a vehicle speed.

In some examples, the predetermined speed threshold is associated with a mobile device model. Thus a speed-based application control can be performed on a per mobile device basis.

In some examples, the memory has stored therein a plurality of predetermined speed thresholds, one threshold for each mobile device model or for a group of mobile device models. Thereby different mobile devices can be subjected to application control at different vehicle speeds.

In some examples, the transceiver is operable to transmit control signals to the mobile device and receive display data related to at least one application from the mobile device. Thus remote application control can be provided for controlling the application of the mobile device.

In some examples, the at least one application includes a terminal mode application. Thereby all display output from the mobile device can be conveniently uniformly.

In some examples, different applications identified in the records are associated with different predetermined speed thresholds. Thereby different applications can be subjected to control at different vehicle speeds.

Viewed from another aspect there can be provided a vehicle comprising the above apparatus.

Viewed from a further aspect there can be provided a method for an in-vehicle apparatus comprising the steps of: storing a record of applications, each application being associated with one or more mobile device models; receiving a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located; receiving model information data from the mobile device; retrieving identification information for at least one application in the record associated with the mobile device based on the received model information data; and controlling the display on a display of the in-vehicle apparatus of the at least one application identified by retrieved identification information, when the detected speed of the vehicle exceeds a predetermined speed threshold. Thereby speed and device model selective control of mobile device-originating display data can be effected.

Viewed from another aspect there can be provided a computer program product comprising processor implementable instructions for causing a programmable device
to carry out the above method and/or to become configured as the above apparatus.

Further feature combinations provided by the present teachings will be understood from the following detailed description and the accompanying figures.

**Brief Description of Drawings**

The present teachings will now be described by way of example only and with reference to the following drawings in which like numerals reflect like elements:

- **[fig.1]** Figure 1 illustrates schematically the interior dash of a vehicle;
- **[fig.2]** Figure 2 illustrates schematically an in-vehicle apparatus and a mobile device;
- **[fig.3]** Figure 3 illustrates an example process flow performed by the in-vehicle apparatus;
- **[fig.4]** Figure 4 illustrates an example process flow performed by the in-vehicle apparatus; and
- **[fig.5]** Figure 5 illustrates an example process flow performed by the in-vehicle apparatus.

**Description of Embodiments**

While the disclosure is susceptible to various modifications and alternative forms, specific embodiments are shown by way of example in the drawings and are herein described in detail. It should be understood however that drawings and detailed description attached hereto are not intended to limit the disclosure to the particular form disclosed but rather the disclosure is to cover all modifications, equivalents and alternatives falling within the scope of the claimed invention.

Figure 1 illustrates schematically a part of the interior 1 of a vehicle according to one example. In this example the dashboard of a vehicle is illustrated in the figure, but it will be appreciated that other parts of the vehicle that include an in-vehicle apparatus may also be used. For example, an in-vehicle apparatus may be installed in the headrest of either or both of the fronts seats of a vehicle, viewable by passengers seated in the rear of the vehicle.

The interior part 1 of the vehicle includes an in-vehicle apparatus 2. The in-vehicle apparatus 2 in this example is a display capable of displaying content received from a connected device 4. The display 4 may also include other functionality, for example satellite navigation unit or sat-nav, entertainment controls (e.g., volume, track, skip, pause), or vehicle system control. The in-vehicle apparatus 2 includes a display 10 for displaying the content received from a connected device 4, and if the apparatus includes such functionality, displaying information regarding route planning and information related to the vehicle. In this example, the display is a liquid crystal display or LCD, but other display technologies may be used, e.g., a light-emitting diode display or an electroluminescent display.
Figure 1 also illustrates a mobile device 4 that is in communication with the in-vehicle apparatus 2. The mobile device 4 in this example is a mobile telephone or mobile phone. However, the mobile device 4 may also include a portable music player or other portable or mobile electronic device capable of interfacing with the in-vehicle apparatus 2. The communication between the in-vehicle apparatus and the mobile device is two-way.

The mobile device 4 in this example is not part of the vehicle or the in-vehicle apparatus 2. The mobile device 4 is in communication with the in-vehicle apparatus 2 using a wired or wireless connection. For example, the mobile device 4 may be connected to the in-vehicle apparatus 2 using a USB connection. Further examples, include wired or wireless connections using Bluetooth, IEEE 1394, IEEE802.11 or ZigBee, but the connection is not limited to these examples. The mobile device 4 includes a display 6 and a keypad 8. It will be appreciated that the keypad 8 may be part of the display 6 in the form of a touch screen. The display 6 of the mobile device 4 is an LCD, but other display technologies may be used, e.g., a light-emitting diode display or an electroluminescent display.

Figure 2 illustrates schematically the in-vehicle apparatus 2 and the mobile device 4. The in-vehicle apparatus 2 includes a display unit 10, a memory 16, a communication unit 18 and a control unit 20. The communication unit 18 may also be referred to as a transceiver for transferring data to and from the mobile device 4. The memory 16 is in the form of a ROM and RAM, but may be any form of solid state memory or drive. For example, the memory may be in the form of a removable flash drive or a hard-disc drive. The display unit or display 10 includes a display screen 12, for example an LCD, and a touch-screen or touch panel 14 in the form of a capacitive touch panel, for example, that is overlaid on the display screen 12. The touch screen may also be provided using alternative technologies, for example, resistive or infrared.

It will be appreciated that a control panel may be used that is separate from the display screen 10, for example, the in-vehicle apparatus 2 may include a separate control panel including a number of push buttons allowing user control of the in-vehicle apparatus 2. The input unit may also include a rotary type control, jockey-wheel or other directional control device.

The communication unit or transceiver 18 includes hardware and software to allow the in-vehicle apparatus 2 to communicate with the mobile device 4. In this example, the communication unit 18 uses a wired connection using a USB connection on each of the in-vehicle apparatus 2 and the mobile device 4. It will be appreciated that when the mobile device 4 is connect to the in-vehicle apparatus using a USB connection on the in-vehicle apparatus, a communication channel is established using known techniques. Any software used by the communication unit 18 is stored within a ROM (not shown).
of the communication unit 18, but may also be stored in the ROM part of the memory 16 of the in-vehicle apparatus 2. As described above, the communication between the mobile device 4 and the in-vehicle apparatus 2 may also be implemented using other forms of wired or wireless connection.

[0034] The control unit 20 provides the control of the elements of the in-vehicle apparatus 2 and is in communication with the memory 16, the display 10 and the transceiver 18. The control unit 20 also receives vehicle related information from a communication bus 22 of the vehicle, e.g., vehicle speed information, vehicle temperature data or tachometer data.

[0035] The mobile device 4 includes a display unit 24, a memory 26, a communication unit or transceiver 28 and a control unit 30. The memory 26 is in the form of a ROM and RAM, but may be any form of solid state memory or drive. For example, the memory may be in the form of a removable flash drive or a hard-disc drive. The display unit 24 includes the display screen 6, for example an LCD, and a touch panel 8 in the form of a capacitive touch panel, for example. The touch panel may be overlaid on the display screen 6 or may be arranged on a separate part of the mobile device. The touch screen may also be provided using alternative technologies, for example, resistive or infrared.

[0036] It will be appreciated that control of the mobile device 4 may be affected using a separate control panel including a number of push buttons allowing user control of the mobile device 4. The input unit may also include a rotary type control, jockey-wheel or other directional control device.

[0037] The communication unit or transceiver 28 includes hardware and software to allow the mobile device 4 to communicate with the in-vehicle apparatus 2. In this example, the transceiver 28 uses USB to communicate with the in-vehicle apparatus 2. Any software used by the transceiver 28 is stored within a ROM (not shown) of the communication unit 28, but may also be stored in the ROM part of the memory 26 of the mobile device 4. As described above, the communication between the mobile device 4 and the in-vehicle apparatus 2 may also be implemented using other forms of wired or wireless connection.

[0038] The mobile device 4 in this example is a mobile phone. However, it may also be a mobile tablet pc, or music device, for example, which may or may not include a telephone capability. Nevertheless, it will be appreciated that those aspects of the mobile device that are not related to the present teachings are not described, but it will be understood that these are implemented using known techniques.

[0039] The control unit 30 provides the control of the elements of the mobile device 4 and is in communication with the memory 26, the display 24 and the communication unit 24. For example, the control unit 30 may receive a control signal from a user on from the input device 8 to launch an application. The applications can be any application ex-
ecutable by the mobile device and may include one or more of an audio playback application, a video playback application, an information presentation application, a game, an information recordal and/or retrieval application (such as an name and address application), and a system application such as a terminal mode application. The control unit 30 will control the display screen 6 to display the launched application.

As previously described, the mobile device 4 and the in-vehicle apparatus 2 communicates via connection 32. More specifically, the communication unit 28 of the mobile device 4 communicates with the communication unit 18 of the in-vehicle apparatus 2. According to one example the in-vehicle apparatus 2 receives data from the mobile device 4 related to data displayed on the display screen 6 of the mobile device 4. Furthermore, control signals from the control unit 20 of the in-vehicle apparatus 2 are transmitted to and received from the control unit 30 of the mobile device 4 via the established communication channel 32.

In this example, a Virtual Network Computing (VNC) type approach is used to allow the in-vehicle apparatus 2 to transmit control signals via connection 32 to the mobile device 2 and to allow the display or parts thereof of the mobile device 2 to be reproduced on the display screen 12 of the in-vehicle apparatus 2. It will be appreciated that other protocols may be used instead of VNC such as X Window System (or X11) or a terminal mode system such as MirrorLink (Trademark).

If the mobile device 4 includes a map or route planning application, the user may wish to display this on the display screen 12 of the in-vehicle apparatus 2. A further example may be a video player application available on the mobile device 4 that the user may wish to be displayed on the display screen 12 of the in-vehicle apparatus 2. By way of example it is assumed that a route planner application and a video player application, when executed on the mobile device 4 can be displayed on the screen 12 of the in-vehicle apparatus 2.

Figure 3 is a flow chart of a process performed by the control unit 20 of the in-vehicle apparatus 2 to control the display of applications executed on the mobile device 4 on the display screen 12 of the in-vehicle apparatus 2. Before the steps illustrated in Figure 3 are performed it will be appreciated the mobile device 4 and the in-vehicle apparatus 2 will establish a communication channel. This is performed in a typical manner known to those skilled in the art. For example, the control unit 30 of the mobile device 4 will search for devices in the vicinity and prompt a user to select a device to connect to. The user selects the in-vehicle apparatus and a two-way communication channel between the mobile device 4 and the in-vehicle apparatus 2 is established. During the process of establishing a connection device identifications are transferred between the two devices. These identifications are stored in the respective
memories 16, 26 of the in-vehicle apparatus 2 and the mobile device 4.

In step S3-1, a list or other store of records containing the names of applications executable on mobile devices is stored. Each application is associated with one or more information types relating to a mobile device, such as mobile device models, platforms, operating systems or versions thereof. The list can be created using one or more of the possible information types relating to the mobile device. In one example list, a first entry in the list is for an application called <Route planner>, which is associated with Mobile Device 1 and Mobile Device 2 and a second entry in the list is for an application called <Video player> and is associated with Mobile Device 1 and Mobile Device 3. In another example list, a first entry in the list is for an application called <Navigator>, which is associated with Mobile Device Platform 1, versions 2 and 3 and with Mobile Device Platform 2, version 4 and a second entry in the list is for an application called <Messager> which is associated with Mobile Device Operating System 2 and Mobile Device Platform 3. In some implementations, different entries on the list may be associated with different speed thresholds, for example depending upon the level of drive interruption or distraction a given application is deemed to create. Thus a driver assistance application such as a navigation application may be set having a higher speed threshold than a visual content presentation application such as a video player application. The list of application names is stored in the memory 16 of the in-vehicle apparatus. The list may be pre-stored when the in-vehicle apparatus 4 is initially installed in a vehicle, or may be uploaded by a user, and may also be uploaded / updated via a mobile device or other means, such as from a storage device compatible with the in-vehicle apparatus 2.

In a separate list or other store of records a speed threshold is stored. This separate list is in the present example stored in a different location of the memory to the application list. The storage of the speed threshold is also performed in step S3-1. Step S3-1 may suitably be performed before a mobile device is connected or paired with the in-vehicle apparatus 4. However, the application lists and speed threshold data may be uploaded to the in-vehicle apparatus 2 after a mobile device has been paired with the in-vehicle apparatus 2. If the speed threshold is stored in a different location to the application list, it may be easier to update with different values. In some examples the speed threshold may include multiple speed thresholds each associated with one or more applications. Thus different application may be controlled according to differing speed thresholds. For example an application that is considered to have a relatively low driver distraction impact may have a higher speed threshold than an application that is considered to have a relatively high driver distraction impact.

In step S3-2, the in-vehicle apparatus 2 receives a signal indicative of the speed of the vehicle in which the mobile device 4 is located. The indication of the speed is
received from a communication channel or bus 22 of the vehicle that contains data related to the vehicle. In this example, the speed related data is transmitted from a vehicle's central processing unit (CPU). The CPU of the vehicle will preferably receive speed data from a sensor mounted on the vehicle which can be relayed to the in-vehicle apparatus 2. Furthermore, in this example the in-vehicle apparatus 2 transits a request to the CPU of the vehicle to obtain the indication of the vehicle's speed. Alternatively, the in-vehicle apparatus may be configured to periodically receive an indication of the vehicle's speed from the vehicle's CPU.

In step S3-3, the in-vehicle apparatus 2 receives data regarding the information data of the mobile device 4 that is paired with the in-vehicle apparatus 2. The information data provides the control unit with data describing one or more information types relating to a mobile device, such as mobile device models, platforms, operating systems or versions thereof. The information data of the mobile device 4 may be transmitted from the mobile device 4 when the communication channel between the mobile device 4 and the in-vehicle apparatus 2 is established. This information data is then stored in the memory 16 of the in-vehicle apparatus 2 for later retrieval, such that in step S3, the model information of the mobile device 4 is retrieved from the memory 16.

In step S3-4, the in-vehicle apparatus 2 accesses the memory 16 to retrieve the application list. In particular, the in-vehicle apparatus 2 retrieves the names or identification information of those applications that appears in the list that are associated with the information data for the mobile device connected to the in-vehicle apparatus 2. Using the first example list illustrated above, if the mobile device 4 model is Model Device 1, the names or identification information <Route planner> and <Video player> are retrieved from the list in the memory 16 and if the mobile device 4 model is Model Device 2, only the name <Route planner> is retrieved from the list in the memory 16.

In step S3-5, the in-vehicle apparatus 2 periodically receives the data related to the speed of the vehicle from the vehicle's communication bus and compares the received indication of the vehicle's speed to the stored speed threshold, which is retrieved from the memory 16 when the comparison is performed. If in step S3-5 it is determined that the indicated speed of the vehicle is not greater than the speed threshold, the process returns to the beginning of step S3-5 and continues to compare the threshold speed to the indicated vehicle's speed. If it is determined in S3-5 that the indicated speed of the vehicle exceeds the retrieved speed threshold the process moves to step S6.

In step S3-6, the control unit 20 of the in-vehicle apparatus controls the display of applications on the display screen 12 of the in-vehicle apparatus. The control performed by the control unit 20 may be to permit the display of only those applications whose
identification information was retrieved from the memory 16 or may be to prohibit the display of those applications whose identification information was retrieved from the memory 16.

[0051] For example, compared to the first example list above, if the mobile device is Device Model 1, application names or identification information <Route planner> and <Video player> are returned from the memory 16 in step S4. When it is determined that the vehicle's indicated speed exceeds the stored threshold speed, the applications <Route planner> and <Video player> are prohibited from being displayed on the display screen 12 of the in-vehicles apparatus 2. Alternatively, when it is determined that the vehicle's indicated speed exceeds the stored threshold speed, applications <Route planner> and <Video player> running on the mobile device are the only applications that can be displayed on the display screen 12 of the in-vehicles apparatus 2. That is to say that all other applications are prohibited from being displayed except for <Route planner> and <Video player> running when the indicated speed of the vehicle exceeds the speed threshold.

[0052] The control of the display of the applications on the in-vehicle apparatus 2 is now described. In this example, when it is determined that the speed of the vehicle exceeds the threshold speed, the control unit 20 transmits a control signal to the mobile device 4 to command the mobile device 4 to cease or prevent the mobile device transmitting display data related to the application whose identification information appears in the list associated with the mobile device model. Alternatively, the control signal may command the mobile device 4 to only transmit display data of those applications whose identification information appears in the list when the indicated speed of the vehicle exceeds the speed threshold. It will be appreciated that the display data will only be transmitted or prevented from being transmitted from the mobile device 4 when the identified application is running on the mobile device 4.

[0053] Thus it is possible to control the display of certain applications based on the mobile device model according to the speed of the vehicle.

[0054] In another example, the control unit 20 of the in-vehicle apparatus does not transmit control signals to the mobile device 4. Instead, the control unit 20 interrogates received displayed data from the mobile device 4 to determine which application the display data is related to. For example, the control unit 20 interrogates the display data to determine the name or identification of the application contained within the data. Once the control unit 20 has discovered the name of the application from the display data the process of determining whether or not to display the display data is performed. In this example, all display data that is transmitted from the mobile device 4 is interrogated to determine the name of the application that is contained with the display data.

[0055] The predetermined speed threshold that is stored in the memory 16 of the in-vehicle
may also be associated with one or more mobile device models. Furthermore, the memory 16 may store a plurality of predetermined speed thresholds, which are stored for each mobile device model.

[0056] In another example the in-vehicle apparatus 2 includes a speed detection unit (not shown). For example, the speed detection unit may be in the form of an application executed on the in-vehicle apparatus 2 that uses the vehicle's movement based on GPS data to determine the vehicle's speed.

[0057] With reference now to Figure 4, a further example illustrating operation of a process performed by the control unit 20 of the in-vehicle apparatus 2 to control the display of applications executed on the mobile device 4 on the display screen 12 of the in-vehicle apparatus 2.

[0058] As with the example of Figure 3 above, this method presupposes that the mobile device and in-vehicle apparatus already have a connection established. If no such connection has been established, then a connection will be established as the first part of the method of claim 4 (although not shown in Figure 4).

[0059] As shown in Figure 4, the process starts with the in-vehicle apparatus receiving information data from a connected mobile device at step S4-1. This information data provides to the in-vehicle apparatus information describing one or more properties of the mobile device, such as mobile device model, platform, operating system or version thereof.

[0060] Next, at step S4-2 the in-vehicle apparatus checks whether a list of applications corresponding to the mobile device information data exists. This check therefore establishes whether the in-vehicle apparatus already knows of the particular mobile device model, platform, operating system, and/or version is known to the control unit for the purposes of controlling display of content from the mobile device on a display of the in-vehicle apparatus.

[0061] If the check reveals that no list of applications corresponding to the information data for the connected device exists, then at step S4-3 the in-vehicle apparatus prohibits display control for that mobile device. At this time a message indicating that display from the connected mobile device is not allowed can optionally be displayed to alert a user to the device incompatibility. As will be appreciated from the above discussion, if an update for the in-vehicle apparatus is performed then a list corresponding to this mobile device may be added to the in-vehicle apparatus such that future connections from that mobile device may become acceptable.

[0062] If on the other hand, the check reveals that a list of applications does exist for the information data of the connected mobile device, then at step S4-4 the in-vehicle apparatus retrieves the ID of applications in the list.

[0063] Once the in-vehicle apparatus has retrieved the ID of applications in the list, the
process continues at step S4-5 with the in-vehicle apparatus receiving a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located. As discussed above for the example of Figure 3, the signal indicative of the speed of the vehicle can be received via and from one of a number of elements of the vehicle, but in any case the signal will originate or be derived from a device with a capability of measuring or inferring the speed of the vehicle, such as a wheel, shaft or engine rotation measurement device associated with the moving parts of the vehicle, or from a navigation device such as a satellite navigation device, for from a motion inhibiter such as a handbrake, or a combination of these.

Next, at step S4-6, a check is performed to determine whether the vehicle speed exceeds a predetermined threshold. There may be a single speed threshold against which the check is performed or multiple thresholds. In addition, the in-vehicle apparatus may hold the threshold(s) as information that it has independently of an application list for a connected mobile device or the threshold(s) may be associated with or received from a connected mobile device, for example the threshold(s) may be included in the application list or with the IDs of the applications in the list.

If it is determined at step S4-6 that the speed does not exceed the threshold (or in the case of multiple thresholds - that the speed exceeds less than all thresholds) then at step S4-7 the in-vehicle system informs the connected mobile device that display (in general or of the specific applications in the list) is permitted. In the case of multiple thresholds being employed, then the mobile device may be informed of specific application ID associated with applications for which display is allowed.

As the speed of a vehicle can change over time, processing returns to step S4-5 where an updated signal indicative of the vehicle speed is received and processed as above. If during such processing of such an updated signal, the alternative path of S4-8 and S4-9 is selected from the check at step S4-6 then the previous actions at step S4-7 are over-ridden by the new actions taken in step S4-8 and S4-9 for that later iteration.

On the other hand, if it is determined at step S4-6 that the speed does exceed the threshold (or in the case of multiple thresholds - that the speed exceeds one or more thresholds) then at step S4-8 the in-vehicle system informs the connected mobile device of any application IDs associated with applications that are prohibited from display on a display of the in-vehicle apparatus at this time. Where multiple thresholds are used and the speed threshold check reveals that some but not all thresholds have been exceeded, then the in-vehicle apparatus will inform the connected mobile device of the application IDs of applications for which the associated threshold has been exceeded, but will not inform the connected mobile device of application IDs of applications for which the threshold has not been exceeded.

At this time, the in-vehicle apparatus can present at step S4-8 a message (for example
visually on a display of the in-vehicle apparatus, but an audible message could be presented as well or instead) to inform an occupant of the vehicle that display of content from the mobile device is unavailable or prohibited. The message could be a display unavailable message or could be an associated message such that a notification that the vehicle is in motion. Where multiple thresholds are used, the display of such a message could be reserved until all thresholds have been exceeded, or a message could be presented along with presentation of content from non-prohibited applications.

[0069] As the speed of a vehicle can change over time, processing returns to step S4-5 where an updated signal indicative of the vehicle speed is received and processed as above. If during such processing of such an updated signal, the alternative path of S4-7 is selected from the check at step S4-6 then the previous actions at step S4-8 and S4-9 are over-ridden by the new actions taken in step S4-7 for that later iteration.

[0070] As will be appreciated from the above discussion, if multiple thresholds are employed, then action may be taken at S4-8 and S4-9 in respect of some applications where at least one threshold is exceeded at the same time that action may be taken at S4-7 in respect of some applications where at least one threshold is not exceeded.

[0071] As noted above, there may be occasions where one or more applications is permitted for display even though a speed threshold has been exceeded. This can occur in situations where a single speed threshold is applied and in situations where multiple speed thresholds apply. Although the above description refers to informing the mobile device of applications that are prohibited from display when a speed threshold is exceeded, it is also anticipated that the system can be arranged to additionally or alternatively inform the mobile device of what applications are permitted for display at any given time (including both when the speed threshold is not exceeded and when the speed threshold is exceeded). To facilitate this, the list of applications may be include one or both of positive and negative conditions relating to when content from a particular application may be displayed.

[0072] Thus there has now been described another example of an approach for in in-vehicle apparatus to control display of content from a connected mobile device in dependence upon the current speed of the vehicle and the particular application for which display of content is desired.

[0073] With reference now to Figure 5, a further example illustrating operation of a process performed by the control unit 20 of the in-vehicle apparatus 2 to control the display of applications executed on the mobile device 4 on the display screen 12 of the in-vehicle apparatus 2. In this example, the decision on whether to permit display based upon vehicle speed can be supplemented by the engagement or otherwise of a supplementary vehicle safety function.

[0074] As with the example of Figures 3 and 4 above, this method presupposes that the
mobile device and in-vehicle apparatus already have a connection established. If no such connection has been established, then a connection will be established as the first part of the method of claim 5 (although not shown in Figure 5).

As shown in Figure 5, the process starts with the in-vehicle apparatus receiving information data from a connected mobile device at step S5-1. This information data provides to the in-vehicle apparatus information describing one or more properties of the mobile device, such as mobile device model, platform, operating system or version thereof.

Next, at step S5-2 the in-vehicle apparatus checks whether a list of applications corresponding to the mobile device information data exists. This check therefore establishes whether the in-vehicle apparatus already knows of the particular mobile device model, platform, operating system, and/or version is known to the control unit for the purposes of controlling display of content from the mobile device on a display of the in-vehicle apparatus.

If the check reveals that no list of applications corresponding to the information data for the connected device exists, then at step S5-3 the in-vehicle apparatus prohibits display control for that mobile device. At this time a message indicating that display from the connected mobile device is not allowed can optionally be displayed to alert a user to the device incompatibility. As will be appreciated from the above discussion, if an update for the in-vehicle apparatus is performed then a list corresponding to this mobile device may be added to the in-vehicle apparatus such that future connections from that mobile device may become acceptable.

If on the other hand, the check reveals that a list of applications does exist for the information data of the connected mobile device, then at step S5-4 the in-vehicle apparatus retrieves the ID of applications in the list.

Once the in-vehicle apparatus has retrieved the ID of applications in the list, the process continues at step S5-5 with the in-vehicle apparatus receiving a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located. As discussed above for the example of Figures 3 and 4, the signal indicative of the speed of the vehicle can be received via and from one of a number of elements of the vehicle, but in any case the signal will originate or be derived from a device with a capability of measuring or inferring the speed of the vehicle, such as a wheel, shaft or engine rotation measurement device associated with the moving parts of the vehicle, or from a navigation device such as a satellite navigation device, for from a motion inhibiter such as a handbrake, or a combination of these.

Next, at step S5-6, a check is performed to determine whether the vehicle speed exceeds a predetermined threshold. There may be a single speed threshold against which the check is performed or multiple thresholds. In addition, the in-vehicle
apparatus may hold the threshold(s) as information that it has independently of an application list for a connected mobile device or the threshold(s) may be associated with or received from a connected mobile device, for example the threshold(s) may be included in the application list or with the IDs of the applications in the list.

If it is determined at step S5-6 that the speed does not exceed the threshold (or in the case of multiple thresholds - that the speed exceeds less than all thresholds) then at step S5-7 the in-vehicle system informs the connected mobile device that display (in general or of the specific applications in the list) is permitted. In the case of multiple thresholds being employed, then the mobile device may be informed of specific application ID associated with applications for which display is allowed.

On the other hand, if it is determined at step S5-6 that the speed does exceed the threshold (or in the case of multiple thresholds - that the speed exceeds one or more thresholds) then at Step S5-8 a check is performed to determine whether a safety function is activated. This check is performed as some vehicle safety functions may operate to mitigate the impact of temporary driver distraction and thus allow an application to be displayed at a higher speed than would otherwise be the case. Examples of safety functions that could be taken into account include systems that provide some degree of autonomous driving control such as an adaptive cruise control (i.e. a system that governs the speed of a vehicle based upon the distance from the vehicle to a next closest vehicle and/or the speed of a next closest vehicle) or an automatic vehicle convoy control (i.e. a system that governs speed and/or steering of a vehicle based upon the speed and/or direction and/or predicted direction of a teamed vehicle in a controlled convoy or <Virtual train>).

If it is determined at step S5-9 that a safety function is activated then at step S5-9 an adjusted list of prohibited applications is selected. This adjusted list may alter whether one or more applications is prohibited for the speed threshold and/or for the case of using multiple speed thresholds may move one or more applications from a first speed threshold to a second speed threshold. The outcome of this step may therefore trigger or alter a display of permission to display being granted at step S5-7.

After selecting the adjusted list at step S5-9 or if it is determined that no safety function is activated at step S5-8, the in-vehicle system informs (step S5-10) the connected mobile device of any application IDs associated with applications that are prohibited from display on a display of the in-vehicle apparatus at this time. Where multiple thresholds are used and the speed threshold check reveals that some but not all thresholds have been exceeded, then the in-vehicle apparatus will inform the connected mobile device of the application IDs of applications for which the associated threshold has been exceeded, but will not inform the connected mobile device of application IDs of applications for which the threshold has not been exceeded.
At this time, the in-vehicle apparatus can present at step S5-11 a message (for example visually on a display of the in-vehicle apparatus, but an audible message could be presented as well or instead) to inform an occupant of the vehicle that display of content from the mobile device is unavailable or prohibited. The message could be a display unavailable message or could be an associated message such that a notification that the vehicle is in motion. Where multiple thresholds are used, the display of such a message could be reserved until all thresholds have been exceeded, or a message could be presented along with presentation of content from non-prohibited applications.

As will be appreciated from the above discussion, if multiple thresholds are employed, then action may be taken at S5-8 to S5-11 in respect of some applications where at least one threshold is exceeded at the same time that action may be taken at S5-7 in respect of some applications where at least one threshold is not exceeded.

To take account of the ability of the vehicle speed to change over time, the speed of the vehicle relative to the speed threshold is checked on multiple occasions over time. In this example the method of checking for changes is by use of an interrupt-type arrangement where a change in the vehicle speed (S5-12) triggers a new test for whether the speed threshold has been exceeded. The speed change trigger can be determined as a change of more than a certain absolute or percentage value from the last measured speed. Alternatively or in addition the trigger can include a timer to ensure that the speed threshold test is carried out often enough. In the alternative, this repeated check can be implemented by a loop-back as illustrated with reference to Figure 4 above.

Similarly, as a safety function may be activated or deactivated at different times, the activation of the safety function can be checked to ensure that the state of the safety function used to determine the prohibited applications at one time still applies at a later time. Thus a safety function change (step S5-13) trigger can be provided to cause the test at step S5-8 to be re-made when a safety function activation state changes.

Although not shown in figure 5, the test for whether a vehicle safety function is activated could look for a given vehicle safety function condition. Taking the example of an adaptive cruise control, the in-vehicle device could use a signal describing a current inter-vehicle distance (either in absolute terms or relative to the threshold) as measured by the adaptive cruise control as an input to selecting an adjusted list of prohibited applications.

As noted above, there may be occasions where one or more applications is permitted for display even though a speed threshold has been exceeded. This can occur in situations where a single speed threshold is applied and in situations where multiple speed thresholds apply. Although the above description refers to informing the mobile device of applications that are prohibited from display when a speed threshold is exceeded, it is also anticipated that the system can be arranged to additionally or alter-
natively inform the mobile device of what applications are permitted for display at any
given time (including both when the speed threshold is not exceeded and when the
speed threshold is exceeded). To facilitate this, the list of applications may be include
one or both of positive and negative conditions relating to when content from a
particular application may be displayed.

[0091] Thus there has now been described another example of an approach for in-vehicle
apparatus to control display of content from a connected mobile device in dependence
upon the current speed of the vehicle and the particular application for which display
of content is desired. In this example, the impact of supplementary safety equipment in
the vehicle can be taken into account.

[0092] While the disclosure is described herein by way of example for several embodiments
and illustrative drawings, those skilled in the art will recognize that the disclosure is
not limited to the embodiments or drawings described. It should be understood, that the
drawings and detailed description thereto are not intended to limit the disclosure to the
particular form disclosed, but on the contrary, the intention is to cover all modi-
fications, equivalents and alternatives falling within the spirit and scope of the present
disclosure. The headings used herein are for organizational purposes only and are not
meant to be used to limit the scope of the description. As used throughout this ap-
plication, the word may is used in a permissive sense (i.e. meaning might) rather than
the mandatory sense (i.e., meaning must). Similarly, the words include, including, and
includes mean including, but not limited to.
Claims

[Claim 1] An in-vehicle apparatus comprising:
a display configured to display data related to applications of a mobile
device in communication with the in-vehicle apparatus;
a communication interface operable to receive information data from
the mobile device; and
a control unit operable to:
i) receive a signal indicative of the speed of a vehicle in which the in-
vehicle apparatus is located;
ii) if the speed exceeds a predetermined speed threshold, determine,
based on received information data, at least one application associated
with the mobile device that is to be blocked; and
iii) send a signal to the mobile device to instruct the mobile device to
block output of data corresponding to the at least one application for
display on the display.

[Claim 2] The apparatus according to claim 1, wherein control unit is further
operable to receive a signal from the mobile device acknowledging that
the at least one application is blocked.

[Claim 3] The apparatus according to claim 1 or 2, wherein control unit is further
operable cause the display to display a message indicating un-
availability of mobile device content for display.

[Claim 4] The apparatus according to claim 1, 2 or 3, wherein the information
data from the mobile device is information indicating one or more
properties of the mobile device selected from the group comprising a
model information of the mobile device; platforms information of the
mobile device, operating systems information of the mobile device, and
version information of a model, platform and/or operating system of the
mobile device.

[Claim 5] The apparatus of claim 4, further comprising:
a memory having stored therein a record comprising an identification
information of at least one application, each application being as-
associated with one or more mobile device models, platforms, operating
systems and/or versions thereof; and
wherein the control unit operable to retrieve from the memory the iden-
tification information of the at least one application in the record as-
associated with the mobile device based on received information data.

[Claim 6] The apparatus according to any preceding claim, further comprising a
memory having stored therein a record comprising the identification information of at least one application, each application being associated with one or more mobile device information data.

[Claim 7] The apparatus according to any claim 6, wherein the control unit is further operable to prohibit display of output data from the mobile device if the information data of the mobile device does not correspond to any application information record.

[Claim 8] The apparatus of claim 7, wherein the control unit is further operable to, if the information data of the mobile device does not correspond to any application information record, send a signal to the mobile device to instruct the mobile device to block output data for display on the display.

[Claim 9] The apparatus of claim 8, wherein the control unit is further operable, responsive to instructing the mobile device to block output of data for display on the display, to cause the display to display a message indicative of unavailability of mobile device content for display.

[Claim 10] The apparatus of any preceding claim, wherein the control unit is further operable to:
receive a signal indicative of whether a vehicle safety system is activated;
if the vehicle safety system is activated, determine, based on received information data, at least one application associated with the mobile device that was to be blocked no longer to be blocked, or at least one application associated with the mobile device that was not to be blocked now to be blocked.

[Claim 11] The apparatus of claim 10, wherein the vehicle safety system is a system that provides at least partial autonomous driving control to the vehicle.

[Claim 12] The apparatus of claim 10 or 11, wherein the vehicle safety system is an adaptive cruise control or an automatic vehicle convoy control.

[Claim 13] The apparatus according to any preceding claim, wherein the predetermined speed threshold is stored in the memory.

[Claim 14] The apparatus according to claim 13, wherein the predetermined speed threshold and the application record are stored in a different area of the memory.

[Claim 15] The apparatus according to any preceding claim, wherein the display on the in-vehicle display of the at least one application identified by the retrieved identification information is allowed when the detected speed
of the vehicle exceeds the predetermined speed threshold.

[Claim 16] The apparatus according to any preceding claim, wherein the display on the in-vehicle display of the at least one application identified by the retrieved identification information is prohibited when the detected speed of the vehicle exceeds the predetermined speed threshold.

[Claim 17] The apparatus according to any preceding claim, wherein the control unit is operable to generate a control signal for the mobile device comprising instructions for the mobile device to control the transmission of the display data related to an application from the mobile device to the in-vehicle apparatus.

[Claim 18] The apparatus according to any preceding claim, wherein the control unit is operable to interrogate display data received from the mobile device to determine the identity of an application in the display data.

[Claim 19] The apparatus according to any preceding claim, comprising a speed detection unit operable to detect the speed of the vehicle.

[Claim 20] The apparatus according to any preceding claim, wherein the predetermined speed threshold is associated with a mobile device model.

[Claim 21] The apparatus according to any preceding claim, wherein the memory has stored therein a plurality of predetermined speed thresholds, one threshold for each mobile device model or for a group of mobile device models.

[Claim 22] The apparatus according to any preceding claim, wherein the transceiver is operable to transmit control signals to the mobile device and receive display data related to at least one application from the mobile device.

[Claim 23] The apparatus according to any preceding claim, wherein the at least one application includes a terminal mode application.

[Claim 24] The apparatus of any preceding claim, wherein different applications identified in the records are associated with different predetermined speed thresholds.

[Claim 25] An in-vehicle apparatus comprising:
- a display configured to display data related to applications of a mobile device in communication with the in-vehicle,
- a transceiver operable to receive an information data indicating a characteristic of the mobile device,
- a control unit operable to:
  - receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located;
decide, based on received information data, at least one application, associated with the mobile device, allowable when the detected speed of the vehicle exceeds a predetermined speed threshold; and send a signal to indicate the allowable application to the mobile device.

[Claim 26] A vehicle comprising the apparatus according to any one of claims 1 to 25.

[Claim 27] A method for an in-vehicle apparatus having a display configured to display data related to applications of a mobile device in communication with the in-vehicle apparatus, and having a communication interface operable to receive information data from a mobile device, the method comprising: receiving a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located; if the speed exceeds a predetermined speed threshold, determining, based on received information data, at least one application associated with the mobile device that is to be blocked; and sending a signal to the mobile device to instruct the mobile device to block output of data corresponding to the at least one application for display on a display that can display data provided by the in-vehicle apparatus.

[Claim 28] The method of claim 27, further comprising receiving a signal from the mobile device acknowledging that the at least one application is blocked.

[Claim 29] The method of claim 27 or 28, further comprising causing the display to display a message indicating unavailability of mobile device content for display.

[Claim 30] The method of claim 27, 28 or 29, wherein the information data from the mobile device is information indicating one or more properties of the mobile device selected from the group comprising a model information of the mobile device; platforms information of the mobile device, operating systems information of the mobile device, and version information of a model, platform and/or operating system of the mobile device.

[Claim 31] The method of claim 30, further comprising: retrieving from a memory, having stored therein a record comprising an identification information of at least one application, each application being associated with one or more mobile device models, platforms, operating systems and/or versions thereof, the identification information of the at least one ap-
pllication in the record associated with the mobile device based on received information data.

[Claim 32] The method of any of claims 27 to 31, further comprising accessing a memory having stored therein a record comprising the identification information of at least one application, each application being associated with one or more mobile device information data.

[Claim 33] The method of claim 32, further comprising prohibiting display of output data from the mobile device if the information data of the mobile device does not correspond to any application information record.

[Claim 34] The method of claim 33, further comprising, if the information data of the mobile device does not correspond to any application information record, sending a signal to the mobile device to instruct the mobile device to block output of data for display on the display.

[Claim 35] The method of claim 34, further comprising, responsive to instructing the mobile device to block output of data for display on the display, causing the display to display a message indicating unavailability of mobile device content for display.

[Claim 36] The method of any of claims 27 to 35, further comprising: receiving a signal indicative of whether a vehicle safety system is activated; if a received signal indicates that a vehicle safety system is activated, determining, based on received information data, at least one application associated with the mobile device that was to be blocked no longer to be blocked, or at least one application associated with the mobile device that was not to be blocked now to be blocked.

[Claim 37] The method of claim 35, wherein the vehicle safety system is a system that provides at least partial autonomous driving control to the vehicle.

[Claim 38] The method of claim 36 or 37, wherein the vehicle safety system is an adaptive cruise control or an automatic vehicle convoy control.

[Claim 39] The method of any of claims 27 to 38, further comprising reading the predetermined speed threshold from a memory.

[Claim 40] The method of 39, further comprising reading the speed threshold and the application record from different areas of memory.

[Claim 41] The method of any of claims 27 to 40, further comprising allowing display on the in-vehicle display of the at least one application identified by the retrieved identification information when the detected speed of the vehicle exceeds the predetermined speed threshold.
[Claim 42]  The method of any of claims 27 to 41, further comprising prohibiting display on the in-vehicle display of the at least one application identified by the retrieved identification information when the detected speed of the vehicle exceeds the predetermined speed threshold.

[Claim 43]  The method of any of claims 27 to 42, further comprising generating a control signal for the mobile device comprising instructions for the mobile device to control the transmission of the display data related to an application from the mobile device to the in-vehicle apparatus.

[Claim 44]  The method of any of claims 27 to 43, further comprising interrogating display data received from the mobile device to determine the identity of an application in the display data.

[Claim 45]  The method of any of claims 27 to 44, wherein the vehicle has a speed detection unit operable to detect the speed of the vehicle.

[Claim 46]  The method of any of claims 27 to 45, wherein the predetermined speed threshold is associated with a mobile device information data.

[Claim 47]  The method of any of claims 27 to 46, further comprising accessing in memory at least one of a plurality of predetermined speed thresholds, one threshold for each mobile device information data or group of information data.

[Claim 48]  The method of any of claims 27 to 47, further comprising transmitting, using the transceiver, control signals to the mobile device and receiving, using the transceiver, display data related to at least one application from the mobile device.

[Claim 49]  The method of any of claims 27 to 48, wherein the at least one application includes a terminal mode application.

[Claim 50]  The method of any of claims 27 to 49, wherein different applications identified in the records are associated with different predetermined speed thresholds.

[Claim 51]  A method for an in-vehicle apparatus having a display configured to display data related to applications of a mobile device in communication with the in-vehicle, and a transceiver operable to receive an information data indicating a characteristic of the mobile device, the method comprising:

receiving a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located;

deciding, based on received information data, at least one application, associated with the mobile device, allowable when the detected speed of the vehicle exceeds a predetermined speed threshold; and
sending a signal to indicate the allowable application to the mobile device.

[Claim 52] A computer program product comprising processor implementable instructions for causing a programmable device to carry out the method of any one of claims 27 to 51 and/or to become configured as the apparatus of any of claims 1 to 26.

[Claim 53] An apparatus as substantially hereinbefore described with reference to the accompanying drawings.

[Claim 54] A method as substantially hereinbefore described with reference to the accompanying drawings.

[Claim 55] A vehicle as substantially hereinbefore described with reference to the accompanying drawings.
[Fig. 3]

Store a predetermined speed threshold and a list of applications, each application being associated with one or more mobile device models

Receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located

Receive information data from the mobile device

Retrieve identification information of applications in the list associated with the mobile device based on the received information data

Predetermined speed exceeded?

Control the display of display data related to those applications for which the identification information was received
Receive information data from a connected mobile device

S4-1

S4-2

Check whether a list of applications associated with the mobile device exists

NOT EXIST

S4-3

EXIST

Prohibit display control for mobile device

Retrieve ID of applications in the list

S4-4

Receive a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located

S4-5

S4-6

Predetermined speed exceeded?

YES

Inform mobile device of prohibited application IDs

Inform mobile device that display permitted

S4-8

S4-7

Display unavailable message
[Fig. 5]

Receive information data from a connected mobile device

Check whether a list of applications associated with the mobile device exists

EXIST

PROHIBIT display control for mobile device

RETRIEVE ID of applications in the list

RECEIVE a signal indicative of the speed of a vehicle in which the in-vehicle apparatus is located

PREDETTERMINED speed exceeded?

NO

Inform mobile device that display permitted

YES

Inform mobile device of prohibited application IDs

Display unavailable message

SPEED CHANGE

S5-12

S5-6

S5-7

S5-13

S5-8

S5-9

S5-10

S5-11
**INTERNATIONAL SEARCH REPORT**

**INTERNATIONAL PATENT CLASSIFICATION (IPC)**

- G06F 3/0481
- H04M 1/60
- H04M 1/725
- H04W 4/02

**ADDITIONS**

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

**FIELD SEARCHED**

Minimum documentation searched.

- G06F
- H04M
- H04W
- B60K

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.

- EPO-Internal
- WPI Data

**DOCUMENTS CONSIDERED TO BE RELEVANT**

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- abstract
- paragraphs [0009] - [0018]
- paragraphs [0023] - [0027]
- paragraphs [0042] - [0043]
- paragraphs [0055] - [0076]
- figures 2,3A

**Further documents are listed in the continuation of Box C.**

- Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "E" earlier application or patent but published on or after the international filing date
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**Date of the actual completion of the international search**

27 February 2015

**Date of mailing of the international search report**

05/03/2015

**Name and mailing address of the ISA**

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
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**Authorized officer**

Gui tarte Perez, J
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