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(54) **IN-VEHICLE TIRE GAUGE SYSTEM AND METHODS**

(75) Inventors: **Kevin W. Owens**, Sterling Heights, MI (US); **Daniel C. McGarry**, Oxford, MI (US); **Kevin R. Krause**, Plymouth, MI (US)

(73) Assignee: **GENERAL MOTORS LLC**, DETROIT, MI (US)

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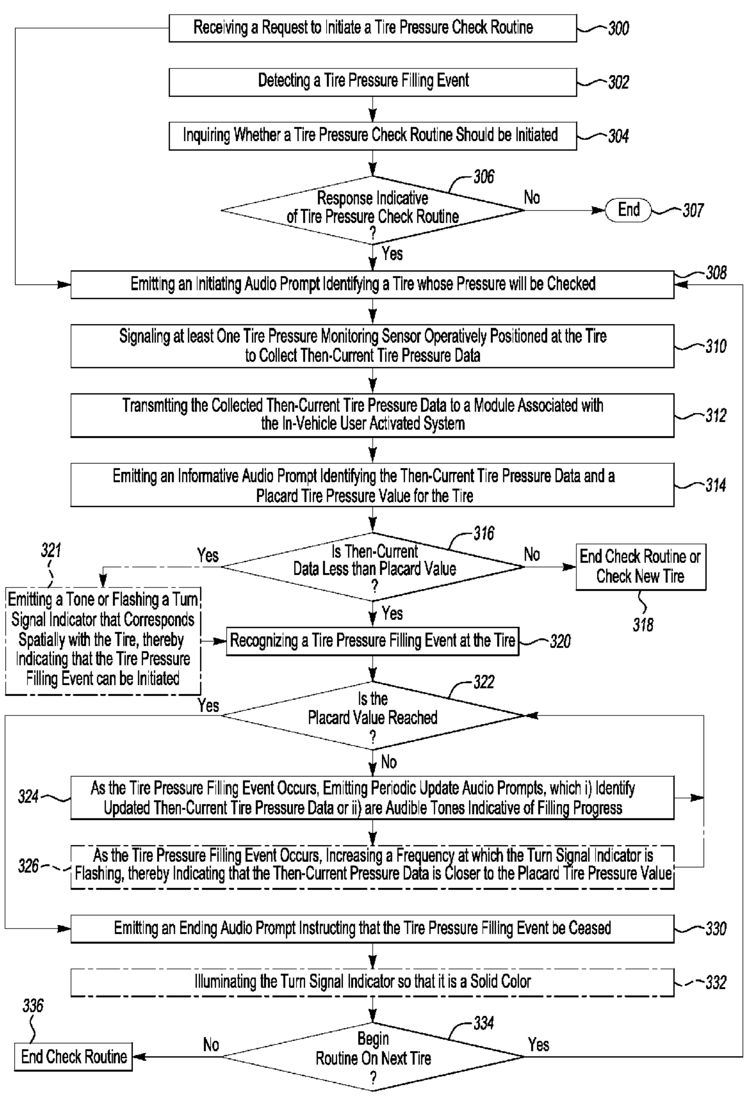
(57) **ABSTRACT**

In-vehicle tire gauge system and methods are disclosed herein. The in-vehicle tire gauge system includes a user activated system operatively positioned in a vehicle. The user activated system includes at least one of preset voice prompts or audible tones for guiding a tire pressure check routine, a monitoring system for detecting a tire filling event, and a module for converting tire pressure data into audible feedback. At least one tire pressure monitoring sensor is operatively positioned at each tire of the vehicle and is configured to collect the tire pressure data and transmit such data to the module. An audio system is in operative communication with the user activated system, and is configured to output, via in-vehicle speakers associated with the audio system, the at least one of preset voice prompts or audible tones, the audible feedback, or combinations thereof.



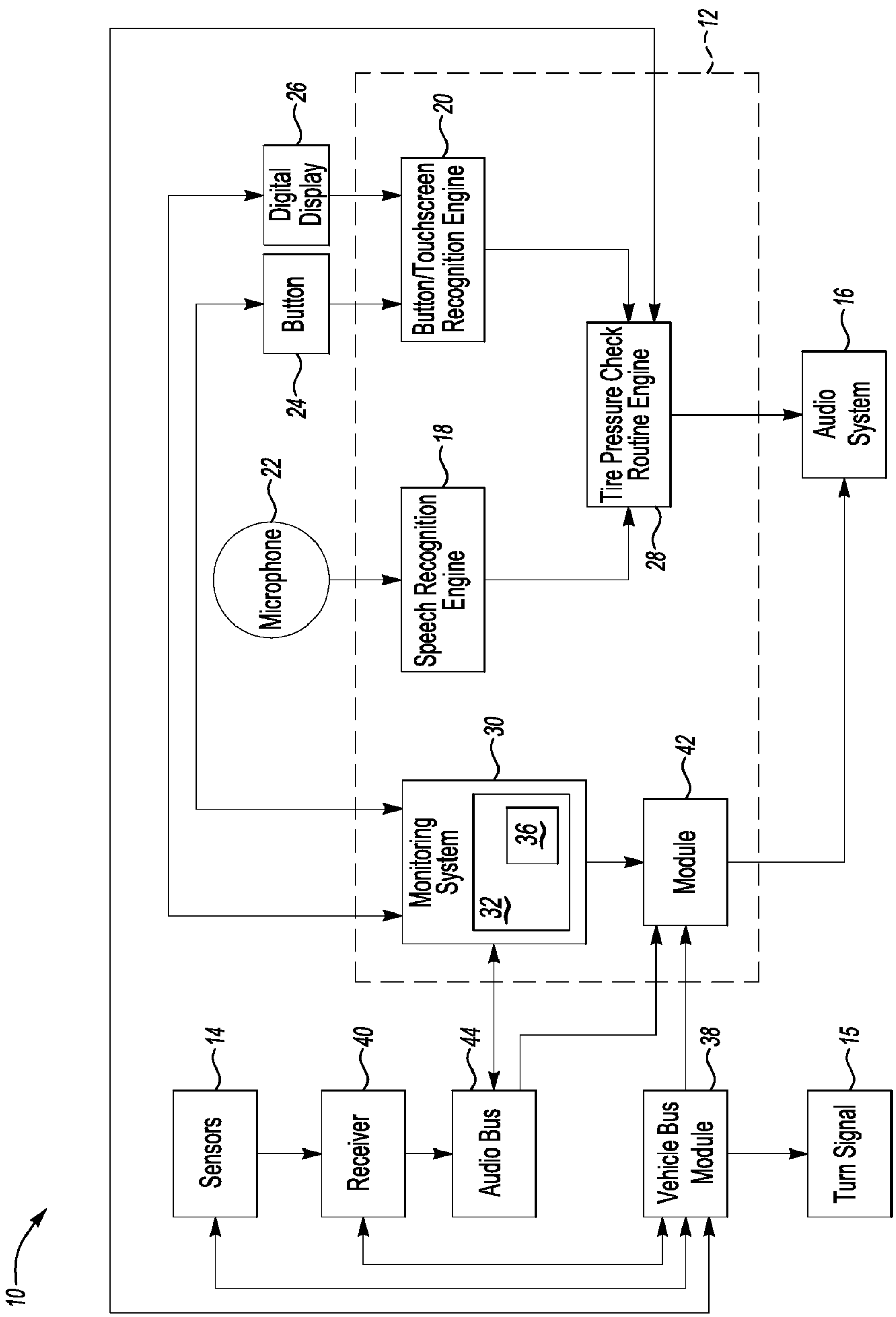

10
12
Digital Display
26
Button
24
Button/Touchscreen Recognition Engine
20
Microphone
22
Speech Recognition Engine
18
Tire Pressure Check Routine Engine
28
Audio System
16
Monitoring System
30
32
36
Module
42
Sensors
14
Receiver
40
Audio Bus
44
Vehicle Bus Module
38
Turn Signal
15

Fig-1

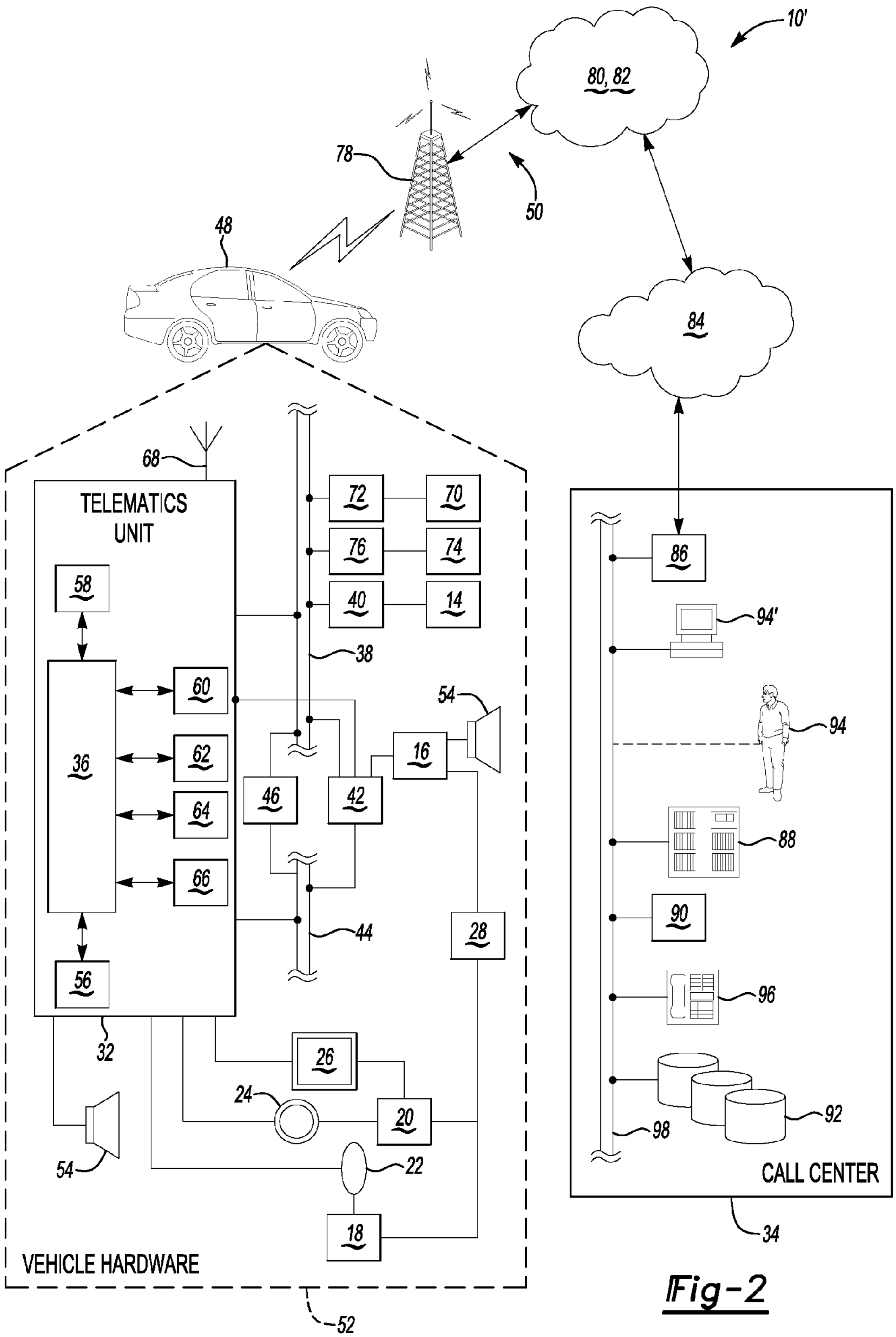

10'
80, 82
78
50
48
84
68
TELEMATICS
UNIT
72
70
76
74
40
14
58
38
60
36
62
64
66
54
16
46
42
44
28
56
32
26
24
20
22
54
18
VEHICLE HARDWARE
52
86
94'
94
88
90
96
92
98
CALL CENTER
34

Fig-2

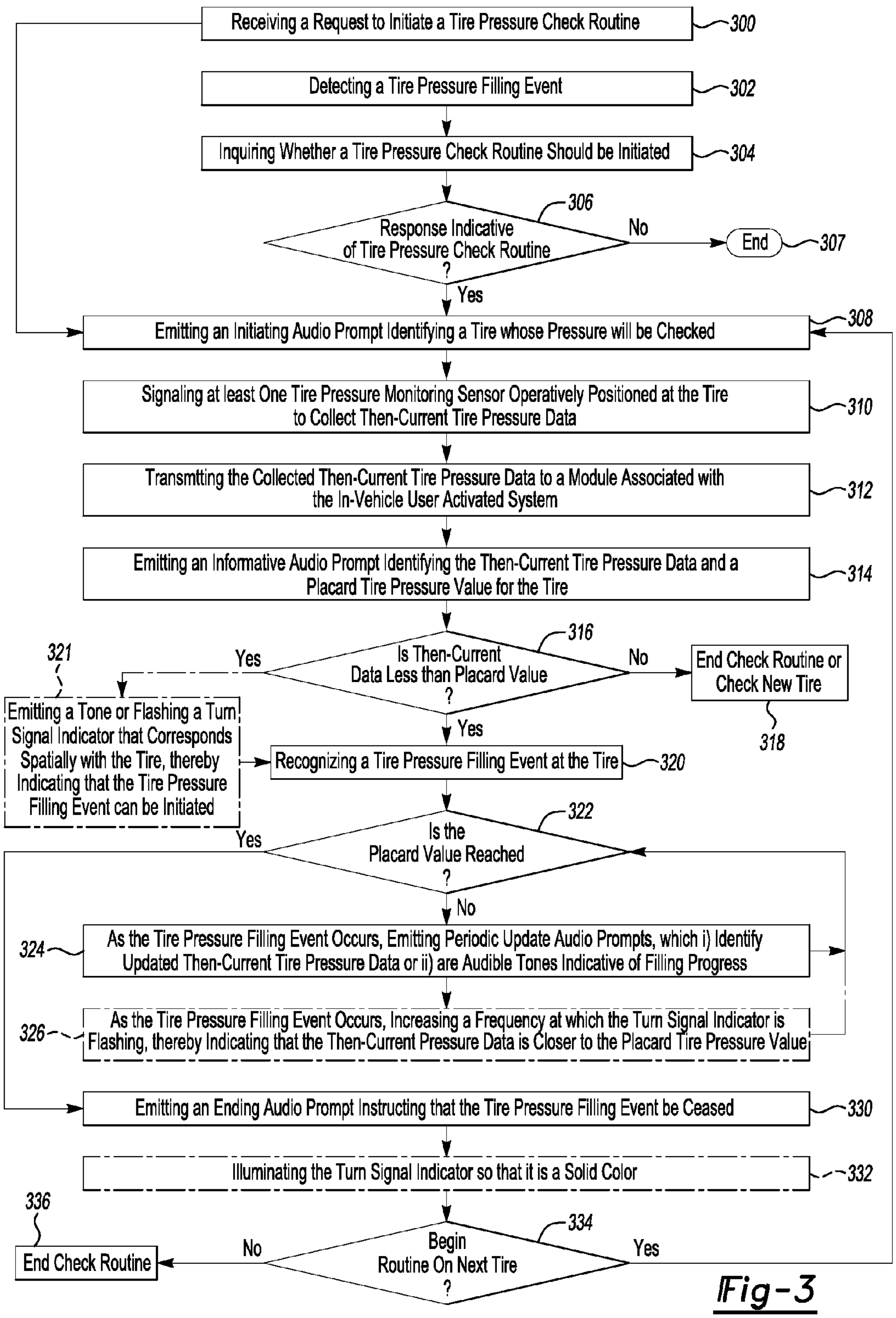

Receiving a Request to Initiate a Tire Pressure Check Routine
300
Detecting a Tire Pressure Filling Event
302
Inquiring Whether a Tire Pressure Check Routine Should be Initiated
304
306
Response Indicative of Tire Pressure Check Routine ?
No
End
307
Yes
Emitting an Initiating Audio Prompt Identifying a Tire whose Pressure will be Checked
308
Signaling at least One Tire Pressure Monitoring Sensor Operatively Positioned at the Tire to Collect Then-Current Tire Pressure Data
310
Transmtting the Collected Then-Current Tire Pressure Data to a Module Associated with the In-Vehicle User Activated System
312
Emitting an Informative Audio Prompt Identifying the Then-Current Tire Pressure Data and a Placard Tire Pressure Value for the Tire
314
316
Is Then-Current Data Less than Placard Value ?
No
End Check Routine or Check New Tire
318
Yes
321
Emitting a Tone or Flashing a Turn Signal Indicator that Corresponds Spatially with the Tire, thereby Indicating that the Tire Pressure Filling Event can be Initiated
Yes
Recognizing a Tire Pressure Filling Event at the Tire
320
322
Is the Placard Value Reached ?
Yes
No
324
As the Tire Pressure Filling Event Occurs, Emitting Periodic Update Audio Prompts, which i) Identify Updated Then-Current Tire Pressure Data or ii) are Audible Tones Indicative of Filling Progress
326
As the Tire Pressure Filling Event Occurs, Increasing a Frequency at which the Turn Signal Indicator is Flashing, thereby Indicating that the Then-Current Pressure Data is Closer to the Placard Tire Pressure Value
Emitting an Ending Audio Prompt Instructing that the Tire Pressure Filling Event be Ceased
330
Illuminating the Turn Signal Indicator so that it is a Solid Color
332
336
End Check Routine
No
334
Begin Routine On Next Tire ?
Yes

Fig-3

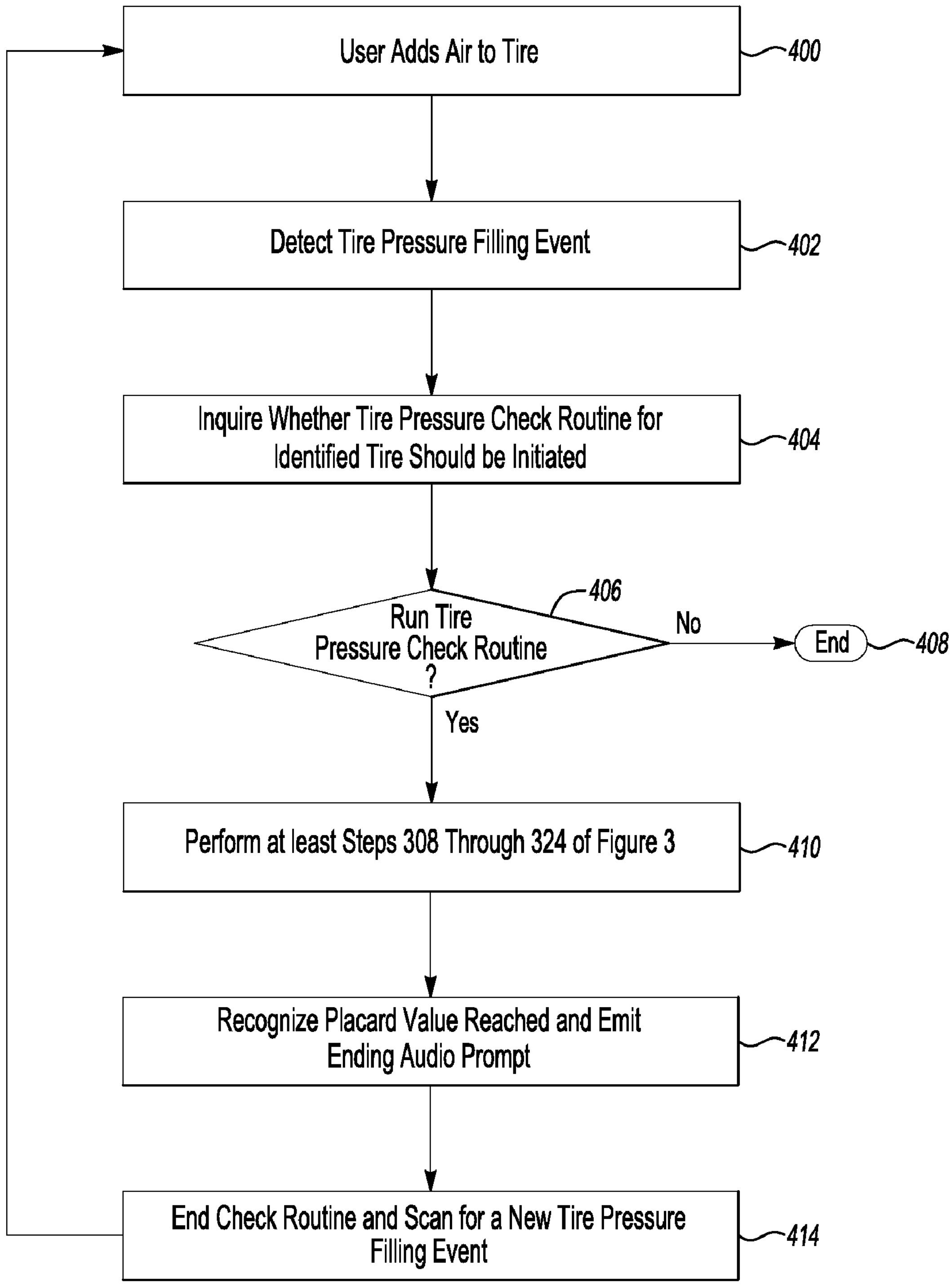

User Adds Air to Tire
400
Detect Tire Pressure Filling Event
402
Inquire Whether Tire Pressure Check Routine for Identified Tire Should be Initiated
404
406
Run Tire Pressure Check Routine ?
No
End
408
Yes
Perform at least Steps 308 Through 324 of Figure 3
410
Recognize Placard Value Reached and Emit Ending Audio Prompt
412
End Check Routine and Scan for a New Tire Pressure Filling Event
414

Fig-4

IN-VEHICLE TIRE GAUGE SYSTEM AND METHODS

TECHNICAL FIELD

[0001] The present disclosure relates generally to in-vehicle tire gauge systems and methods.

BACKGROUND

[0002] Maintaining accurate tire pressure can improve vehicle performance in a variety of ways, including, for example, enhancing vehicle handling, extending tire life, and increasing gas mileage. Systems that make tire pressure maintenance more convenient are desirable.

SUMMARY

[0003] In-vehicle tire gauge systems and methods are disclosed herein. An example of the in-vehicle tire gauge system includes a user activated system operatively positioned in a vehicle. The user activated system includes at least one of preset voice prompts or audible tones for guiding a tire pressure check routine, a monitoring system for detecting a tire filling event, and a module for converting tire pressure data into audible feedback. At least one tire pressure monitoring sensor is operatively positioned at each tire of the vehicle and is configured to collect the tire pressure data and transmit such data to the module. An audio system is in operative communication with the user activated system, and is configured to output, via in-vehicle speakers associated with the audio system, the at least one of preset voice prompts or audible tones, the audible feedback, or combinations thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Features and advantages of the present disclosure will become apparent by reference to the following detailed description and drawings, in which like reference numerals correspond to similar, though perhaps not identical, components. For the sake of brevity, reference numerals or features having a previously described function may or may not be described in connection with other drawings in which they appear.

[0005] FIG. **1** is a schematic diagram of an example of an in-vehicle tire gauge system;

[0006] FIG. **2** is a schematic diagram of another example of a system including an example of the in-vehicle tire gauge system in a vehicle that is in selective communication with a telematics service center;

[0007] FIG. **3** is a flow diagram depicting various examples of an in-vehicle tire gauge system; and

[0008] FIG. **4** is a flow diagram of another example of the in-vehicle tire gauge system.

DETAILED DESCRIPTION

[0009] Examples of the method and system disclosed herein advantageously enable a vehicle operator to utilize the in-vehicle systems as a tire pressure gauge. As such, a mechanical gauge is not needed. Furthermore, the in-vehicle system utilizes a user activated system which transmits audio prompts to the user during the tire pressure check routine. This advantageously allows the system to be used in any vehicle, whether or not that vehicle is equipped with PSI display capabilities. This also advantageously allows the user to follow the prompts of the tire pressure check routine without having to re-enter the vehicle to check the then-current PSI. As such, the method and system disclosed herein substantially simplify tire maintenance.

[0010] It is to be understood that, as used herein, the term "user" includes vehicle owners, operators, and/or passengers. It is to be further understood that the term "user" may be used interchangeably with subscriber/service subscriber.

[0011] The terms "connect/connected/connection" and/or the like are broadly defined herein to encompass a variety of divergent connected arrangements and assembly techniques. These arrangements and techniques include, but are not limited to (1) the direct communication between one component and another component with no intervening components therebetween; and (2) the communication of one component and another component with one or more components therebetween, provided that the one component being "connected to" the other component is somehow in communication with the other component (notwithstanding the presence of one or more additional components therebetween). Additionally, two components may be permanently, semi-permanently, or releasably engaged with and/or connected to one another.

[0012] It is to be further understood that "communication" is to be construed to include all forms of communication, including direct and indirect communication. Indirect communication may include communication between two components with additional component(s) located therebetween.

[0013] Referring now to FIG. **1**, an example of the in-vehicle tire gauge system **10** is depicted. Generally, the system **10** includes a user activated system **12**, tire pressure sensors **14**, and an audio system **16**. As described further herein, these components **12**, **14**, and **16** work together with other in-vehicle components to run a tire pressure check routine.

[0014] The user activated system **12** includes a voice activated or speech recognition engine **18** and/or a button/touchscreen press recognition engine **20**. The speech recognition engine **18** is operatively connected to a microphone **22**, which converts acoustical pressure waves (sound (i.e., the user's utterance)) into electrical signals and transmits them to the speech recognition engine **18**. The speech recognition engine **18** is configured, in some instances, to record the utterances, and to run one or more software programs and/or software routines having computer readable code for recognizing and responding to a user's spoken command. Similarly, the button/touchscreen press recognition engine **20** is operatively connected to in-vehicle buttons, knobs, switches, keyboards, and/or controls **24** and, when present, an in-vehicle display **26**. The display **26** may be operatively connected to the telematics unit **32** directly, or may be part of the audio system **16**. Non-limiting examples of the display **26** include a VFD (Vacuum Fluorescent Display), an LED (Light Emitting Diode) display, a driver information center display, a radio display, an arbitrary text device, a heads-up display (HUD), an LCD (Liquid Crystal Diode) display, and/or the like. When the control(s) **24** is/are operated or a command is entered via the display **26**, the button/touchscreen press recognition engine **20** is configured to transmit such command to another component (e.g., a tire pressure check routine engine **28**) which runs one or more software programs and/or software routines having computer readable code for recognizing and responding to a user's input. While not shown in FIG. **1**, it is to be understood that a user's input may also be entered via an auxiliary device in operative communication with the vehicle (e.g., via a USB connection or a short-range wireless connection).

[0015] In particular, each of the engines **18** and **20** is capable of communicating with (via signals) a tire pressure check routine engine **28**, which includes preset voice prompts and/or audible signals for guiding a user through a tire pressure check routine. More particularly, when a user utilizes the microphone **22**, control(s) **24**, or display **26** to request the tire pressure check routine, the corresponding engine **18** or **20** transmits a signal to the tire pressure check routine engine **28** instructing the engine **28** to begin the tire pressure check routine (which is discussed further hereinbelow in reference to FIG. **3**).

[0016] The user activated system **12** also includes a monitoring system **30** for detecting a tire filling event. In the example shown in FIG. **1**, the monitoring system **30** is a telematics unit **32**. Generally, the telematics unit **32** is an onboard device that provides a variety of services, both individually and through its communication with a call center (shown as reference numeral **34** in FIG. **2**). The telematics unit **32** includes an electronic processing device **36** operatively coupled to one or more other electronic devices, which are discussed further in reference to FIG. **2**. The telematics unit **32** acts as the monitoring device **30** when it is configured to receive PSI data from a vehicle bus **38** and recognize that a change in air pressure is or has taken place. It is to be understood however, that any vehicle module (e.g., body control module (BCM)) in communication with the vehicle bus **38** may be configured to act as the monitoring system **30**.

[0017] The vehicle bus **38** is a network connection selected from a controller area network (CAN), a media oriented system transfer (MOST), a local interconnection network (LIN), an Ethernet, and other appropriate connections such as those that conform with known ISO, SAE, and IEEE standards and specifications, to name a few. The vehicle bus **38** enables the vehicle (**48**, not shown in FIG. **1**) to send and receive signals from the telematics unit **32** to various units of equipment and systems both outside the vehicle and within the vehicle to perform various functions, such as unlocking a door, executing personal comfort settings, and/or the like.

[0018] The vehicle bus **38** is in operative communication with various tire sensors **14** that monitor one or more conditions, such as air pressure and/or air temperature within a respective one of the vehicle tires (not shown). The sensors **14** may be in communication with electronic modules (not shown), which transmit signals (e.g., radio frequency signals) indicative of the conditions sensed by the sensors **14** to a receiver **40** in operative communication with the vehicle bus **38**. It is to be understood that each of the sensors **14** may be in communication with a single receiver **40**. Generally, the receiver **40** acts as a temporary repository for the received signals (indicative of air pressure/temperature data), until such data is pulled from or pushed to the vehicle bus **38**, and transmitted to the telematics unit **32** and/or a conversion module **42**.

[0019] The transmission of data from the receiver **40** to other in-vehicle modules generally includes transmission to at least the telematics unit **32** and the conversion module **42**. In some instances, information is transmitted directly to both components (e.g., when the data is broadcast to a number of modules operatively connected to the bus **38**). Data is transmitted to the telematics unit **32** when it is acting as a detection module (or monitoring system **30**) and so that it can run comparisons between then-current readings and placard values. Data is transmitted to the module **42** for conversion and presentation to a vehicle user. In some instances, the data is transmitted to the telematics unit **32** for comparison with a placard value, and then to the module **42** for conversion and presentation. Data may also be transmitted to the telematics unit **32** for storage and possible transmission to the call center **34**. The various aspects will be discussed further herein in reference to FIG. **3**.

[0020] The conversion module **42** is a system that receives the analog or digital signals from the receiver **40**, and renders such signals as sound. Analog signals may be transmitted through an audio bus **44**, while digital signals may be transmitted through the vehicle bus **38**. In one example, the signals are digital until the audible signals are generated and broadcast into the vehicle from the audio system **16**. The types of signals depend, at least in part, upon the source of the signals. The module **42** converts the received signals into voice communications (e.g., a then-current PSI reading) or other audible feedback (e.g., audible tone(s) indicative of a tire pressure level change). The conversion module **42** includes suitable software routines for analyzing the received data and for converting such data to a suitable audio output for delivery to a user via the audio system **16**.

[0021] The audio system **16** is operatively connected to the vehicle bus **38** and to the audio bus **44** (through the module **42**). The audio system **16** provides AM and FM radio, satellite radio, CD, DVD, multimedia and other like functionality independent of an infotainment center (shown as **46** in FIG. **2**). Audio system **16** may contain a speaker system, or may utilize other in-vehicle speaker(s) via arbitration on vehicle bus **38** and/or audio bus **44**.

[0022] Referring now to FIG. **2**, another example of the system **10'** is depicted. In this example, all of the components of the system **10** of FIG. **1** are depicted with various other components that may be included in the system **10'**. It is to be understood that all of the system **10** components of FIG. **1** are in-vehicle or on-board components of the vehicle **48**.

[0023] It is to be understood that the overall architecture, setup and operation, as well as many of the individual components of the system **10'** shown in FIG. **2** are generally known in the art. Thus, the following paragraphs provide a brief overview of one example of such a system **10'**. It is to be understood, however, that additional components and/or other systems not shown here could employ the method(s) disclosed herein.

[0024] The vehicle **48** is a mobile vehicle, such as a motorcycle, car, truck, recreational vehicle (RV), boat, plane, etc. The vehicle **48** may come equipped with suitable hardware and software that enables them to communicate (e.g., transmit and/or receive voice and data communications) over a wireless carrier/communication system **50**, or such hardware and software may be added thereto if such equipment is not originally available.

[0025] Some of the vehicle hardware **52** is shown generally in FIG. **2**, including the telematics unit **32** and other components that are operatively connected to the telematics unit **32**. Examples of such other hardware **52** components include the microphone **22**, speaker(s) **54**, buttons (which also includes knobs, switches, keyboards, controls, and/or the like) **24**, and/or a digital display **26**. Generally, these hardware **52** components enable a user to communicate with the telematics unit **32** and any other system **10**, **10'** components in communication with the telematics unit **32**, for example to activate or engage one or more of the vehicle components. In one example, one of the buttons **24** may be an electronic pushbutton used to initiate voice communication with the call center **34** (whether it be a live advisor **94** or an automated call response system **94'**). In another example, one of the buttons **24** may be used to initiate emergency services. In still another example, one of the buttons **24** may be used to initiate the tire pressure check routine engine **28**.

[0026] As discussed in reference to FIG. **1**, the telematics unit **32** is an on-board device that provides a variety of services, both individually and through its communication with the call center **34**. The telematics unit **32** generally includes electronic processing device **36** operatively coupled to one or more types of electronic memory **56**, a cellular chipset/component **58**, a wireless modem **60**, a navigation unit containing a location detection (e.g., global positioning system (GPS)) chipset/component **62**, a real-time clock (RTC) **64**, a short-range wireless communication network **66** (e.g., a BLUETOOTH® unit), and/or a dual antenna **68**. In one example, the wireless modem **60** includes a computer program and/or set of software routines executing within processing device **36**.

[0027] It is to be understood that the telematics unit **32** may be implemented without one or more of the above listed components, such as, for example, the short-range wireless communication network **66**. It is to be further understood that telematics unit **32** may also include additional components and functionality as desired for a particular end use.

[0028] The electronic processing device **36** may be a micro controller, a controller, a microprocessor, a host processor, and/or a vehicle communications processor. In another example, electronic processing device **36** may be an application specific integrated circuit (ASIC). Alternatively, electronic processing device **36** may be a processor working in conjunction with a central processing unit (CPU) performing the function of a general-purpose processor.

[0029] The location detection chipset/component **62** may include a Global Position System (GPS) receiver, a radio triangulation system, a dead reckoning position system, and/or combinations thereof In particular, a GPS receiver provides accurate time and latitude and longitude coordinates of the vehicle **48** responsive to a GPS broadcast signal received from a GPS satellite constellation (not shown).

[0030] The cellular chipset/component **58** may be an analog, digital, dual-mode, dual-band, multi-mode and/or multi-band cellular phone. The cellular chipset-component **58** uses one or more prescribed frequencies in the 800 MHz analog band or in the 800 MHz, 900 MHz, 1900 MHz and higher digital cellular bands. Any suitable protocol may be used, including digital transmission technologies such as TDMA (time division multiple access), CDMA (code division multiple access) and GSM (global system for mobile telecommunications). In some instances, the protocol may be short-range wireless communication technologies, such as BLUETOOTH®, dedicated short-range communications (DSRC), or Wi-Fi. However, these short-range wireless protocols are generally used with the short-range wireless communication network **66** when it is included in the system **10'**.

[0031] Also associated with electronic processing device **36** is the previously mentioned real time clock (RTC) **64**, which provides accurate date and time information to the telematics unit **32** hardware and software components that may require and/or request such date and time information (e.g., to associate air pressure and/or temperature readings with a time and date). In an example, the RTC **64** may provide date and time information periodically, such as, for example, every ten milliseconds.

[0032] In addition to the tire air pressure and/or temperature sensors **14**, the vehicle **48** may also include crash/collision sensors **70** and/or any other desirable vehicle sensors **74**. The crash/collision sensors **70** can detect, for example, the speed at which an impact takes place, the severity of a vehicle collision, such as the angle of impact and the amount of force sustained, or the like. The other sensors **74** include, but are not limited to gyroscopes, accelerometers, magnetometers, emission detection and/or control sensors, and/or the like.

[0033] The sensors **70** and **74** are operatively connected to respective interface modules **72** (e.g., a vehicle crash and/or collision detection sensor interface) and **76** (e.g., powertrain control module, climate control module, body control module, and/or the like). Each of the interfaces **72** and **76** includes hardware that receives information from the respective sensors **70** and **74** and transmits such information to the telematics unit **32** via the vehicle bus **38**.

[0034] As shown in FIG. **2**, in addition to the vehicle **48** and its associated components, the system **10'** may also include the previously mentioned wireless carrier/communication system **50** (including, but not limited to, one or more cell towers **78**, one or more base stations **80** and/or mobile switching centers (MSCs) **82**, one or more land networks **84**, one or more service providers (not shown)), and one or more call centers **34**. In an example, the wireless carrier/communication system **50** is a two-way radio frequency communication system.

[0035] Vehicle communications preferably use radio transmissions to establish a voice channel with wireless carrier system **50** such that both voice and data transmissions may be sent and received over the voice channel. Vehicle communications are enabled via the cellular chipset/component **58** for voice communications and the wireless modem **60** for data transmission. In order to enable successful data transmission over the voice channel, wireless modem **60** applies some type of encoding or modulation to convert the digital data so that it can communicate through a vocoder or speech codec incorporated in the cellular chipset/component **58**. It is to be understood that any suitable encoding or modulation technique that provides an acceptable data rate and bit error may be used with the examples disclosed herein. Generally, dual mode antenna **68** services the location detection chipset/component **62** and the cellular chipset/component **58**.

[0036] The microphone **22** provides the user with a means for inputting verbal or other auditory commands, and can be equipped with an embedded voice processing unit utilizing human/machine interface (HMI) technology known in the art. Conversely, speaker **54** provides verbal output to the vehicle occupants and can be either a stand-alone speaker specifically dedicated for use with the telematics unit **32** or can be part of a vehicle audio system **16**. In either event and as previously mentioned, microphone **22** and speaker **54** enable vehicle hardware **52** and call center **34** to communicate with the occupants through audible speech or, in some instances, tones.

[0037] Wireless carrier/communication system **50** may be a cellular telephone system or any other suitable wireless system that transmits signals between the vehicle hardware **52** and land network **84**. According to an example, wireless carrier/communication system **50** includes the one or more cell towers **78**, the base stations **80** and/or mobile switching centers (MSCs) **82**, as well as any other networking components required to connect the wireless system **50** with land network **84**. It is to be understood that various cell tower/base station/MSC arrangements are possible and could be used with wireless system **50**. For example, a base station **80** and a cell tower **78** may be co-located at the same site or they could be remotely located, and a single base station **80** may be coupled to various cell towers **78** or various base stations **80** could be coupled with a single MSC **82**. A speech codec or vocoder may also be incorporated in one or more of the base stations **80**, but depending on the particular architecture of the wireless network **50**, it could be incorporated within a Mobile Switching Center **82** or some other network components as well.

[0038] Land network **84** may be a conventional land-based telecommunications network that is connected to one or more landline telephones and connects wireless carrier/communication network **50** to call center **34**. For example, land network **84** may include a public switched telephone network (PSTN) and/or an Internet protocol (IP) network. It is to be understood that one or more segments of the land network **84** may be implemented in the form of a standard wired network, a fiber or other optical network, a cable network, other wireless networks such as wireless local networks (WLANs) or networks providing broadband wireless access (BWA), or any combination thereof.

[0039] Call center **34** is designed to provide the vehicle hardware **52** with a number of different system back-end functions and, according to the example shown here, generally includes one or more switches **86**, servers **88** and software **90** associated therewith, databases **92**, live and/or automated advisors **94**, **94'**, as well as a variety of other telecommunication and computer equipment **96** that is known to those skilled in the art. These various call center components are coupled to one another via a network connection or bus **98**, similar to the one (vehicle bus **38**) previously described in connection with the system **10** and vehicle hardware **52**.

[0040] The live advisor **94** may be physically present at the call center **34** or may be located remote from the call center **34** while communicating therethrough via telecommuting.

[0041] Switch **86**, which may be a private branch exchange (PBX) switch, routes incoming signals so that voice transmissions are usually sent to either the live advisor **94** or an automated response system **94'**, and data transmissions are passed on to a modem (not shown) or other piece of equipment for demodulation and further signal processing. The modem preferably includes an encoder, as previously explained, and can be connected to various devices such as the server **88** and/or databases **92**. The database **72** may be designed to store subscriber profile records, subscriber behavioral patterns, vehicle data (e.g., tire pressure fill times/dates, tire rotation dates, etc.), or any other pertinent subscriber information.

[0042] It is to be appreciated that the call center **34** may be any central or remote facility, manned or unmanned, mobile or fixed, to or from which it is desirable to exchange voice and data communications.

[0043] In some instances, the call center **34** is a data center that receives voice or data calls, analyzes the request associated with the voice or data call, and transfers the call to an application specific call center (not shown). It is to be understood that the application specific call center may include all of the components of the call center **34**, but is a dedicated facility for addressing specific requests, needs, etc. Examples of such application specific call centers are emergency services call centers, navigation route call centers, in-vehicle function call centers, or the like.

[0044] Furthermore, although a service provider (not shown) may be located at the call center **34**, the call center **34** is a separate and distinct entity from the service provider. In an example, the service provider is located remote from the call center **34**. A service provider provides the user with telephone and/or Internet services. In an example, the service provider is a wireless carrier (such as, for example, Verizon Wireless®, AT&T®, Sprint®, etc.). It is to be understood that the service provider may interact with the call center **24** to provide service(s) to the user.

[0045] Referring now to FIG. **3**, examples of the tire pressure gauge method (utilizing at least the system **10**) are depicted. As used herein, the phrase "tire pressure check routine" (TPCR) refers to a tour, guided by the in-vehicle system **12**, which takes a user through the process of checking tire pressure and, if needed, filling their vehicle tires. Generally, the tire pressure check routine is performed during an ignition ON cycle of the telematics unit **32** (by activating the vehicle electronics, but not the engine of the vehicle **48**).

[0046] In each of the examples disclosed herein, the tire pressure check routine is initiated by the user. In one example, the user initiates the routine on his/her own accord (see reference numeral **300**). In another example, the user is asked if he/she wishes to initiate the routine after a tire pressure filling event is detected (see, e.g., reference numerals **302** through **306**, which will be discussed further hereinbelow). In still another example (shown and discussed in reference to FIG. **4**), the user is asked if he/she wishes to initiate a routine for a single tire after the tire pressure filling event is detected. In this example, the routine ends after one tire is filled, and begins again only after another filling event is recognized by the system **10**. This enables a completely user directed routine, where the system **10** follows the actions of the user.

[0047] Referring back to reference numeral **300**, one example of the method begins when the user activated system **12** receives a request (e.g., from a vehicle user) to initiate the tire pressure check routine. The user may request the routine via the button **24**, a display icon on the display **26**, or by speaking a command into the microphone **22**. The associated engine **18** or **20** will recognize the command, and in response, will transmit a signal to the tire pressure check routine engine **28** indicating that the TPCR has been requested.

[0048] The tire pressure check routine engine **28** initiates the routine by emitting (via the audio system **16**) a preset audio prompt (also referred to herein as the initiating audio prompt) that identifies a tire whose pressure will be checked first. For example, when a user requests the TPCR, the default protocol for the TPCR may be to check the driver's side front tire first or to check the tire with the lowest PSI first. In this example, the engine **28** will emit, via the audio system **16**, a preset voice prompt stating, for example, "Checking Driver Side Front Tire." It is to be understood that the default protocol may be such that any of the tires is first in the order for being checked. Furthermore, the default protocol may be revised to change the order of the tires. This may be useful, for example, if a user is keeping a close watch on the air in a particular tire. The user may request that the call center **34** update the protocol for the TPCR such that the tire likely of most interest is checked first.

[0049] The tire pressure check routine engine **28** is operatively connected to the vehicle bus **38** so that it can transmit a request signal to the vehicle bus **38**. This request signal commands the vehicle bus **38** to pull a then-current tire pressure reading from sensor(s) **14** associated with the identified tire. The vehicle bus **38** may have to transmit another signal prompting the sensor(s) **14** to take a reading (see reference numeral **310**), unless such data is being consistently reported (e.g., every second) in which the vehicle bus **38** may transmit the most recently reported value. It is to be understood that the engine **28** may be directly connected to the vehicle bus **38**, or such communication may take place through the telematics unit **32**.

[0050] During this step, the vehicle bus **38** also requests the placard value for the particular tire. In one example, the placard value is stored in the telematics unit memory **56**. The value may be initially stored in the telematics unit **32** at the end of the vehicle manufacturing line. The value may be updated by a user, for example, via a telematics web service after the tires have been rotated or replaced. The user may also update the value using a voice command or other in-vehicle control. In one example, the user can set and store the value at any desirable time. In another example, the system **10** is configured to require the user to enter the placard value (e.g., via a voice command or other in-vehicle control) as the TPCR is started (e.g., at the very beginning or before each tire is checked). The value may also be updated by the call center **34**, for example, via the wireless communication system **50** after various conditions have been recorded at the vehicle **48** at a point in time or over time. For example, if a user updates his/her garage address from a sunny climate to a cold climate, the placard value of the tires may need to be adjusted due to the change in temperature. The call center **34** can recognize the change in the user's profile, request the most recent information regarding the tire maintenance, determine a new placard value, and load such placard value(s) onto the telematics unit **32**. It is to be understood that any updated values will replace the previous values.

[0051] In another example, the placard value is dynamically generated (i.e., at the request of the vehicle bus **38**) at the vehicle **48** or at the call center **34**. The telematics unit **32** or the call center **34** will receive the then-current tire pressure and the then-current outside temperature (which are taken by one or more sensors **14**) from the vehicle bus **38** (or audio bus **44** if in the form of an analog signal). When generated on-board, the telematics unit **32** utilizes an algorithm to generate the placard value from the then-current tire pressure, the then-current outside temperature, and in some instances, the then-current location of the vehicle **48**. When generated off-board, the vehicle bus **38** transmits the then-current information to the call center **34** which has the advantage of utilizing the then-current data in conjunction with previously stored data (e.g., vehicle driving history, location history, maintenance history, etc.) to generate the placard value. Whether the placard value is pulled from the telematics unit memory **56** or is dynamically generated at the telematics unit **32** or at the call center **34**, the placard value is transmitted to the module **42**.

[0052] Once the then-current air pressure reading is obtained from the sensor(s) **14** or the receiver **40**, the vehicle bus **38** transmits the signal to the module **42**, as shown at reference numeral **312**. The module **42** includes a software routine that can analyze and interpret the signals indicative of the then-current air pressure and the placard value, and then convert the signals indicative of the air pressure and the placard value to an informative audio prompt. This particular audio prompt is transmitted over the audio system **16**, thereby audibly identifying the then-current air pressure reading and the placard value for the user (see reference numeral **314**). For example, the informative audio prompt may say something like, "driver side front tire is currently 32 PSI and placard value is 35 PSI."

[0053] The then-current air pressure reading is also transmitted to the telematics unit **32**, which is configured to compare the then-current air pressure with the placard value, and determine whether the then-current data is less than the placard value, as shown at reference numeral **316**. If the then-current air pressure is not less than the placard value, then the telematics unit **32** will instruct the module **42** to emit the information audio prompt with the two pressure values, and then will ask the user if he/she wishes to end the TPCR or continue the TPCR with the next tire (see reference numeral **318**).

[0054] It is to be understood that the then-current air pressure readings may be taken for each tire simultaneously. In this instance, the telematics unit **32** receives all of the data and runs the comparison for each tire. If the tire pressure of each tire is at or above the placard value, the system **10** will indicate to the user that the tires have suitable pressure and the TPCR is not necessary. In this particular instance, the TPCR would end.

[0055] If, however, the then-current data is less than the placard value, then a few different scenarios are possible. The system **10** can do nothing and wait for recognition of a tire pressure filling event, as shown at reference numeral **320**. In this instance, the user is aware that the tire air pressure is low and that air should be added to the tire by virtue of the informative audio prompt. As such, the monitoring system **30** (e.g., telematics unit **32** or some other in-vehicle module configured to detect a change in pressure at the respective tires) scans incoming data signals from the vehicle bus **38** looking for a change in the air pressure at the tire.

[0056] In some instances, prior to the monitoring system **30** recognizing the tire pressure filing event, the module **42** may be configured to emit a tone or prompt via the audio system **16** indicating to the user that filling of the tire may begin, as shown at reference numeral **321**. The prompt may be something like, "begin filling driver side front tire" or simply "begin filling." The tone may be a default tone or a user selected tone (e.g., via a telematics service web page or a display screen in the vehicle **48**) that indicates to the user that filling may begin. Such prompts and/or tones would be emitted after the module **42** recognizes that the then-current data is less than the placard value. In other instances, prior to the monitoring system **30** recognizing the tire pressure filing event, the vehicle bus **38** may send a signal to the turn signal (shown as reference numeral **15** in FIG. **1**) located on the same side as the tire to be filled to begin flashing at a predetermined rate. The flashing of the turn signal **15** may act as an indicator to the user that the filling of the tire may begin. In still other instances, both an audible prompt/tone and the flashing turn signal **15** may be used to indicate to the user that the tire may be filled.

[0057] Once the user begins filling the tire and the monitoring system **30** recognizes a change in the air pressure of the tire, the vehicle bus **38** will be triggered to periodically pull pressure values from the sensor(s) **14** as the filling event occurs. The periodic values may be retrieved at predetermined intervals during the filling event. For example, the vehicle bus **38** may request an updated pressure reading every 500 milliseconds, every second, every **2** seconds, or at any desirable preset time period. The monitoring system **30** continues to monitor the tire pressure filling event so that the vehicle bus **38** knows to continue to retrieve then-current data according to the preset intervals. The intermittent or periodic pressure values that are received at the vehicle bus **38** will be transmitted to the telematics unit **32**. The telematics unit **32** is configured to again compare the then-current tire pressure value to the placard value (previously received) to determine if the pressure in the tire has reached the placard value (see reference numeral **322**). Since multiple updated values may be transmitted during the filling event, it is to be understood that the comparison may be performed multiple times for each value received.

[0058] If, after a respective comparison is complete, the placard value is not reached, the module **42** will convert the then-current value into a voice communication which indicates to the user the actual tire pressure value at that time, or into a tone or series of tones that are indicative of the filling progress, as shown at reference numeral **324**. For example, if the placard value is 35 PSI and as filling occurs a value of 34 PSI is received, the module **42** may transmit an audio output of "34 PSI" or "current tire pressure is 34 PSI, keep filling" or "placard not reached, keep filling" or the like. The tone utilized for the periodic updates may be a continuous tone or beep that increases in volume and/or frequency as the then-current tire pressure value gets closer to the placard value. For example, a beep may be used that begins slowly, increases in speed as filling progresses, and ultimately is a solid tone when the placard value is reached. Alternatively, a different tone may be used for each of the periodic updates, thus signifying to the user that the tire pressure is closer to the placard value.

[0059] It is to be understood that as the filling event continues, the periodic updates may continuously (i.e., at each interval when a value is retrieved and compared to the placard value) be transmitted to the user via the audio system **16**. For example, after one of the periodic updates is emitted, the module **42** may receive another tire pressure value from the vehicle bus **38** at the next predetermined interval. The telematics unit **32** will perform the comparison with the placard value, and if the placard value is again not reached, will instruct the module **42** to emit another periodic update with the more recent tire pressure value. This loop is shown between reference numerals **322** and **324**, and will continue until the placard value is reached.

[0060] During the tire pressure filling event, the system **10** may also be configured so that the turn signal **15** indicator is utilized to update the user of the tire filling progress, as shown at reference numeral **326**. In this example, as the vehicle bus **38** receives increasing tire pressure values from the signals(s) **14** and receiver **40**, it may transmit a signal to the turn signal **15** located on the same side as the tire being filled commanding it to continue flashing at a predetermined rate. As the tire pressure increases, the rate at which the flashing occurs may increase or decrease, depending upon how the indicators are being used. In one example, the flashing is increased as the tire pressure increases; and when the placard value is reached, the turn signal **15** will be illuminated without flashing (see, e.g., reference numeral **332**). In another example, the flashing is decreased as the tire pressure increases, indicating that the filling event is nearing an end. In this example, when the placard value is reached, the turn signal **15** will be turned off.

[0061] When the comparison indicates that the received then-current tire pressure value is the same or greater than the placard value, the module **42** will be instructed to transmit an ending audio prompt or tone via the audio system **16** which instructs the user to cease the tire pressure filling event, as shown at reference numeral **330**. For example, if the placard value is 35 PSI and the comparison indicates that the then-current tire pressure is 35 PSI, the module **42** may transmit an audio output of "35 PSI has been reached, stop filling" or "placard value obtained, stop filling" or "stop filling" or the like. In one example, the tone utilized for the ending audio prompt may be a high pitched tone or an intermittent buzzer that continues until a change in air pressure is not recognized or the user manually instructs the system **10**. As mentioned above, the turn signal **15** may also be used in conjunction with the ending audio prompt to indicate to the user that the tire is full (see reference numeral **332**).

[0062] Once the TPCR is complete for the first tire, the module **42** is configured to prompt the user about whether he/she wishes to end the TPCR or continue the TPCR with the next tire (see reference numeral **334**). If the user indicates that he/she wishes to end the TPCR, the method will cease (see reference numeral **336**). However, if the user indicates (e.g., verbally or via an in-vehicle button **24** or display **26**) that he/she wishes to continue the TPCR, the method will return to reference numeral **308** and repeat the process for the second tire in the protocol of the routine. This will continue until all the tires have been checked and, if needed, filled, or until the user stops the routine. In this particular example, the then-current pressure is checked for each tire separately, and if the tire does not need more air, the system **10** will move on to the next tire.

[0063] In another example, the order of routine may be determined at the outset of the method by the then-current PSI values of the tires. For example, the system **10** may be configured to check all of the tires at the outset of the TPCR, and then prompt the user to begin a filling event at the first tire that is low. As such, during one TPCR, the then-current pressure of all of the tires may be checked at the outset, and then the system **10** will guide the user to fill those tires in need of more air one at a time. For example, if two of the four tires are identified as having low air pressure, the routine will guide the user to the first of the low tires for a filling event, and then upon completion of that filling event, will guide the user to the second of the low tire for a filling event. After completion of both of these filling events, the TPCR will end.

[0064] It is to be understood that the user may stop the routine at any time throughout the method by commanding the system **10** to stop (e.g., by verbally instructing the system **10** or by inputting the command via a button **24** or the display **26**). Additionally, the TPCR may automatically stop or end if, after being initiated, there is no change in PSI detected on any tire for a predetermined period of time (i.e., the TPCR times out).

[0065] Referring back to reference numerals **302** through **308** of FIG. **3**, another example of the method begins when the monitoring system **30** recognizes a tire pressure filling event. In this example, the user does not initiate the TPCR, but rather begins filling one of the tires. The monitoring system **30** will detect the change in pressure (as shown at reference numeral **302**) and the module **42** will inquire as to whether the user would like to initiate the tire pressure check routine (as shown at reference numeral **304**). This inquiry is accomplished by emitting a preset voice communication that asks the user, for example, “do you want to initiate the tire pressure check routine?” or “do you want to utilize the virtual tire gauge?” or the like.

[0066] The user can respond verbally (e.g., by speaking the response into the microphone **22**) or physically (e.g., via the button (or other control) **24** or a display icon on the display **26**). The associated engine **18** or **20** will recognize the response, and in response, will transmit a signal to the tire pressure check routine engine **28** indicating that the TPCR has been requested or not requested. When the user does not wish to initiate the TPCR, the method will end (as shown at reference numeral **307**). However, when the user does wish to initiate the TPCR, the method will continue at reference numeral **308** and the steps will be accomplished as previously described.

[0067] Another example of the method is depicted in FIG. **4**. In this example, the method begins when the user adds air to one of the tires (see reference numeral **400**) and the monitoring system **30** recognizes the tire pressure filling event (see reference numeral **402**). In this example, the user does not initiate the TPCR, but rather begins filling one of the tires. The monitoring system **30** will detect the change in pressure, and the module **42** will inquire as to whether the user would like to initiate the tire pressure check routine for the identified tire (as shown at reference numeral **404**). This inquiry is accomplished by emitting a preset voice communication that asks the user, for example, “do you want to initiate the tire pressure check routine?” or “do you want to utilize the virtual tire gauge?” or the like.

[0068] The user can respond verbally (e.g., by speaking the response into the microphone **22**) or physically (e.g., via the button (or other control) **24**, or a display icon on the display **26**, or another device operative connected to the vehicle **48**). The associated engine **18** or **20** will recognize the response, and in response, will transmit a signal to the tire pressure check routine engine **28** indicating that the TPCR has been requested or not requested for the particular tire being filled. When the user does not wish to initiate the TPCR, the method will end (as shown at reference numerals **406** and **408**). However, when the user does wish to initiate the TPCR for the tire, the method will continue at reference numeral **410**, and at least steps **308** through **324** will be accomplished as previously described for the tire.

[0069] In this example and as shown in reference numeral **412**, when the tire is filled at or above the placard value, the telematics unit **32** will recognize that the placard value has been reached, and the module **42** will emit the ending audio prompt. Rather than asking whether the user wishes to continue the TPCR, the system **10** will simply wait for the user to begin another filling event, as shown at reference numeral **414**. The telematics unit **32** may be configured to scan the vehicle bus **38** output to determine if another filling event is initiated. As such, in this embodiment of the method, the TPCR is initiated potentially multiple times based upon the user’s actions (i.e., adding air to the tire(s)) as opposed to the process being initiated and guiding the user through the filling of each tire.

[0070] While the examples shown and discussed in reference to FIGS. **3** and **4** utilize the in-vehicle speaker(s) **54** to emit the audio prompts (in the form of voice communications or tones), it is to be understood that the audio system **16** may transmit the audio prompts to a wireless communication device (not shown) that is in communication with (i.e., has been linked to) the telematics unit **32**. For example, a user may utilize a short-range wireless communication device by linking such device to the telematics unit **32** of the in-vehicle system **10**. For example, the user may receive the audible prompts/tones via an earpiece that utilizes BLUETOOTH® communication, and thus the user does not have to have the in-vehicle volume up to a level that can be heard at each tire. In another example, the wireless device may have a specific application installed thereon for initiating and receiving prompts of the TPCR. In such instances, the prompts may also be visual.

[0071] In some instances, the user may select the tone characteristics (i.e., sound used, volume level, frequency, etc.) or the audio voice prompts/communications that should be used throughout the TPCR. Preset tones and prompts may be saved in the module **42**, and the user may select from the list of preset prompts/tone using the in-vehicle display **26** or a telematics service web page.

[0072] While not shown in the figures, it is to be understood that the telematics unit **32** may transmit any data associated with the tire pressure check routine to the call center **34** over a voice channel or as packet data. Such data includes, but is not limited to, each recorded then-current tire pressure, the initial and final tire pressure values, the placard value, a time and/or date stamp of the filling event, an amount of air added to each of the tires, the tires checked, the tires filled, etc. The uploading of the recording takes place during a vehicle data upload event. The vehicle data upload event takes place at some predetermined interval (e.g., data is uploaded to the call center **34** every day), or in response to some trigger (e.g., when the tire pressure check routine is complete), or when requested (i.e., on demand from the telematics unit **32** or the call center **34**). The telematics unit **32** may include a vehicle data upload (VDU) system (not shown), which is configured to receive raw vehicle data from the bus **38**, packetize the data, and upload the packetized raw data to the call center **34** (or other external entity). The VDU is operatively connected to the processor **36** of the telematics unit **32**, and thus is in communication with the call center **34** via the bus **38** and the wireless communication system **50**. The VDU may be the telematics unit’s central data system that can include a modem, a processor, and an on-board database. The database can be implemented using a separate network attached storage (NAS) device or be located elsewhere, such as in memory **56**, as desired. The VDU system has an application program that handles all of the vehicle data upload processing, including communication with the call center **34** and the setting and processing of triggers.

[0073] Once the call center **34** has the data, it may be organized and stored in the associated subscriber’s profile in the database **72**. When the transmission of the data takes place, the vehicle **48** making such transmission is identified at the call center **34** via one or more identifiers associated with the telematics unit **32** or vehicle **48**.

[0074] The call center **34** may use the data to keep track of the tire maintenance for the vehicle **48**. For example, the call center **34** may maintain the air pressure data (e.g., frequency of air fill ups recorded via the methods disclosed herein) with other data, such as, tire rotations, tire replacements, etc. input via the user and/or dealership performing such maintenance. Such data may be used for generating re-sale reports, for transmitting periodic reports to the user, for alerting the user of patterns in tire inflation (e.g., the call center **34** notices that the user fills up the passenger side rear tire more often than the other tires), for prompting a user when maintenance comes due, or for any other desirable use.

[0075] While several examples have been described in detail, it will be apparent to those skilled in the art that the disclosed examples may be modified. Therefore, the foregoing description is to be considered exemplary rather than limiting.

1. An in-vehicle tire gauge system, comprising:

a user activated system operatively positioned in a vehicle, the user activated system including:

at least one of preset voice prompts or audible tones for guiding a tire pressure check routine;

a monitoring system for detecting a tire filling event;

a module for converting tire pressure data into audible feedback;

at least one tire pressure monitoring sensor operatively positioned at each tire of the vehicle and configured to collect the tire pressure data and transmit such data to the module; and

an audio system in operative communication with the user activated system and configured to output, via in-vehicle speakers associated with the audio system, the at least one of preset voice prompts or audible tones, the audible feedback, or combinations thereof.

2. The in-vehicle tire gauge system as defined in claim **1**, further comprising:

a receiver operatively connected to the at least one tire pressure monitoring sensor, and configured to receive the tire pressure data from the at least one tire pressure monitoring sensor; and

a vehicle bus operatively connected to the receiver and the module, and configured to receive the tire pressure data from the receiver and transmit the tire pressure data to the module.

3. The in-vehicle tire gauge system as defined in claim **2**, further comprising a telematics unit in operative communication with the vehicle bus, and configured to receive the tire pressure data from the vehicle bus.

4. The in-vehicle tire gauge system as defined in claim **3**, further comprising a telematics service center in selective communication with the telematics unit, and configured to receive the tire pressure data from the telematics unit.

5. The in-vehicle tire gauge system as defined in claim **1**, further comprising an in-vehicle button or an in-vehicle display icon configured to initiate the tire pressure check routine.

6. The in-vehicle tire gauge system as defined in claim **1**, further comprising a turn signal indicator configured to identify at least one of i) a tire associated with the tire filling event, ii) a start time for the tire filling event, iii) an end time for the tire filling event, or iv) combinations of i, ii, and iii.

7. A tire pressure gauge method, comprising:

emitting, via an in-vehicle user activated system and an in-vehicle audio system, an initiating audio prompt identifying a tire whose pressure will be checked;

signaling at least one tire pressure monitoring sensor operatively positioned at the tire to collect then-current tire pressure data;

transmitting the collected then-current tire pressure data to a module associated with the in-vehicle user activated system;

emitting, via the in-vehicle user activated system and the in-vehicle audio system, an informative audio prompt identifying the then-current tire pressure data and a placard tire pressure value for the tire;

recognizing a tire pressure filling event at the tire;

as the tire pressure filling event occurs, emitting, via the in-vehicle user activated system and the in-vehicle audio system, periodic update audio prompts, each of which i) identifies updated then-current tire pressure data or ii) is an audible tone indicative of filling progress; and

when the placard tire pressure value is reached, emitting, via the in-vehicle user activated system and the in-vehicle audio system, an ending audio prompt instructing that the tire pressure filling event be ceased.

8. The tire pressure gauge method as defined in claim **7** wherein prior to emitting the initiating audio prompt, the method further comprises receiving an input to initiate a tire pressure check routine via the in-vehicle audio system, an in-vehicle button or an in-vehicle display icon.

9. The tire pressure gauge method as defined in claim **7**, further comprising:

emitting, via the in-vehicle user activated system and the in-vehicle audio system, a second initiating audio prompt identifying a second tire whose pressure will be checked;

signaling at least one tire pressure monitoring sensor operatively positioned at the second tire to collect then-current second tire pressure data;

transmitting the collected then-current second tire pressure data to the module associated with the in-vehicle user activated system;

emitting, via the in-vehicle user activated system and the in-vehicle audio system, a second informative audio prompt identifying the collected then-current second tire pressure data and a placard tire pressure value for the second tire;

recognizing a tire pressure filling event at the second tire;

as the second tire pressure filling event occurs, emitting, via the in-vehicle user activated system and the in-vehicle audio system, periodic update audio prompts, each of which i) identifies updated then-current second tire pressure data or ii) is an audible tone indicative of filling progress; and

when the placard tire pressure value is reached, emitting, via the in-vehicle user activated system and the in-vehicle audio system, an ending audio prompt instructing that the second tire pressure filling event be ceased.

10. The tire pressure gauge method as defined in claim **9**, further comprising repeating the steps for at least a third and a fourth tire.

11. The tire pressure gauge method as defined in claim **7** wherein prior to emitting the informative audio prompt, the method further comprises:

collecting a then-current outside temperature; and

using the then-current tire pressure data and the then-current outside temperature to determine the placard tire pressure value for the tire.

12. The tire pressure gauge method as defined in claim **7**, further comprising:

transmitting data related to the tire pressure filling event to a telematics unit in operative communication with the in-vehicle user activated system and the in-vehicle audio system, the data related to the tire pressure filling event selected from the then-current tire pressure data, the placard tire pressure value, a timestamp of the tire pressure filling event, a datestamp of the tire pressure filling event, an amount of pressure change applied to the tire, a then-current outside temperature, and combinations thereof; and

transmitting the data related to the tire pressure filling event to a telematics service center in selective communication with the telematics unit.

13. The tire pressure gauge method as defined in claim **12**, further comprising generating a tire pressure history report based upon the data received at the telematics service center.

14. The tire pressure gauge method as defined in claim **7**, further comprising:

flashing a turn signal indicator that corresponds spatially with the tire, thereby indicating that the tire pressure filling event can be initiated;

as the tire pressure filling event occurs, increasing a frequency at which the turn signal indicator is flashing, thereby indicating that the then-current pressure data is closer to the placard tire pressure value; and

when the placard tire pressure value is reached, illuminating the turn signal indicator so that it is a solid color.

15. The tire pressure gauge method as defined in claim **7**, further comprising:

simultaneously with the signaling of the at least one tire pressure monitoring sensor, signaling each other tire pressure monitoring sensor operatively positioned at each other tire to collect then-current tire pressure data from each other tire in addition to the tire;

identifying a placard value for each other tire and the tire; and

from the data and the placard values, identifying which of the tires has a low air pressure.

16. A tire pressure gauge method, comprising:

detecting a tire pressure filling event via an in-vehicle component in operative communication with a vehicle bus that receives PSI information from at least one tire pressure monitoring sensor; and

in response to the detecting, inquiring, via a user activated system in operative communication with the an in-vehicle component, whether a tire pressure check routine should be initiated.

17. The tire pressure gauge method as defined in claim **16**, further comprising:

detecting, via the user activated system, an input indicative of initiating the tire pressure check routine;

identifying, via the in-vehicle component, a tire associated with the detected tire pressure filling event;

receiving periodic readings of then-current tire pressure data for the tire at the in-vehicle component; and

emitting, during the tire pressure filling event and via the in-vehicle user activated system and an in-vehicle audio system, periodic update audio prompts relaying the periodic readings of the then-current tire pressure data of the identified tire or audible tones indicative of filling progress.

18. The tire pressure gauge method as defined in claim **17**, further comprising:

emitting, via the in-vehicle user activated system and the in-vehicle audio system, an informative audio prompt identifying a placard tire pressure value for the identified tire; and

when the placard tire pressure value is reached during the tire pressure filling event, emitting, via the in-vehicle user activated system and the in-vehicle audio system, an ending audio prompt instructing that the tire pressure filling event be ceased.

19. The tire pressure gauge method as defined in claim **18** wherein prior to emitting the informative audio prompt, the method further comprises:

collecting a then-current outside temperature; and

using the then-current tire pressure data and the then-current outside temperature to determine the placard tire pressure value for the identified tire.

20. The tire pressure gauge method as defined in claim **18** wherein after the ending audio prompt is emitted, the method further comprises:

inquiring, via the user activated system, whether the tire pressure check routine should be continued;

detecting, via the user activated system, an input indicative of continuing the tire pressure check routine;

emitting, via the in-vehicle user activated system and an in-vehicle audio system, an instruction prompt identifying an other tire whose pressure will be checked;

signaling at least one tire pressure monitoring sensor operatively positioned at the other tire to collect then-current other tire pressure data;

transmitting the collected then-current other tire pressure data to the module;

emitting, via the in-vehicle user activated system and the in-vehicle audio system, an other informative audio prompt identifying the then-current other tire pressure data and a placard tire pressure value for the other tire;

recognizing a tire pressure filling event at the other tire;

as the other tire pressure filling event occurs, emitting, via the in-vehicle user activated system and the in-vehicle audio system, periodic update audio prompts, each of which i) identifies updated then-current other tire pressure data or ii) is an audible tone indicative of filling progress; and

when the placard tire pressure value is reached in the other tire, emitting, via the in-vehicle user activated system and the in-vehicle audio system, an other ending audio prompt instructing that the other tire pressure filling event be ceased.

21. The tire pressure gauge method as defined in claim **17**, further comprising:

transmitting data related to the tire pressure filling event to a telematics unit in operative communication with the in-vehicle user activated system and the in-vehicle audio system, the data related to the tire pressure filling event being selected from the then-current tire pressure data, the placard tire pressure value, a timestamp of the tire pressure filling event, a datestamp of the tire pressure filling event, an amount of pressure change applied to the tire, and combinations thereof; and

transmitting the data related to the tire pressure filling event to a telematics service center in selective communication with the telematics unit.

22. The method as defined in claim **16**, further comprising:

running a the tire pressure check routine for a tire associated with the tire pressure check routine; and

upon filling the tire, ending the tire pressure check routine until an other tire pressure filling event is detected via the in-vehicle component.

* * * * *