The present application relates to a vehicle (1) comprising a route planning device (3). The route planning device (3) includes a processor of a control unit (5) configured to identify a start location for a journey and a destination for the journey. One or more modes of transport for completing at least a portion of the journey are identified. The processor generates a travel route from the start location to the destination. The generated route comprises a plurality of modes of transport. At least one of the one or more identified modes of transport is selected in dependence on one or more preferences associated with the user. The present application also relates to a method of planning a travel route; and to a route planning device (3).
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ROUTE PLANNING DEVICE AND ASSOCIATED METHOD

TECHNICAL FIELD
The present disclosure relates to a route planning device and method. Aspects of the invention relate to a vehicle having a route planning device; to a method of generating a travel route; and to a route planning device.

BACKGROUND
It is known to provide a satellite navigation system for a vehicle. The system can generate a travel route to a user-defined destination and instructions are then output to facilitate navigation to the destination. However, the satellite navigation system typically generates the route only taking into account travel within the vehicle. This may not be the most appropriate mode of transport to reach a particular destination.

At least in certain embodiments, the present invention seeks to provide a route planning device which overcomes or ameliorates at least some of the problems associated with known devices.

SUMMARY OF THE INVENTION
Aspects of the present invention relate to a vehicle; to a method of generating a travel route; and to a route planning device.

According to a further aspect of the present invention there is provided a vehicle comprising a route planning device, the route planning device comprising a processor configured to:

- identify a start location for a journey;
- identify a destination for the journey; and
- generate a travel route from the start location to the destination;

wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a vehicle user.

The processor typically identifies a plurality of modes of transport suitable for completing at least a portion of the journey. At least in certain scenarios, the travel route can comprise a plurality of the identified modes of transport. The resulting intermodal travel route can integrate travel in said vehicle with travel making use of public transport, for example. By implementing user preferences, the route planning device can generate a customised route to the defined destination. The travel route can link public transport to vehicle usage to
generate the most time-efficient route to the defined destination. The route planning device can also look at the current user state, for example by referencing the user's diary or calendar to determine the purpose of the journey. A holistic journey approach to planning a whole journey, including a return journey can be considered.

The route planning device can learn the user preferences, for example based on historical data.

The start location and/or the destination for the journey can be user-defined. Alternatively, the start location could correspond to a current vehicle location. The current vehicle location could, for example, be determined with reference to a satellite navigation system. The destination could be obtained automatically from a database associated with the user (for example a diary, calendar, e-mail database, or a short messaging service communication).

The route planning strategy can be modified based on events determined at the defined destination, for example based on traffic congestion at the defined destination. If appropriate, the device can propose alternate routes to the defined destination.

The user can request that the device identify a route from a starting location (A) to a destination (B) at a particular time, where the starting location (A) can be the same or different than the present location of the vehicle and destination (B) can be any location. If the user doesn't specify the starting location (A), the device can be configured to use the current vehicle location. If the user doesn't specify the destination (B), the device will use the current destination. If the user doesn't specify a time, the device will use the current time.

The route planning device can make use of cellular communication networks to retrieve one or more of the following: public transport timetable information (for example to determine departure and/or arrival times); reported delays in the scheduled public transport services; transportation fares; parking space availability; and parking charges. The route planning device can estimate a total travel time based on a plurality of candidate travel routes.

The route planning device could access personal data, for example by accessing user calendar information. Alternatively, the route planning device could ask for more information, for example to determine when the return journey will take place. The route planning device can also look at transport options for a return journey starting from the destination. For example, the route planning device could obtain timetable information for public transport to complete the return journey. The generated route from the start location to the destination
could be modified based on the information determined for the return journey. For example, the route planning device could generate the route to avoid a route which relies on public transport for the return journey after the last scheduled service.

The device could be configured to continue to assess multimodal travel options while the user is away from the vehicle and update the user with options, for example for the return journey in view of changing conditions. An update could, for example, be pushed or forwarded to a cellular telephone associated with the user. A dedicated software application could operate on the user's cellular telephone. There may be a handshake between the dedicated software application and the vehicle and/or device. The vehicle and/or the device may communicate with the dedicated software application to send relevant information. The vehicle and/or device may communicate a route or a subsequent part of journey to a user outside the vehicle. The relevant route information may be communicated by a notification such as text, email etc. Relevant route information may be transmitted to and from the dedicated software application on a mobile device. Alternatively relevant route information may be transmitted from a remote server.

At least some of said preferences can be pre-defined by said user. Alternatively, or in addition, at least some of said preferences can be determined based on historical data and/or current data. The current data can be data which is updated at least substantially in real time. The processor can be configured to predict said preference based on said historical data and/or said current data. The current data can be obtained by accessing a remote server over a wireless network, such as a cellular telephone network or a dedicated data network. The current data can be updated at least substantially in real time.

A rating or ranking can be applied to each subset of the data and the preference predicted using an algorithm. The algorithm can, for example, implement probability analysis to determine the most likely user preferences.

The one or more preferences can comprise one or more of the following:
- a distance that the user prefers to walk;
- a preferred mode of personal transport;
- a preferred mode of public transport;
- a scheduled appointment time;
- an estimated time to destination;
- an estimated return time; and
- a scheduled connection.
The one or more preferences can comprise one or more parameters relating to a return journey from said destination to the current location of the vehicle or to a user-defined location.

The generated route can comprise a first mode of transport and a second mode of transport. The first and second modes of transport can be different from each other. The processor can be configured to identify an intermediate location for the user to change from said first mode of transport to said second mode of transport. The vehicle can represent either said first mode of transport or said second mode of transport. The first mode of transport can consist of driving in said vehicle; and the second mode of transport can consist of public transport.

The processor can be configured to identify said intermediate location from one or more candidate locations. The intermediate location can be identified in dependence on said one or more preferences associated with said user. Alternatively, or in addition, the intermediate locations can be based on real time information relating to each said candidate location. For example, an intermediate location can be identified based on weather conditions at each candidate location and/or traffic information at on the route to said candidate location.

The processor can be configured to identify at least one car park on said generated route. The vehicle can represent either said first mode of transport or said second mode of transport. The processor can be configured to identify at least one car park proximal to said intermediate location for parking the vehicle.

The processor can be configured to determine one or more of the following parameters relating to each said car park:
- availability of parking spaces for said vehicle;
- a financial cost of parking the vehicle;
- opening hours of said car park.

The processor can be configured to select one of a plurality of said car parks in dependence on said one or more preferences associated with said user. The car park can, for example, be a park-and-ride service.

The current vehicle location can be specified by the user or can be determined by communication with a satellite network.
The vehicle is typically a road-going vehicle, such as an automobile or a sports utility vehicle.

The vehicle can comprise a battery for supplying electric current to a traction motor. The travel route could comprise a charging station for re-charging the battery.

According to a further aspect of the present invention there is provided a method of generating a travel route, the method comprising:

- identifying a start location for a journey;
- identifying a destination for the journey; and
- generating a travel route from the start location to the destination;

wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a user.

The start location can correspond to the current location of the vehicle. The destination can be user-defined or can be obtained by interrogating a database associated with the user.

According to a further aspect of the present invention there is provided a route planning device comprising a processor configured to:

- identify a start location for a journey;
- identify a destination for the journey; and
- generate a travel route from the start location to the destination;

wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a user.

The route planning device can comprise system memory including computer program code, wherein the system memory and the computer program code are configured, with the processor, to cause the test apparatus to implement the method(s) described herein.

The processor described herein is apparatus and can comprise one or more electronic processors. Similarly, the system memory can comprise one or more memory devices coupled to the processor. The processor can be a general purpose processor which is caused to implement the method(s) described herein when computer program code is executed.
Within the scope of this application it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the present invention will now be described, by way of example only, with reference to the accompanying figures, in which:

Figure 1 shows a schematic representation of a vehicle incorporating a route planning device in accordance with an embodiment of the present invention;

Figure 2 shows a procedural flow chart for the operation of the route planning device shown in Figure 1;

Figure 3 shows a first sub-routine of the flow chart shown in Figure 2;

Figure 4 shows a second sub-routine of the flow chart shown in Figure 2;

Figure 5 shows a third sub-routine of the flow chart shown in Figure 2;

Figure 6 illustrates a method of using the route planning device to manipulate data to generate an intermodal route in accordance with an embodiment of the present invention; and

Figure 7 shows a procedural flow chart for the interaction between the vehicle and a mobile receiving application in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION

A vehicle 1 incorporating an intermodal route planning device 3 in accordance with an embodiment of the present invention is shown in Figure 1. The device 3 is configured to integrate vehicle and public transport transportation. The route planning device 3 in the present embodiment is installed in the vehicle 1, for example in the dashboard or centre console (not shown)

The route planning device 3 comprises a control unit 5 comprising one or more electronic processors (not shown) operatively connected to a storage device 7, such as memory. The control unit 5 is operatively connected to a satellite navigation device 9 having an antenna
11 for receiving radio signals transmitted from a network of earth-orbiting satellites. The satellite navigation device 9 operates in conventional manner to determine the geographic location of the vehicle 1. The position of the vehicle 1 identified by the satellite navigation device 9 is referred to herein as the current vehicle location. Rather than utilise the current vehicle location, the user could specify an alternate start location for a journey which is then used as a start point for subsequent route planning.

The route planning device 3 is coupled to a human machine interface (HMI) 13 to enable a user to input data. The user can use the HMI 13 to enter a destination into the route planning device 3, for example using an address, a post (ZIP) code, or coordinates. The HMI 13 can, for example, comprise an input wheel, a touch screen, a keypad or a steering wheel control. Rather than rely on a user-specified destination, the route planning device 3 could retrieve a destination from the user's diary (or other database associated with the user). Equally, the route planning device 3 could suggest possible destinations based on historical data. The route planning device 3 could, for example, display one or more candidate destinations and allow the user to select the destination for a particular journey. Alternatively, or in addition, preferred start locations and/or destinations could be stored for selection by the user.

The device 3 is configured to generate a route from the current vehicle location to the destination specified by the user. In accordance with the present invention, the device 3 is configured to generate the route taking account of a plurality of different modes of transport. The vehicle 1 represents only one mode of transport to be considered when the device 3 generates the route. The device 3 can also take into account one or more forms of public transport; and/or the user walking as a further mode of transport. The device 3 can thereby generate a route comprising a plurality of different modes of transport. If the route comprises performing a first section in the vehicle 1 and a second section on public transport, the device 3 can be configured to identify a suitable break point in the journey and to identify a car park for parking the vehicle 1.

As described herein, the route is generated with reference to preferences associated with the user (typically the driver of the vehicle 1). The preferences for each user are defined in user profiles which are stored in the storage device 7. The user can select the appropriate profile when they enter the vehicle, for example by selecting their name from a list of stored profiles. Alternatively, automatic user identification can be performed, for example employing one or more of the following techniques: image recognition, biometric method, specific user action/gesture, user device detection (cellular telephone, key fob etc.)
The device 3 then generates routes based on the preferences associated with that user. The operation of the device 3 will now be described with reference to the process flow charts in Figures 2 to 5.

The process commences when the user starts a journey, and enters a destination into the route planning device 3 (STEP 101). The device 3 carries out an analysis of the user's profile, and determines whether or not the user is new to the vehicle (STEP 102). If the user has previously used the vehicle, the device 3 carries out an analysis of the user's historic data to understand the user's preferences (STEP 103). A first sub-routine 200 for analysing the historic data is described in more detail below with reference to Figure 3.

The device 3 then determines whether or not the user has a preference to use public transport for the type of journey being considered (STEP 104). If the user has previously had such a preference, the process commences an analysis of available public transport options and incorporates this information into the destination route planning (STEP 105). The user preferences can be pre-defined by the user, for example based on criteria input by the user. Alternatively, the user preferences can be derived from historical data. The historical data can, for example, be data recorded for a similar journey completed previously by the user (for example a journey having the same destination); or cumulative data recorded over a plurality of journeys completed previously by the user.

If the device 3 determines that the user is new to the vehicle (STEP 102), a default preference profile is selected for use during the remainder of the procedure (STEP 106). The process then performs an analysis of available public transport options and incorporates them into the destination route planning (STEP 105). The analysis of the public transport is performed as part of the first sub-routine 200 shown in Figure 3. The device 3 can learn about the preferences of a new user as they use the vehicle and make decisions. A learning algorithm can implement this strategy in combination with predefined user settings.

Following the analysis of the public transport, the device 3 displays the various transport options to the user (STEP 107). These options include details of savings on cost, time, carbon emissions etc. in order of user preference, and with a recommended option. The transport options can, for example, be output to the display provided in the central console of the vehicle.

The user then selects one of the displayed transport options (STEP 108), and the device 3 is updated accordingly. The device 3 monitors conditions at the defined destination and...
determines whether or not there is an issue near the destination address, such as congestion, no parking space available, road works etc. (STEP 109). Identification of an issue can be performed automatically by accessing one or more databases, stored locally and/or remotely. The device 3 can communicate with a remote server over a wireless network (such as a cellular telephone network) to obtain current data (i.e. data which is updated substantially in real time), for example to identify localised congestion and/or to check availability of parking spaces in one or more car parks along the route. If the device 3 identifies a potential issue at the destination address (which may, for example, result in an unexpected delay), an update is output to the user (STEP 110) to provide the relevant information. The user is asked whether they want to look for alternative options for reaching the destination. The user enters a response (STEP 111). If an alternative is required, the process repeats analysis of the public transport options (STEP 105), and the intervening procedures (STEPS 107-110) are repeated.

If the user does not require an alternative option, the device 3 analyses the situation to recommend the potential benefits of alternate options (STEP 112). For example, a time or cost saving associated with a particular route can be output for the user. If the user indicates a preference against using public transport for the type of journey being considered (STEP 104), the process moves directly to recommend alternate options (STEP 112).

The user responds then inputs a response (STEP 113) to the recommendations made by the device 3. If the response is positive and the user confirms that they would like the device 3 to search for alternative options, the process returns to procedural step to analyse public transport options (STEP 105), and the intervening procedures (STEPS 107 to 112) are repeated. If the user response is that no further search for alternative options is required, the device 3 records the user’s response for future analysis (STEP 114). The device 3 then goes into an idle state (STEP 115) until the user makes a request for information and/or there is a change in the situation around the destination.

As outlined above, the first sub-routine 200 is implemented to analyse the user's historic data to understand the user preferences (STEP 103). The first sub-routine 200 will now be described with reference to Figure 3. The type of the journey to be made is identified (STEP 201). For example, the device 3 can identify a frequent destination, such as a daily commute; an infrequent destination, such as a trip to an airport; or a journey to an unfamiliar destination. The device 3 then analyses the driving conditions to the destination (STEP 202). The device 3 analyses the historic preferences/behaviour data of the user so as to predict user preferences (STEP 203). A user behaviour and preference table T1 and a priority
matrix (i.e. a weightage matrix) are created (STEP 204). The priority matrix can define a rating for each of the defined preferences. A sample preference table T1 showing the journey selection criteria (User preference situational matrix (UPSiM) and the Journey user preference matrix) is reproduced below.

| Journey selection Criteria: Driving conditions (User preference situational matrix (UPSiM)) |
|---------------------------------|-------------------------------|
| Weather condition               | 1. Weather                   |
| Walking                         | 2. How much I have to walk?  |
| Time taken                      | 3. Time to destination       |
| Total Time (car to parking, An=walking to transport +n, walking to destination) | where A can be multiple transports and n is walking to new transport |
| Total return journey Cost       | 4. Cost                      |
| + Cost saving over period of time |
| Cost saving calculation over period of time (if I do this on daily basis, and if I have for example a rail card that gives me discounts, what would be the best option). Maybe for day it is best to use taxi but for a month a train? |
| Will do First table analysis    | 5. Convenience of parking    |
|                                  | Number of parking spaces available near station |
| Return journey time             | 6. Return Journey convenience? |
| Public transport preference     | 7. What type of transport? (I would prefer Train than a bus) |
| Facilities available            | 8. Facilities available      |
|                                  | Seat Reservation and Facility (coffee or WiFi (can I do work whilst travelling?)) |
| Arrival time vs User diary      | 9. Arrival time – If I need to be at destination at 12pm what would be the best travel route at cheapest price |
| Number of changes               | 10. Number of inter-changes  |

| Journey selection Criteria: Driving conditions (Journey user preference matrix) |
|---------------------------------|-------------------------------|
| Cost                            | 1. Cost                       |
| Parking facility                | 2. Number of parking spaces available |
| Predicted Traffic conditions    | 4. Predicted Traffic condition outside car park during return journey? |
| Security                        | 5. Car security (Crime rate)  |
| Proximity to destination        | 6. Proximity of car park to destination |
| Time to destination             | 7. Time to destination after you parked, i.e. Total Time (car parking + walking/cycling/bus) |
| Parking facility                | 8. Parking payment options (card or cash, or cash only; Receipts?) |
| Opening time                    | 9. Opening Times (maybe parking shuts at 10pm – and you won’t be able to leave until tomorrow) |

TABLE T1
The user preference table T1 illustrates the user preferences which include, but are not limited to, one or more of the following: how far the user is prepared to walk, the preferred mode of public transport (e.g. bus or train), and the preferred return journey. When creating the user behaviour and preference table T1, an analysis of user preferences is made, as well as identifying a public transport stop near to the destination as per user preferences. Data is also collected (including service, time, cost, frequency etc.) about identified suitable public transport.

As outlined above, the device 3 collects information about the available public transport options to reach the specified destination (STEP 105). The collection of data is performed as part of the first sub-routine 200 and, as described herein, the collected data is combined with the data stored in the user behaviour and preference table T1. The device 3 collects information for different modes of public transport suitable for conveying the user from the current location (or an alternate location specified by the user) to the specified destination; or from an intermediate location to the specified address (STEP 206). The public transport options can include car sharing, bus, rail, underground (subway) and tram transportation from the current location to the specified destination; or from an intermediate location to the specified destination.

The information collected in relation to public transport can include one or more of the following: timing (for example departure time, arrival time and/or journey time); cost (for example a fare for completing the journey); and historic traffic condition data in the region of the public transport station (or stop) to estimate local traffic on arrival. The analysis can optionally also look at alternative parking locations, including one or more of the following: parking cost; car park opening hours; available parking spaces (which may be updated in real time); present traffic conditions (for example, real time traffic data); and historic data at the expected time of arrival at the station to predict traffic conditions on arrival.

The device 3 identifies possible travel connections to the destination (STEP 207). The travel connections are identified with reference to the user behaviour and preference table T1. In particular, the user behaviour and preference table T1 is analysed to identify user preferences (STEP 208). The device 3 identifies the public transport stations (or stops) proximal to the specified destination are identified based on the user preferences (STEP 209). A second sub-routine 300 is implemented to identify the public transport stations and this is described below with reference to Figure 4. The data (including service times, cost, frequency etc.) relating to the identified public transport routes for performing part or all of
the journey to the specified destination is collected (STEP 210). The collected data is
returned to identify the possible connections to the destination (STEP 207).

The device 3 identifies possible car park locations for the destination (STEP 211). A third
sub-routine 400 is implemented to identify the possible car park locations (for example to
identify car parks within a predefined range of a public transport route connection) and this is
described below with reference to Figure 4. The journey options and corresponding parking
options are analysed (STEP 212) with reference to the user behaviour and preference table
T1. The device 3 displays the options to the user (STEP 213) with details of savings on cost,
time, emissions (for example estimated C02 emissions). The options are displayed in an
order based on the defined user preferences, optionally with a recommended option
highlighted. The identified options are then displayed (STEP 107), for example on a screen
associated with the HMI 13.

The second sub-routine 300 which identifies the public transport stations will now be
described with reference to Figure 4. A journey option table T2 is created by linking one or
more public transport options to reach the specified destination (STEP 301). The route
options are analysed (STEP 302) against the user preferences using real-time and/or
historic data. The timing for a return journey from the specified destination is identified or
estimated (STEP 303) using historic data and/or live data from the user's calendar. A return
journey (including options, time and cost) is analysed (STEP 304) against the user behaviour
and preference table T1 and historic and/or current data. A prompt is issued (STEP 305) to
check if any return journey options are missing from the displayed option table. If the user
indicates that a return journey option is missing, this is added to the option table (STEP 306).
Any options found for the return journey will automatically be added to the journey option
table. The device 3 will highlight those options for the return journey which are limited or not
available at an identified return journey time. Similarly, the device 3 will notify the user if it
determines that there is no service currently available (or there is a delayed service) at one
of said interchange options, but there are suitable travel options available for the return
journey.

The information can be collected from an on-board database, for example stored on the
memory device provided in the vehicle 1; or by accessing a remote database over a wireless
network.

The third sub-routine 400, which is implemented to identify possible car park locations, will
now be described with reference to Figure 4. A parking option table T3 (shown in Figure 6) is
created for the journey (STEP 401) to identify all parking options available near the specified
destination and at any journey break points along the one or more routes identified. Analysis
of the parking options is performed (STEP 402) based on the estimated arrival time and the
data stored in the preferences and behaviour table T1 making use of the historic and current
data. The user return journey timing is then identified or estimated using historic data and
live data from the user’s calendar (STEP 403). An analysis is made of parking conditions
(including cost) for the time of the stay and the return journey time against the user
preferences and behaviour table T1 (STEP 404). A query is raised as to the possibility of a
parking option being missing from the option table (STEP 405). If the device 3 receives
confirmation that a car parking option is missing, a parking option is added to the journey car
park option table T3 (STEP 406) and the earlier procedures in the third sub-routine 400
(STEPS 401 to 405) are repeated.

As shown schematically in Figure 6, the journey option table T2 and the user behaviour and
preference table T1 are combined to generate a user preference analysis table T4. The user
preference analysis table T4 provides a journey/route preference ranking. The available car
parks for each journey are then identified to create the journey car park option table T3. The
user behaviour and preference table T1 contains a car park user preference matrix M1 which
links the user preferences to a plurality of predefined conditions, such as driving conditions.
The car park user preference matrix M1 is combined with the journey car park option table
T3 to create a user preference analysis table T5. The user preference analysis table T5
defines each of the available journeys and identifies each car park associated therewith.

The device 3 can compare the routes and/or car park options against each other to give
weightage in the journey option table T2 and the journey car park option table T3 (e.g. two
journey options require three (3) changes, one journey option requires one (1) change, and
the other journey option requires no (0) changes; the device 3 will mark the no change
journey option to 3 points, the one change journey option to 2 points and the three change
journey options will each be allocated to 1 point). The required number of options could vary
depending on the route and it will be appreciated that a fixed number of weightage points will
not provide accurate results.

The method described herein to determine the user preference analysis table T5 is provided
by way of example only and is intended to outline a simple procedure for identifying the route
and car park(s). This approach allows a user to choose from a variety of identified scenarios,
including a non-preferred car park on a preferred route, a preferred car park on a non-
preferred route, and a preferred car park on a preferred route.
Figure 7 shows an embodiment of an interaction (500) between the route planning device and a mobile device. Each of the steps in figure 7 has been identified below in the table.

<table>
<thead>
<tr>
<th>Step number</th>
<th>Step description</th>
</tr>
</thead>
<tbody>
<tr>
<td>501</td>
<td>Vehicle system activated</td>
</tr>
<tr>
<td>502</td>
<td>Detect event</td>
</tr>
<tr>
<td>503</td>
<td>Identify alternative intermodal journey option to the destination for a whole journey as disclosed in figures 2 to 6 while ensuring some means of return journey transport is available</td>
</tr>
<tr>
<td>504</td>
<td>Inform driver about the incident and suggest intermodal journey option</td>
</tr>
<tr>
<td>505</td>
<td>User response</td>
</tr>
<tr>
<td>506</td>
<td>User reached breakpoint/car park for intermodal journey</td>
</tr>
<tr>
<td>507</td>
<td>Driver turns off vehicle</td>
</tr>
<tr>
<td>508</td>
<td>Vehicle system sends further/return journey options to the user through a mobile counterpart/ email/ text message</td>
</tr>
<tr>
<td>509</td>
<td>Receiving mobile application continuously monitors conditions on the route to update the driver</td>
</tr>
<tr>
<td>510</td>
<td>Detect event</td>
</tr>
<tr>
<td>511</td>
<td>Identify alternative intermodal journey option to the destination for the whole journey as disclosed in figures 2 to 6</td>
</tr>
<tr>
<td>512</td>
<td>Inform the user about the incident and suggest intermodal journey option</td>
</tr>
<tr>
<td>513</td>
<td>User response</td>
</tr>
<tr>
<td>514</td>
<td>Update journey options</td>
</tr>
<tr>
<td>515</td>
<td>User continues journey to the destination</td>
</tr>
<tr>
<td>516</td>
<td>User arrive at the destination</td>
</tr>
<tr>
<td>517</td>
<td>Mobile application identifies return journey time as setup by the vehicle system</td>
</tr>
<tr>
<td>518</td>
<td>Mobile application checks update on the previous planned journey and updates on the route</td>
</tr>
<tr>
<td>519</td>
<td>Mobile application informs the user about the options</td>
</tr>
<tr>
<td>520</td>
<td>User starts return journey</td>
</tr>
<tr>
<td>521</td>
<td>Mobile application updates vehicle system about the return journey status</td>
</tr>
<tr>
<td>522</td>
<td>Identify alternative intermodal journey option to the destination for the whole journey as disclosed in other flow charts</td>
</tr>
<tr>
<td>523</td>
<td>Inform the driver about the incident and suggest intermodal journey option</td>
</tr>
<tr>
<td>524</td>
<td>User response</td>
</tr>
<tr>
<td>525</td>
<td>Update journey options and inform vehicle system</td>
</tr>
<tr>
<td>526</td>
<td>User continues journey to the destination</td>
</tr>
<tr>
<td>527</td>
<td>User arrives at the destination</td>
</tr>
</tbody>
</table>

While a vehicle system is activated (STEP 501), an event is detected (STEP 502). The event may be a change in conditions in/around a destination (e.g. car park is full, there was an accident or a road closure etc.); a change in condition on the route (e.g. a congestion); and/or availability of public transport modes to reduce CO₂, time or cost. If the event is detected the system identifies an alternative intermodal journey option to the destination (Destination I) for a whole journey as described in other flow charts while ensuring some
means of return journey transport is available (STEP 503). The return journey will be considered with view of cost and CO2 saving to make a decision about breakpoint(s) for intermodal transport(s) along with user preferences. After the identification, a user (or a driver in this example) is informed about the incident and intermodal journey options are suggested (STEP 504). If the user does not respond then the system proceeds to the previous state and continues to monitor the situation or proceeds with a planned route that has been previously suggested and accepted. The planning of the route will go into default mode (go to STEP 501). If the user responds positively to the suggestion then the planned route, effectively the destination and/or intermediate location would be amended accordingly. Steps 501 to 505 are envisaged to be an iterative process with input from real-time events described above.

When the user follows the planned route and arrives at the breakpoint such as a car park for intermodal journey (STEP 506) the user turns off his vehicle (STEP 507). When the user triggers the sequence of switching off the vehicle, the vehicle or the route planning device installed in the vehicle sends further legs of the journey and return journey options to the user through a mobile counterpart (STEP 508). This can be through email, text message or using Bluetooth® connection directly to the counterpart mobile device through a receiving application. The mobile receiving app will continuously monitor conditions on the route to update the user (STEP 509). In this way information on the planned route can be maintained but also the route to the destination can be planned continuously in real-time even when the user is no longer driving. This also saves the user having to re-plan the journey from the point of change of the mode of travel.

As with the route planning device on board the vehicle the mobile receiving application will continue with the monitoring and if an event is detected (STEP 510) alternative intermodal journey options to the destination (Destination 1) for the whole journey as described in other flow charts are identified (STEP 511). Similarly to the step 504 the user is informed about the incident and intermodal journey options are suggested (STEP 512). The user responses to the suggestion (STEP 513). If the user does not want to change his route the user will continue to follow the route to the destination (Destination 1) (STEP 515). If the user does accept the suggestion then the journey options are updated to take new conditions into account (STEP 514).

After the user has arrived at his destination (Destination 1) (STEP 516), the mobile application identifies a return journey time as setup by the vehicle system (STEP 517) and alert the user accordingly. For example, the application would alert the user when the user
needs to start his journey back to where his vehicle is parked in order to arrive at the car park in time. The return journey time is estimated by the vehicle system from historic data and/or calendar entry as explained above. The calculation of the estimation has been done by the vehicle before the user leaves the vehicle. Therefore it does not require extra computational power from the mobile device. The whole journey which is planned whilst the user was in the vehicle at the start of the intermodal leg of the journey is transmitted to the mobile receiving application as an initial route option at the start of the journey. Thus as an option the user can refer to this default route.

The mobile application checks any update on the previously planned journey and updates the route accordingly (STEP 518). For example, the planned journey can be compared with real-time travel information and only when a difference between the two has been detected, the system recalculates its previous route plan. The user is informed of any potential options arising from the updates (STEP 519). The user then starts the return journey (STEP 520). The mobile application updates the vehicle system about the return journey status (STEP 521). The vehicle receiver can use this to pre-condition the vehicle around the estimated time or around the time any prepaid parking expires. Alternatively, the vehicle can be pre-conditioned depending on the estimated distance, or on the user's predefined conditions and preferences. For example, the vehicle can be pre-conditioned 15 minutes before the user arrives back at the vehicle.

In this embodiment, the mobile application identifies alternative intermodal journey option to the destination (Destination II) for a whole journey as described in the flow charts described above (STEP 522) and informs the user about the incident and suggest intermodal journey option (STEP 523). The user makes a decision whether to accept the new suggested option (STEP 524). If the user accepts the suggestion then the journey route is updated (STEP 525) then the user can continue on with the journey to the destination (Destination II) until the user reaches the destination (Destination II) (STEP 526, 527). If the user does not accept the suggested options the planned route is kept and the user can continue his journey to the destination using already set up route (STEP 526, 527).

It will be appreciated that various changes and modifications can be made to the device 3 described herein. Whereas in certain embodiments of invention the system resides in the vehicle, in other embodiments the system resides in a portable nomadic device which is therefore able to be removed from the vehicle. In yet other embodiments, the system resides in a remote server which is capable of communicating with the in-vehicle system. In all the embodiments, the system is capable of communicating with a personal mobile device.
Further aspects of the present invention will now be set out in the accompanying numbered paragraphs:

1. A vehicle comprising a route planning device, the route planning device comprising a processor configured to:
   - identify a start location for a journey;
   - identify a destination for the journey; and
   - generate a travel route from the start location to the destination;

   wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a vehicle user.

2. A vehicle as described in paragraph 1, wherein at least some of said preferences are determined based on historical data and/or current data.

3. A vehicle as described in paragraph 2, wherein the processor is configured to predict said preference based on said historical data and/or said current data.

4. A vehicle as described in paragraph 2, wherein said current data is obtained by accessing a remote server over a wireless network.

5. A vehicle as described in paragraph 1, wherein at least some of said preferences are pre-defined by said user.

6. A vehicle as described in paragraph 1, wherein said one or more preferences comprise one or more of the following:
   - a distance that the user prefers to walk;
   - a preferred mode of personal transport;
   - a preferred mode of public transport;
   - a scheduled appointment time;
   - an estimated time to destination;
   - an estimated return time;
   - carbon dioxide emissions; and
   - a scheduled connection.
7. A vehicle as described in paragraph 1, wherein said one or more preferences comprise one or more parameters relating to a return journey from said destination to the start location of the journey or to a user-defined location.

8. A vehicle as described in paragraph 1, wherein the generated route comprises a first mode of transport and a second mode of transport, the first and second modes of transport being different from each other.

9. A vehicle as claimed in claim 8, wherein the vehicle represents either said first mode of transport or said second mode of transport.

10. A vehicle as described in paragraph 8, wherein the processor is configured to identify an intermediate location for the user to change from said first mode of transport to said second mode of transport.

11. A vehicle as described in paragraph 10, wherein the processor is configured to identify said intermediate location from one or more candidate locations in dependence on said one or more preferences associated with said user.

12. A vehicle as described in paragraph 11, wherein the intermediate location is based on real time information relating to each said candidate location.

13. A vehicle as described in paragraph 10, wherein the processor is configured to identify at least one car park proximal to said intermediate location for parking the vehicle.

14. A vehicle as described in paragraph 1, wherein the generated route comprises at least one car park for the vehicle.

15. A vehicle as described in paragraph 14, wherein the processor is configured to determine one or more of the following parameters relating to each said car park:
   - availability of parking spaces for said vehicle;
   - a financial cost of parking the vehicle;
   - opening hours of said car park.

16. A vehicle as described in paragraph 15, wherein the processor is configured to select one of a plurality of said car parks in dependence on said one or more preferences associated with said user.
17. A vehicle as described in paragraph 1, wherein the current vehicle location is
determined by communication with a satellite network.

18. A method of generating a travel route, the method comprising:
identifying a start location for a journey;
identifying a destination for the journey; and
generating a travel route from the start location to the destination;
wherein generating the travel route comprises comparing a plurality of modes of
transport and selecting at least one of said plurality of modes of transport in dependence on
one or more preferences associated with a user.

19. A route planning device comprising a processor configured to:
identify a start location for a journey;
identify a destination for the journey; and
generate a travel route from the start location to the destination;
wherein generating the travel route comprises comparing a plurality of modes of
transport and selecting at least one of said plurality of modes of transport in dependence on
one or more preferences associated with a user.
CLAIMS:

1. A vehicle comprising a route planning device, the route planning device comprising a processor configured to:
   - identify a start location for a journey;
   - identify a destination for the journey; and
   - generate a travel route from the start location to the destination;
wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a vehicle user.

2. A vehicle as claimed in claim 1, wherein at least some of said preferences are determined based on historical data and/or current data.

3. A vehicle as claimed in claim 2, wherein the processor is configured to predict said preference based on said historical data and/or said current data.

4. A vehicle as claimed in claim 2 or claim 3, wherein said current data is obtained by accessing a remote server over a wireless network.

5. A vehicle as claimed in any one of claims 1 to 4, wherein at least some of said preferences are pre-defined by said user.

6. A vehicle as claimed in any one of the preceding claims, wherein said one or more preferences comprise one or more of the following:
   - a distance that the user prefers to walk;
   - a preferred mode of personal transport;
   - a preferred mode of public transport;
   - a scheduled appointment time;
   - an estimated time to destination;
   - an estimated return time;
   - carbon dioxide emissions; and
   - a scheduled connection.

7. A vehicle as claimed in any one of the preceding claims, wherein said one or more preferences comprise one or more parameters relating to a return journey from said destination to the start location of the journey or to a user-defined location.
8. A vehicle as claimed in any one of the preceding claims, wherein the generated route comprises a first mode of transport and a second mode of transport, the first and second modes of transport being different from each other.

9. A vehicle as claimed in claim 8, wherein the vehicle represents either said first mode of transport or said second mode of transport.

10. A vehicle as claimed in claim 8 or claim 9, wherein the processor is configured to identify an intermediate location for the user to change from said first mode of transport to said second mode of transport.

11. A vehicle as claimed in claim 10, wherein the processor is configured to identify said intermediate location from one or more candidate locations in dependence on said one or more preferences associated with said user.

12. A vehicle as claimed in claim 11, wherein the intermediate location is based on real time information relating to each said candidate location.

13. A vehicle as claimed in any one of claims 10, 11 or 12, wherein the processor is configured to identify at least one car park proximal to said intermediate location for parking the vehicle.

14. A vehicle as claimed in any one of the preceding claims, wherein the generated route comprises at least one car park for the vehicle.

15. A vehicle as claimed in claim 13 or claim 14, wherein the processor is configured to determine one or more of the following parameters relating to each said car park:

   availability of parking spaces for said vehicle;
   a financial cost of parking the vehicle;
   opening hours of said car park.

16. A vehicle as claimed in claim 15, wherein the processor is configured to select one of a plurality of said car parks in dependence on said one or more preferences associated with said user.
17. A vehicle as claimed in any one of the preceding claims, wherein the current vehicle location is determined by communication with a satellite network.

18. A method comprising:
   identifying a start location for a journey;
   identifying a destination for the journey; and
   generating a travel route from the start location to the destination;
   wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a user.

19. A route planning device comprising a processor configured to:
   identify a start location for a journey;
   identify a destination for the journey; and
   generate a travel route from the start location to the destination;
   wherein generating the travel route comprises comparing a plurality of modes of transport and selecting at least one of said plurality of modes of transport in dependence on one or more preferences associated with a user.

20. A vehicle or a device substantially as herein described with reference to the accompanying figures.

21. A method substantially as herein described with reference to the accompanying figures.
A issue could be:
1. Congestion
2. No parking space
3. Road work etc.

FIG. 2
User preferences include (but not limited to):
1. How many miles user prefer to walk
2. Preferred mode of public transport (e.g. bus or train?)
3. Preferred return journey etc.

Flowchart Key (A' to M')

FIG. 3
FIG. 4

300

The system can expend the analysis table for more variables e.g. carbon produced through different options, number of changes etc.

301
Journey option table creation by linking different public transport to reach the destination

302
Route options analysts against user preferences using real time and historic data

303
Identify/estimate user return journey timing using historic data and live data from driver's calendar.

304
Return Journey (options, time and cost) analysis against user preference table using historic data and real time information

305
Is there any return journey option missing from option table?

306
Add journey into option table

Yes
Parking option table creation for destination journey table to identify all parking options available nearby identified journey break points

Analysis of parking options upon arrival time against user preferences table using historic and real time data.

Identify/estimate user return journey timing using historic data and live data from driver's calendar.

Analysis of parking conditions (incl. cost) for time of stay and return journey time against user preferences table using historic and real time data.

Is there any car park option missing from option table?

The system can expend the car park analysis table for variable other than time and cost e.g. carbon produced through different options, number of changes etc.

Add car park into option table

FIG. 5
Journey option table (JOT)  

<table>
<thead>
<tr>
<th>Journey 1</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journey 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journey n</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Route user preference matrix (RUPM)  

<table>
<thead>
<tr>
<th>User preferences</th>
<th>Driver conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Condition 1</td>
</tr>
<tr>
<td></td>
<td>Condition 2</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Condition n</td>
</tr>
</tbody>
</table>

JOT User preference analysis table (UPAT) = JOT*RUPM

This will provide us journey / route preference ranking

Journey Car park option table (JCOT)  

<table>
<thead>
<tr>
<th>Journey 1</th>
<th>Car park1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Car park2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Car park3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Car park4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Journey 2</td>
<td>Car park1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Car park2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Car park3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Car park4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FIG. 6

SUBSTITUTE SHEET (RULE 26)
### Carpark User Preference Matrix (CUPM)

<table>
<thead>
<tr>
<th>User preferences</th>
<th>Condition 1</th>
<th>Condition 2</th>
<th>...</th>
<th>Condition n</th>
</tr>
</thead>
<tbody>
<tr>
<td>User preferences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### JCOT User Preference Analysis Table (JCPAT) = JCOT*JUPM

<table>
<thead>
<tr>
<th>Journey</th>
<th>Car park criteria</th>
</tr>
</thead>
</table>
| Journey 1 | Car park1  
|           | Car park2  
|           | Car park3  
|           | Car park4 |
| Journey 2 | Car park1  
|           | Car park2 |

**FIG. 6 cont.**
<table>
<thead>
<tr>
<th>Journey 3</th>
<th>Car park1</th>
<th>Car park2</th>
<th>Car park3</th>
<th>Car park4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>Car park1</td>
<td>Car park2</td>
<td>Car park3</td>
<td>Car park4</td>
</tr>
<tr>
<td>Journey n</td>
<td>Car park1</td>
<td>Car park2</td>
<td>Car park3</td>
<td>Car park4</td>
</tr>
</tbody>
</table>

FIG. 6 cont.
**Flowchart Key - (A to O)**

<table>
<thead>
<tr>
<th>A</th>
<th>Driver starts journey / enters destination address in the navigation system</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>System analysis user profile</td>
</tr>
<tr>
<td>C</td>
<td>System historic data analysis to understand user preferences</td>
</tr>
<tr>
<td>D</td>
<td>Does user prefer public transport linking for this type of journey in the past</td>
</tr>
<tr>
<td>E</td>
<td>Start public transport analysis and incorporation into destination route planning</td>
</tr>
<tr>
<td>F</td>
<td>Default preference profile is used</td>
</tr>
<tr>
<td>G</td>
<td>Display various transport options to the driver</td>
</tr>
<tr>
<td>H</td>
<td>User selects an option and system updates the navigation system accordingly.</td>
</tr>
<tr>
<td>I</td>
<td>A issue near destination address identified</td>
</tr>
<tr>
<td>J</td>
<td>The system update user with information and ask if user wants to look for alternative method of reach destination.</td>
</tr>
<tr>
<td>K</td>
<td>User response</td>
</tr>
<tr>
<td>L</td>
<td>System analysis situation to recommend potential benefits of recommended option</td>
</tr>
<tr>
<td>M</td>
<td>User response</td>
</tr>
<tr>
<td>N</td>
<td>Record user response for future analysis</td>
</tr>
<tr>
<td>O</td>
<td>System goes to ideal state till user request for information and/or there is change in situation around destination</td>
</tr>
</tbody>
</table>

**FIG. 2 cont.**
<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A'</td>
<td>Identify type of journey e.g. daily commute, journey to unfamiliar destination etc.</td>
</tr>
<tr>
<td>B'</td>
<td>Analysis of driving conditions to the destination</td>
</tr>
<tr>
<td>C'</td>
<td>Analysis of historic user preferences/behaviour data to predict user preferences</td>
</tr>
<tr>
<td>D'</td>
<td>Create user behaviour and preference table and priority matrix (weightage matrix)</td>
</tr>
</tbody>
</table>
| F'  | The system collects information about all option for such as (but not limited to)  
1. All public transport (Bus, Tramp, Metro, Tube, Train) options to the destination.  
1a. Timing  
1b. Cost  
1c. Historic traffic condition data around public transport stop to estimate traffic on arrival  
2. Alternative parking location including  
2a. Parking cost,  
2b. Car park timing,  
2c. Number of spaces available presently,  
2d. Present traffic condition  
2e. Historic data about traffic condition at expected time of arrival to predict traffic condition on arrival. |
| G'  | Identify possible connection to the destination |
| H'  | Analysis of user preferences |
| I'  | Identify public transport stop nearby destination as per user preferences |
| J'  | Collect all data (including service time, cost, frequency etc.) about identified suitable transport |
| K'  | Identify possible car park location to the destination |
| L'  | Analysis of journey options and corresponding car parking options against the user preferences. |
| M'  | System display options to the user with details of saving on cost, time, carbon etc, in order of user preference with recommended option |

**FIG. 3 cont.**
This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [ ] Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. [x] Claims Nos.: 20, 21 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

   see FURTHER INFORMATION sheet PCT/ISA/210

3. [ ] Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.
### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** G01C21/34

**ADD.**

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)

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<tr>
<td>G01C</td>
<td>G06Q G08G</td>
</tr>
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</table>

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 practicable, search terms used)

- **EPO-Internal**
- **WPI Data**

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>WO 02/37446 AI (BOSCH GMBH ROBERT [DE]; TANNEBERGER VOLKMAR [DE]) 10 May 2002 (2002-05-10) page 1, line 8 - line 21 page 4, line 3 - line 15 page 5, line 33 - page 6, line 17 page 8, line 28 - page 11, line 21 figure 1</td>
<td>8-10, 17-19</td>
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</table>

Further documents are listed in the continuation of Box C.

See patent family annex.

* 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
  * "L" documents which may throw doubts on priority claim(s) one of which is cited to establish the publication date of another citation or other special reason as specified
  * "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

* "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

* "Y" document of particular relevance; the claimed invention cannot be considered novel or 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

* "A" document member of the same patent family

**Date of the actual completion of the international search**

16 November 2015

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

25/11/2015

**Name and mailing address of the ISA**

European Patent Office, P. B. 5818 Patentisaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

**Authorized officer**

Yosri, Samir
C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
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<td>paragraphs [0014] - [0020], [0064] - [0066], [0074]</td>
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<tr>
<td></td>
<td>figures 1,7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>paragraphs [0026] - [0028]</td>
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<tr>
<td></td>
<td>paragraphs [0056], [0057]</td>
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<td>paragraphs [0063] - [0065], [0077], [0078]</td>
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<td></td>
<td>figure 1</td>
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</tr>
<tr>
<td></td>
<td>paragraphs [0023] - [0025]</td>
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<td></td>
<td>paragraphs [0029], [0030]</td>
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<tr>
<td></td>
<td>paragraph [0006] - paragraph [0010]</td>
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<td></td>
<td>paragraphs [0013], [0016], [0019] - [0021]</td>
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</tr>
<tr>
<td></td>
<td>paragraphs [0028] - [0030], [0033] - [0036]</td>
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<tr>
<td></td>
<td>figures 1,2</td>
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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 20, 21

See details on Item III of written opinion accompanying the search report.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examination Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter I1 procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.