The invention concerns a method for vehicle checks, comprising the steps of determining checks based on a predetermined list of anticipated checking activities and suggesting to a driver of the vehicle that said checks be performed. The method also comprises the steps of determining, based on information determined about the vehicle and its forward travel, the time available for checks; deciding, based on information determined about the time available to said driver, whether the driver also has time available for perform checks; determining, based on information about the time mutually available to the vehicle and the driver for checks, which of said anticipated checking activities is/are to be suggested; and suggesting to the driver one or a plurality of said anticipated checking activities that fits/fit chronologically within said time mutually available. The invention also concerns a computer program product comprising program code (P) for a computer (200; 210) for implementing a method according to the invention. The invention also concerns an apparatus and a motor vehicle that is equipped with the apparatus.
Apparatus and method for vehicle checks

TECHNICAL FIELD OF THE INVENTION

The present invention concerns a method for vehicle checks. The invention also concerns a computer program product comprising program code for a computer to implement a method according to the invention. The invention also concerns an apparatus for vehicle checks and a motor vehicle that is equipped with the apparatus.

BACKGROUND

Current vehicles are in need of ongoing checks, service and inspection. Component status and operating parameters can be checked by looking over the vehicle with a certain regular frequency, e.g. in connection with yearly service, whereupon broken components can be identified so they can be repaired or replaced.

According to certain regulations, drivers of heavy vehicles are required to perform a so-called "daily check" of their vehicle. A daily check can comprise, for example, steps of checking tread depths on tires and the oil level in a lubrication system. According to certain regulations, daily checks must be performed before a driver work shift, which is important not least from a safety perspective. The daily check of the vehicle is also intended to identify wear of vehicle components early on. Drivers in a number of countries are often trained in keeping records of the daily checks and reporting any deviations to, e.g. a trucking company or personnel at a service facility. The driver is personally responsible for rectifying certain deviations, immediately or as soon as possible.

Systems and methods currently exist to suggest activities for daily vehicle checks. One commonly occurring problem with existing systems and
methods for suggesting activities for daily vehicle checks is that reminders are presented at non-optimal times. Another commonly occurring problem with existing systems and methods for suggesting activities for daily vehicle checks is that said reminders do not sufficiently take into account the vehicle history or a likelihood that a fault or undesired wear has occurred. One consequence of these problems is that the reminder may be perceived more as a disturbance than as a support, whereupon the reminder is ignored and necessary vehicle checks are not initiated or completed.

US 2008/0045274 describes a system for communicating information that facilitates wireless communication between electronic devices. The system comprises a transceiver in a vehicle. The transceiver is arranged for communication with an electronic device that is disposed external to said transceiver. The communication refers to a Bluetooth communication standard.

WO 2008/128337 describes a GSM-based wireless device with a gateway to facilitate telematics and location-based services through the use of GPS via a wireless communications network. The GSM-based wireless device comprises a dynamically configurable virtual SIM card, a virtual client for telematics and location-based services, and events profiles that enable the wireless device to be dynamically configured.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a new and advantageous method for vehicle checks.

Another object of the invention is to provide a new and advantageous apparatus and a new and advantageous computer program for vehicle checks.
Yet another object of the invention is to provide a method, an apparatus and a computer program to produce a user-friendly auxiliary means for satisfactory vehicle checks.

Yet another object of the invention is to provide a method, an apparatus and a computer program to reduce the risk that necessary regular vehicle checks will be omitted or ignored.

Yet another object of the invention is to provide an alternative method, an alternative apparatus and an alternative computer program for vehicle checks.

These objects are achieved by a method for vehicle checks according to claim 1.

According to one aspect of the invention, a method for vehicle checks is provided that comprises the steps of:
- determining checks based on a predetermined list of anticipated checking activities; and
- suggesting to a driver of the vehicle that said checks be performed.

The method also comprises the steps of determining, based on information determined about the vehicle and its forward travel, the time available for checks;
- deciding, based on information determined about the time available to said driver, whether the driver also has time available to perform checks;
- determining, based on information about the time mutually available to the vehicle and the driver to perform checks, which of said anticipated checking activities is/are to be suggested; and
- suggesting to the driver one or a plurality of said anticipated checking activities that fit/fit chronologically within said time mutually available.
Suitable times when a driver is urged to perform checks of a vehicle or at least one specific step in a daily check of a vehicle can thus be identified and, where appropriate, suggested automatically. An increased likelihood that a check will actually be performed is thereby achieved. Said checks of a vehicle can be so-called daily checks.

The forward travel of the vehicle can comprise the position of the vehicle and information about the position along with the operational status of the vehicle. The position of the vehicle can be determined by means of a GPS device or tachograph. Said information about the position can comprise predetermined information, such as information about proximate or upcoming facilities such as a filling station.

Anticipated checking activities can comprise checking activities based on vehicle components and their anticipated service lives and service hours determined based on the history of the forward travel of the vehicle.

Anticipated checking activities can be determined hereby based on a vehicle check history. Suggested checking activities can thus be determined hereby based on information about when individual vehicle components were last replaced, overhauled or were subjected to a check. A more satisfactory set of checking activities can advantageously be suggested in each given instance.

The preferred instances of said time mutually available may occur in connection with fueling, driver rests, loading and/or unloading and at the end of a driver work shift. A naturally appropriate occasion for a vehicle check can thus be chosen, whereupon the likelihood that the driver of the vehicle will actually perform the suggested check is higher than if vehicle checks are suggested when the driver is less receptive to said suggestions.
The preferred instances of said time mutually available may occur in connection with washing of the vehicle, raised bridge or traffic congestion in connection with roadway accidents.

The method can further comprise the step of:
- displaying for the driver information about one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available; and/or
- playing for the driver audio containing information about one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available. A versatile and user-friendly method according to one aspect of the invention is thereby achieved.

The method is easy to implement in existing motor vehicles. Software for vehicle checks according to the invention can be installed in a control unit in the vehicle in connection with its manufacture. A purchaser of the vehicle can thus be given the opportunity to choose the function of the method as an option. Alternatively, software comprising program code for carrying out the innovative method for vehicle checks can be installed in the control unit in connection with an upgrade at a service station. In this case, the software can be loaded into a memory in the control unit. Implementing the innovative method is thus cost-effective, particularly as no additional components need to be installed in the vehicle according to one aspect of the invention. The necessary hardware currently already exists and is disposed in the vehicle.

The invention thus offers a cost-effective solution to the problems described above.

Software comprising program code for vehicle checks can easily be updated or replaced. Furthermore, different parts of the software that contain program code for vehicle checks can be replaced independently of one another. This modular configuration is advantageous from a maintenance standpoint.
According to one aspect of the invention, an apparatus for vehicle checks is provided, comprising:
- devices for determining checks based on a predetermined list of anticipated checking activities;
- devices for suggesting to a driver of the vehicle that said checks be performed;
- devices for determining, based on information determined about the vehicle and its forward travel, the time available for checks;
- devices for deciding, based on information determined about the time available to said driver, whether the driver has time available for performing checks;
- devices for determining, based on information about the time mutually available to the vehicle and the driver for checks, which of said anticipated checking activities is/are to be suggested; and
- devices for suggesting to the driver one or a plurality of said anticipated checking activities that fits/fit within said time mutually available.

In the apparatus, the forward travel of the vehicle can comprise the position of the vehicle and information about the position along with the operational status of the vehicle.

In the apparatus, anticipated checking activities can comprise checking activities based on vehicle components and their anticipated service lives and service hours determined based on the history of the forward travel of the vehicle.

In the apparatus, anticipated checking activities can be determined based on the vehicle check history.

In the apparatus, the preferred instances of said time mutually available can occur in connection with fueling, driver rests, loading and/or unloading and at the end of a driver work shift.
The apparatus can further comprise:
- devices for displaying for the driver information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available; and/or
- devices for playing for the driver audio containing information about said one or a plurality of said suggested anticipated checking activities that fits/fit within said time mutually available.

A suitable occasion for a check can be identified by combining two different types of calculations, both from a driver perspective and from a component perspective. From the driver perspective it is important that a suggested vehicle check be appropriate in terms of the time available to him. The time available to the driver can be determined automatically according to routines stored in a control unit in the vehicle. Alternatively, the driver can manually furnish the time available to him at a scheduled stop, such as during fueling, rests, loading/unloading etc.

From a component perspective it is important that a suggested vehicle check be appropriate with respect to, e.g. prevailing wear measurements of the vehicle components. In certain situations it may be fairly urgent to suggest activities for vehicle checks such as, for example, when an oil level in a lubrication system of the vehicle has fallen below a critical level. The time, and thus also a suitable time for performing checking activities can be determined by a probability-based calculation of when a component fault is expected to occur. Said time can also be determined on the basis of information about the cumulative service hours of components and when a vehicle check was last performed.

Appropriate occasions for checks can be identified based on various sources. Examples of such sources can be included in a group comprising: GPS devices, tachographs and various sensors on the vehicle. A control unit in the vehicle can contain predetermined information about the position of the
vehicle, such as whether said position is situated at a fueling station, loading/unloading site, border station etc. The time available for vehicle checks with regard to the vehicle per se can be determined hereby based on, e.g. a refueling time. The time available for vehicle checks with respect to the driver can be determined hereby based on, e.g. a loading or unloading time, the time for switching trailers, etc. Before a driver is given such occasion (allocated slot time), he may have some time to perform suggested vehicle checks. This can also be relevant while waiting to transport a vehicle by train or ferry. Other appropriate instances for suggested vehicle checks can occur at the start or end of a work shift, while waiting at national borders and during legally mandated rests (which are not to be confused with legally mandated rest times when the driver has free disposal of his time and must not work). Said legally mandated rests pertain to legally mandated times for recovery within the framework of a work shift.

The foregoing objects are also achieved by a motor vehicle that contains the apparatus for vehicle checks. The motor vehicle can be a goods vehicle, bus or car.

According to one aspect of the invention, a computer program for vehicle checks is provided, wherein said computer program contains program code, stored on a computer-readable medium, to cause an electronic control unit or another computer connected to the electronic control unit to perform the steps according to any of claims 1-6.

According to one aspect of the invention, a computer program for vehicle checks is provided, wherein said computer program contains program code to cause an electronic control unit or another computer connected to the electronic control unit to perform the steps according to any of claims 1-6.

According to one aspect of the invention, a computer program product is provided containing a program code, stored on a computer-readable
medium, to perform the method steps according to any of claims 1-6 when said computer program is run on an electronic control unit or another computer connected to the electronic control unit.

Further objects, advantages and new features of the present invention will be apparent to one skilled in the art based on the following details, and through practice of the invention. While the invention is described below, it should be noted that the invention is not limited to the specifically described details. One skilled in the art who has access to the teaching herein will recognize additional applications, modifications and incorporations in other areas, which are within the scope of the invention.

GENERAL DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the additional objects and advantages thereof, reference is now made to the following detailed description, which is to be read along with the accompanying drawings, in which the same reference designations refer to the same parts in the various figures, and in which:

Figure 1 schematically illustrates a vehicle according to an embodiment of the invention;
Figure 2 schematically illustrates a subsystem on the vehicle shown in Figure 1 according to an embodiment of the invention;
Figure 3 schematically illustrates a sensor configuration on the vehicle shown in Figure 1 according to an embodiment of the invention;
Figure 4a schematically illustrates a flow diagram of a method according to an embodiment of the invention;
Figure 4b schematically illustrates, in additional detail, a flow diagram of a method according to an embodiment of the invention; and
Figure 5 schematically illustrates a computer according to an embodiment of the invention.
DETAILED DESCRIPTION OF THE FIGURES

A side view of a vehicle 100 is shown with reference to Figure 1. The exemplary vehicle 100 consists of a tractor 110 and a trailer 112. The vehicle can be a heavy vehicle, such as a goods vehicle or a bus. Alternatively, the vehicle can be a car.

The term "link" refers herein to a communications link, which can be a physical line, such as an opto-electronic communication line, or a non-physical line, such as a wireless connection, for example a radio or microwave link.

An apparatus 299 for vehicle checks on the vehicle 100 is shown with reference to Figure 2.

The apparatus 299 comprises a first control unit 200.

A GPS device 220 is arranged for communication with the first control unit 200 via a link L220. The GPS device 220 is arranged so as to continuously determine a prevailing position $P_v$ of the vehicle 100. The GPS device 220 is arranged so as to continuously send signals $S_{220}$ containing information about said prevailing position $P_v$ to the first control unit 200 via said link L220. The first control unit 200 is arranged so as to continuously receive said signals $S_{220}$ containing information about said prevailing position $P_v$.

A tachograph 230 is arranged for communication with the first control unit 200 via a link L230. The tachograph 230 can be a conventional tachograph for a vehicle, such as a goods vehicle or bus. The tachograph 230 is arranged so as to continuously determine information about, among other things, the vehicle route. The tachograph 230 is arranged so as to continuously determine information about, among other things, the operational status of the vehicle 100. The information about the operational
status can comprise, e.g. a vehicle velocity $V$, an engine status (running or non-running). The tachograph 230 can be arranged so as to log driver rests, hours worked by a driver during a driving shift, etc. The tachograph 230 is arranged so as to continuously send signals $S_{230}$ containing information about said route and/or operational status of the vehicle to the first control unit 200 via said link $L_{230}$. The first control unit 200 is arranged so as to continuously receive said signals $S_{230}$ containing said information.

According to an alternative embodiment, the first control unit 200 is arranged so as to request certain necessary information, such as information comprising said route and/or operational status of the vehicle, at an appropriate time. The tachograph 230 is thus arranged so as to send a signal $S_{230}$ containing said requested information to the first control unit 200 via said link $L_{230}$.

I/O devices 240 are arranged for communication with the first control unit 200 via a link $L_{240}$. The I/O devices 240 can be of a conventional type, and comprise e.g. a touchscreen, keypad, equipment for voice control, loudspeaker, display screen etc. A driver can, by means of the I/O devices 240, input necessary information, such as an estimated rest time, time for loading of goods or a calculated waiting time during a trailer change to the first control unit 200. The I/O devices 240 are arranged so as to send signals $S_{240}$ containing said input information to the first control unit 200 via said link $L_{240}$. The first control unit 200 is arranged so as to continuously receive said signals $S_{240}$ containing said information. The first control unit 200 is arranged so as to send signals containing information for feedback to a driver or operator of the vehicle. Visual or audio feedback regarding suggested activities for vehicle checks can thus be produced.

According to one example, the first control unit 200 can be arranged so as, by means of said I/O devices 240, to furnish information about a number of suggested checking activities chosen from among a set of predetermined
checking activities. Said suggested checking activities can be an appropriately selected number of checking activities. Said predetermined checking activities can be an arbitrary number of checking activities. Said predetermined checking activities are preferably checking activities that pertain to so-called daily checks of the vehicle, such as checks of tread depths on vehicle tires.

A sensor apparatus 250 is arranged for communication with the first control unit 200 via a link L250. The sensor apparatus 250 can be of a conventionally known type and comprises a number of different sensors for determining prevailing statuses of various vehicle components.

An embodiment of the sensor apparatus 250 is described in further detail with reference to Figure 3 below.

The first control unit 200 is arranged for communication with communication devices 260 via a link L260. The communication devices 260 can comprise a transmitter and receiver. The first control unit 200 is arranged so as to send signals S260 containing information about suggested checking activities to the communication devices 260 via the link L260. The communication devices 260 are arranged so as to communicate on an appropriate arbitrary frequency.

The communication devices 260 are arranged for communication with an electronic unit 265 via a wireless link L265. Said electronic unit 265 can be a handheld electronic device, such as a PDA or mobile telephone. The electronic device 265 can comprise communication means, such as a display screen, touch screen, keypad etc. A driver or operator of the vehicle 100 can thereby obtain information about suggested checking activities for the vehicle, according to one aspect of the invention. Said driver or operator of the vehicle can thus use said communication means to actively request suggestions for appropriate checking activities. According to one alternative,
the driver or operator can be provided with information about suggested checking activities automatically by means of the electronic device 265. According to one exemplary embodiment, a driver can note which suggested check activity/activities for the vehicle are being performed by means of said communication means. The driver can thereby manually note a completed suggested check activity, whereupon a signal S265 containing updated information (containing information about completed suggested checking activities) can be sent from the electronic unit 265 via the communication devices 260 to the first control unit 200 for processing and storage in a memory therein.

The first control unit 200 is arranged for communication with printer devices 270 via a link L270. The printer devices 270 can be of a conventional type, and can comprise a printer. A driver can, by means of the I/O devices 240, request a printout of suggested checking activities. The first control unit 200 is arranged so as to send a signal S270 containing said suggested checking activities to the printer devices 270 via said link L270. Said printout can be suitable for keeping records of vehicle checks. Said printout can alternatively constitute memory support for a driver who must perform a suggested vehicle check.

According to one example a driver can, by means of the I/O devices 240, confirm which steps of a suggested vehicle check have been completed and then, by means of the I/O devices 240 or the electronic device 265, request a printout from the printer devices 270 in the form of a completed confirmation list.

The first control unit 200 can, according to one embodiment, be arranged so as, based on information determined about the vehicle and its forward travel, to determine the time available for checks. The first control unit 200 according to one embodiment can be arranged so as, based on information determined about the time available to said driver, to decide whether the
driver also has time available to perform checks. The first control unit 200 according to one embodiment can be arranged so as, based on information about the time mutually available to the vehicle and the driver to perform checks of the vehicle, to determine which of said anticipated checking activities is/are to be suggested. The first control unit 200 according to one embodiment can be arranged so as to suggest to the driver one or a plurality of said anticipated checking activities that fits/fit chronologically within said time mutually available.

A second control unit 210 is arranged for communication with the first control unit 200 via a link L210. The second control unit 210 can be removable connected to the first control unit 200. The second control unit 210 can be a control unit external to the vehicle 100. The second control unit 210 can be arranged so as to perform the innovative method steps according to the invention. The second control unit 210 can be used to load software over to the first control unit 200, particularly software for carrying out the innovative method. The second control unit 210 can alternatively be arranged for communication with the first control unit 200 via an internal network in the vehicle. The second control unit 210 can be arranged so as to perform essentially the same function as the first control unit 200, such as determining, based on information about the time mutually available to the vehicle and the driver for checks, which anticipated checking activities is/are to be suggested to the driver, and suggesting one or a plurality of anticipated checking activities that fits/fit chronologically within said time mutually available.

Figure 3 schematically illustrates a sensor configuration 399 according to one aspect of the invention. The sensor configuration 399 can comprise the sensor apparatus 250 described with reference to Figure 2.

The sensor configuration 399 can include a suitable set of sensors, which sensors are arranged so as to detect various vehicle parameters. A
suggested sensor configuration is exemplified herein, but it must be understood that the suggested sensor configuration described below can comprise more sensors or a subset of exemplary sensors. The sensor configuration 399 comprises at least one sensor.

The sensor configuration 399 can comprise a first sensor 250a. Said first sensor 250a can be a fuel-level sensor. Said first sensor 250a is arranged for communication with the first control unit 200 via a link L250a. Said first sensor 250a is arranged so as to continuously determine a prevailing fuel level L in a fuel tank (not shown) in the vehicle 100. Said first sensor 250a can also be arranged so as to continuously determine a change per unit of time L'(t) in a prevailing fuel level in the fuel tank in the vehicle 100. Said first sensor 250a is arranged so as to continuously or intermittently send signals S250a containing information about said determined fuel level L and/or said determined change per unit of time L'(t) to the first control unit 200.

The first control unit 200 is arranged so as to determine, based on said determined fuel level L and/or said determined change per unit of time L'(t), the time available for checks. The time available for checks can thus be determined hereby based on information determined about the vehicle and its forward travel.

The sensor configuration 399 can comprise a second sensor 250b. Said second sensor 250b can be a vehicle weight sensor. Said second sensor 250b is arranged for communication with the first control unit 200 via a link L250b. Said second sensor 250b is arranged so as to continuously determine a prevailing freight load W in the vehicle 100. Said second sensor 250b is arranged so as to continuously or intermittently send signals S250b containing information about said determined freight load W to the first control unit 200. A loading/unloading status of the vehicle 100 can thus be determined.
The first control unit 200 is arranged so as to determine, based on said determined freight load W, the time available for checks. The time available for checks can thus be determined hereby based on information determined about the vehicle and its forward travel.

The sensor configuration 399 can comprise a third sensor 250c. Said third sensor 250c can be a trailer coupling sensor. Said third sensor 250c is arranged for communication with the first control unit 200 via a link L250c. Said third sensor 250c is arranged so as to continuously determine a trailer coupling status of the vehicle 100. Said third sensor 250c is arranged so as to send, when a trailer coupling is activated or deactivated, a signal S250c containing information about a prevailing coupling status to the first control unit 200. Said coupling status can correspond to a status wherein a trailer is coupled to the vehicle 100 (trailer coupling activated) or a status wherein a trailer is uncoupled from the vehicle 100 (trailer coupling deactivated).

The first control unit 200 is arranged so as to determine, based on said determined trailer coupling status, the time available for checks. The time available for checks can thus be determined hereby based on information determined about the vehicle and its forward travel.

The sensor configuration 399 can comprise a fourth sensor 250d. Said fourth sensor 250d can be an oil-level sensor. Said fourth sensor 250d is arranged for communication with the first control unit 200 via a link L250d. Said fourth sensor 250d is arranged so as to continuously determine a prevailing oil level in a lubrication system in the vehicle 100. Said fourth sensor 250d is arranged so as to send a signal S250d containing information about a prevailing oil level in a lubrication system to the first control unit 200.

The first control unit 200 is arranged so as to determine, based on said determined prevailing oil level in the lubrication system in the vehicle, the time available for checks. The time available for checks can thus be
determined hereby based on information determined about the vehicle and its forward travel.

The sensor configuration 399 can comprise a fifth sensor 250e. Said fifth sensor 250e can be a wear sensor. Said fifth sensor 250e is arranged for communication with the first control unit 200 via a link L250e. Said fifth sensor 250e is arranged so as to continuously determine a prevailing wear measurement for at least one vehicle component, such as a wheel brake or the like. According to one example, said fifth sensor 250e can be arranged so as to detect a wear measurement for a lining on a disk brake on the vehicle. Said fifth sensor 250e can alternatively be arranged so as to calculate, based on a continuously detected operating parameter, a wear measurement for at least one vehicle component. According to one example, the tread depths on at least one vehicle can be calculated based on a detected cumulative number of complete wheel axle rotations of the vehicle 100. Said fifth sensor 250e is arranged so as to continuously or intermittently send a signal S250e containing information about said determined wear measurement to the first control unit 200.

The first control unit 200 is arranged so as to determine, based on said determined wear measurement of at least one component of the vehicle, a suitable time for a vehicle check.

Three different embodiments according to the invention are described summarily below.

Example 1

According to a first example, it can be determined that the vehicle 100 is stopped. This can occur by means of a speedometer (not shown) in the vehicle, the tachograph 230 or the GPS device 220. When it is determined
that the vehicle is stopped, a prevailing position is determined for the vehicle. This can occur by means of the GPS device 220.

Information associated with said determined vehicle position is thereby determined. According to this first example, it is determined that the vehicle has stopped at a filling station. In the event that the vehicle engine is turned off, a monitoring function can determine how a fuel level in a vehicle tank is increasing. This can occur by means of the fuel level sensor 250a. If such is the case, the length of time that fueling is anticipated to continue is calculated. Based on the calculated time, the time available to the driver and, e.g. the vehicle check history, it can be determined whether, and if so which, check activities should be suggested, whereupon a result can be presented by means of e.g. the I/O devices and/or the electronic apparatus 265.

Example 2

According to a second example, it can be determined that the vehicle 100 is stopped. This can occur by means of a speedometer (not shown) in the vehicle, the tachograph 230 or the GPS device 220. When it is determined that the vehicle is stopped, a prevailing position is determined for the vehicle. This can occur by means of the GPS device 220.

Information associated with said determined vehicle position is thereby determined. According to this second example, it is determined that the vehicle has stopped at a rest stop. In the event that the vehicle engine has been turned off, a length of time during which the driver will rest can be determined. This can occur automatically by means of the tachograph 230 or by means of a manual input by means of the I/O devices 240. Based on the time available to the driver and, e.g. information generated by the sensor configuration 250, it can be determined whether, and if so which, checking activities should be suggested, whereupon a result can be presented by means of e.g. the I/O devices and/or the electronic apparatus 265.
Example 3

According to a third example, it can be determined that the vehicle 100 is stopped. This can occur by means of a speedometer (not shown) in the vehicle, the tachograph 230 or the GPS device 220. When it is determined that the vehicle is stopped, a prevailing position is determined for the vehicle. This can occur by means of the GPS device 220.

Information associated with said determined vehicle position is hereby determined. According to this third example, it is determined that the vehicle has stopped at a loading/unloading site. A calculated time can hereby be determined for, e.g. unloading goods. Alternatively, an anticipated time during which the vehicle will be standing still can be determined taking into account an allocated slot time. According to one example, information from the trailer coupling sensor 250c can be taken into consideration. Said anticipated time for unloading and the time available to the driver can be determined automatically or by means of a manual input by means of the I/O devices 240. Based on the time available to the driver and, e.g. information generated by the sensor configuration 250, it can be determined whether, and if so which, checking activities should be suggested, whereupon a result can be presented by means of e.g. the I/O devices and/or the electronic apparatus 265.

Figure 4a schematically illustrates a flow diagram of a method for vehicle checks according to an embodiment of the invention. The method comprises a first method step s401. The step s401 comprises the steps of:
- determining checks based on a predetermined list of anticipated checking activities;
- suggesting to a driver of the vehicle that said checks be performed;
- determining, based on information determined about the vehicle and its forward travel, the time available for checks;
- deciding, based on information determined about said time available to a
driver, whether the driver also has time available for performing checks;
- determining, based on information about the time mutually available to the
vehicle and the driver to perform checks, which of said anticipated checking
activities is/are to be suggested; and
- suggesting to the driver one or a plurality of anticipated checking activities
that fits/fit chronologically within said time mutually available. After the step
s401 the method is concluded.

Figure 4b schematically illustrates a flow diagram of a method for vehicle
checks according to an embodiment of the invention.

The method comprises a first method step s410. The method step s410
comprises the step of determining information about the vehicle and its
forward travel. It can be determined hereby whether the vehicle is standing
still with its engine turned off. The status or condition of vehicle components
can also be determined hereby, along with a position for the vehicle. After the
method step s410, a subsequent method step s420 is performed.

The method step s420 comprises the step of determining, based on
information determined about the forward travel of the vehicle, the time
available for checks. This can occur by means of models stored in the control
unit 200 or by means of inputting sufficient information via the I/O devices
240. After the method step s420, a subsequent method step s430 is performed.

The method step s430 comprises the step of determining information about
the time available to said driver. This can occur by means of models stored in
the control unit 200 or by means of manually inputting sufficient information
via the I/O devices 240. After the method step s430, a subsequent method
step s440 is performed.
The method step s440 comprises the step of deciding, based on said information determined about the time available to said driver, whether the driver also has time available for performing checks. After the method step s440, a subsequent method step s450 is performed.

The method step s450 comprises the step of determining, based on information about the time mutually available to the vehicle and the driver for performing checks, which of the anticipated checking activities is/are to be suggested. After the method step s450, a subsequent method step s460 is performed.

The method step s460 comprises the step of suggesting to the driver one or a plurality of anticipated checking activities that fits/fit chronologically within said time mutually available. The method step s460 can also comprise the steps of displaying for the driver information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available; and/or playing for the driver audio containing information about one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available.

After the method step s460, the method is concluded.

With reference to Figure 5, a diagram is presented of an embodiment of an apparatus 500. The control units 200 and 210, which are described with reference to Figure 2, can, in one embodiment, include the apparatus 500. The apparatus 500 comprises a non-volatile memory 520, a data-processing unit 510 and a read/write memory 550. The non-volatile memory 520 has a first memory section 530 in which a computer program, such as an operating system, is stored to control the function of the apparatus 200 [sic]. The apparatus 500 further comprises a bus controller, a serial communication port, I/O devices, an A/D converter, the time and date input and transfer unit,
an event counter and a termination controller (not shown). The non-volatile memory 520 also has a second memory section 540.

A computer program is furnished that contains routines for vehicle checks according to the innovative method. The program P contains routines for determining checks based on a predetermined list of anticipated checking activities. The program P contains routines for suggesting to a driver of the vehicle that said checks be performed.

The program P contains routines to determine, based on information determined about the vehicle and its forward travel, the time available for checks. The program P contains routines to decide, based on information determined about the time available to said driver, whether the driver also has time available for performing checks. The program P contains routines for determining, based on information about the time mutually available to the vehicle and the driver for performing checks, which of said anticipated checking activities is/are to be suggested. The program P contains routines for suggesting to the driver one or a plurality of anticipated checking activities that fits/fit chronologically within said time available. The program P contains routines for displaying for the driver information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available. The program P contains routines for playing for the driver audio containing information about said one or a plurality of suggested anticipated checking activities that fits/fit chronologically within said time available. The program P can be stored in an executable form or in a compressed form in a memory 560 and/or in a read/write memory 550.

According to one embodiment, information about a number of predetermined positions is stored in, e.g. the memory 550. Said information can comprise data indicating whether the predetermined positions are situated at a port, loading/unloading site, national border, rest stop, parking lot, washing facility,
filling station, service facility etc. Furthermore, according to one embodiment, information regarding a number of predetermined checking activities can be stored in, e.g. the memory 550. According to one aspect of the invention it is possible to determine, based on prevailing circumstances, the time available to the vehicle and the time available to the driver, which checking activities is/are appropriate to suggest in connection with a determined appropriate occasion for a check.

In the memory 550 there can be updateable information, including data regarding completed checking activities, which data can be furnished to, e.g. the electronic unit 265 or the printer device 270.

When it is stated that the data-processing unit 510 performs a given function, it is to be understood that the data-processing unit 510 executes a certain part of the program that is stored in the memory 560, or a certain part of the program that is stored in the read/write memory 550.

The data-processing device 510 can communicate with a data port 599 via a data bus 515. The non-volatile memory 520 is intended to communicate with the data-processing unit 510 via a data bus 512. The separate memory 560 is intended to communicate with the data-processing unit 510 via a data bus 511. The read/write memory 550 is arranged so as to communicate with the data-processing unit 510 via a data bus 514. For example, the links L210, L220, L230, L240, L250, L260, L270, L250a, L250b, L250c, L250d and L250e can be connected to the data port 599 (see Figure 2 and Figure 3).

When data are received at the data port 599, they are stored temporarily in the second memory section 540. Once received input data have been stored temporarily, the data-processing unit 510 is arranged so as to execute code in a manner as described above. According to one embodiment, signals received at the data port 599 contain information about the vehicle and its forward travel. According to one embodiment, signals received at the data
port 599 contain information about the position of the vehicle and information about position along with the operational status of the vehicle. The signals received at the data port 599 can be used by the apparatus 500 to suggest to the driver one or a plurality of anticipated checking activities, according to one aspect of the invention.

Parts of the methods described herein can be performed by the apparatus 500 with the help of the data-processing unit 510, which runs the program stored in the memory 560 or the read/write memory 550. When the apparatus 500 runs the program, the methods described herein are executed.

The foregoing description of the preferred embodiments of the present invention has been furnished for illustrative and descriptive purposes. It is not intended to be exhaustive, or to limit the invention to the variants described. Many modifications and variations will obviously be apparent to one skilled in the art. The embodiments have been chosen and described in order to best explicate the principles of the invention and its practical applications, and to thereby enable one skilled in the art to understand the invention in terms of its various embodiments and with the various modifications that are applicable to its intended use.
CLAIMS

1. A method for vehicle checks comprising the steps of:
   - determining checks based on a predetermined list of anticipated checking activities; and
   - suggesting to the driver that said checks be performed;

   characterized by the steps of:
   - determining (s420), based on information determined about the vehicle and its forward travel, the time available for checks;
   - deciding (s440), based on information determined about the time available to said driver, whether the driver also has time available for performing checks;
   - determining (s450), based on information about the time mutually available to the vehicle and the driver for checks, which of said anticipated checking activities is/are to be suggested; and
   - suggesting (460) to the driver one or a plurality of said anticipated checking activities that fits/fit chronologically within said time mutually available.

2. A method according to claim 1, wherein the forward travel of the vehicle comprises the position of the vehicle and information about the position along with an operational status of the vehicle.

3. A method according to claim 1 or 2, wherein anticipated checking activities comprise checking activities based on vehicle components and their anticipated service lives and service hours determined based on a history of the forward travel of the vehicle.

4. A method according to any of the preceding claims, wherein anticipated checking activities are determined based on a vehicle check history.
5. A method according to any of the preceding claims, wherein the preferred instances of said time mutually available are associated with fueling, driver rests, loading and/or unloading and at the end of a driver work shift.

6. A method according to any of the preceding claims, further comprising the step of:
   - displaying for the driver information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available; and/or
   - playing for the driver audio containing information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available.

7. An apparatus for vehicle checks, comprising:
   - devices (200; 210; 500) for determining checks based on a predetermined list of anticipated checking activities; and
   - devices (200; 210; 500) for suggesting to a driver of the vehicle that said checks be performed;

   characterized by:
   - devices (200; 210; 500) for determining, based on information determined about the vehicle and its forward travel, the time available for checks;
   - devices (200; 210; 500) for deciding, based on information determined about the time available to said driver, whether the driver also has time available for performing checks;
   - devices (200; 210; 500) for determining, based on information about the time mutually available to the vehicle and the driver for checks, which of said anticipated checking activities is/are to be suggested; and
   - devices (200; 210; 500) for suggesting to the driver one or a plurality of said anticipated checking activities that fits/fit chronologically within said time mutually available.
8. An apparatus according to claim 7, wherein the forward travel of the vehicle comprises the position of the vehicle and information about the position along with an operational status of the vehicle.

9. An apparatus according to claim 7 or 8, wherein anticipated checking activities comprises checking activities based on vehicle components and their anticipated service lives and service hours determined based on a history of the forward travel of the vehicle.

10. An apparatus according to any of claims 7-9, wherein anticipated checking activities are determined based on a vehicle check history.

11. An apparatus according to any of claims 7-10, wherein the preferred instances of said time mutually available are associated with fueling, driver rests, loading and/or unloading and at the end of a driver work shift.

12. An apparatus according to any of claims 7-11, further comprising:
   - devices (200; 210; 500; 265; 270) for displaying for the driver information about said one or a plurality of said suggested anticipated checking activities that fits/fits chronologically within said time mutually available; and/or
   - devices (200; 210; 500; 265) for playing for the driver audio containing information about said one or a plurality of said suggested anticipated checking activities that fits/fit chronologically within said time mutually available.

13. A motor vehicle (100; 110) containing an apparatus according to any of claims 7-12.

14. A motor vehicle (100; 110) according to claim 13, wherein the motor vehicle is a goods vehicle, bus or car.
15. A computer program (P) for vehicle checks, wherein said computer program (P) comprises program code to cause an electronic control unit (200; 500) or another computer (210; 500) connected to the electronic control unit (200; 500) to perform the steps according to any of claims 1-6.

16. A computer program product comprising program code, stored on a computer-readable medium, for performing the method steps according to any of claims 1-6 when said computer program is run on an electronic control unit (200; 500) or another computer (210; 500) connected to the electronic control unit (200; 500).
Start

Suggest checking actions to a driver

Determine information about the vehicle and its forward travel

Determine time available for checks

Determine information about time available to a driver

Decide whether the driver also has time available for check

Determine which of anticipated checking activities is/are to be suggested

Suggest one or a plurality of anticipated checking activities to the driver

End

Fig. 4a

Fig. 4b