UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FORD MOTOR COMPANY
Petitioner,

v.

AUTOCONNECT HOLDINGS, LLC
Patent Owner.

U.S. Patent No. 9,290,153 to Ricci

Case No.: IPR2025-01383

PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 311 *ET SEQ.* AND 37 C.F.R. § 42.100 *ET SEQ.*
(U.S. PATENT NO. 9,290,153)

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1001	U.S. Patent No. 9,290,153 ("the '153 Patent")
1002	U.S. Patent No. 9,290,153 Certified File History ("the '153 Patent File History")
1003	Expert Declaration of Todor Cooklev
1004	Todor Cooklev Curriculum Vitae
1005	*AutoConnect Holdings LLC v. Ford Motor Company*, Complaint, Case No. 1:24-cv-01327-JCG (D. Del.) Filed December 6, 2024 ("Complaint")
1006	Plaintiff's Opposition to Defendant's Motion to Dismiss, *AutoConnect Holdings LLC v. Ford Motor Company*, Case No. 1:24-cv-01327-CFC (D Del.) Filed February 28, 2025 (Opposition")
1007-1009	*Intentionally left blank*
1010	U.S. Patent No. 8,768,539 B1 to Clement ("Clement")
1011	U.S. Patent No. 7,388,466 B2 to Ghabra ("Ghabra")
1012	U.S. Patent Application Pub. No. 2012/0092129 A1 to Lickfelt ("Lickfelt")
1013	U.S. Patent Application Pub. No. 2011/0093153 A1 to Moinzadeh ("Moinzadeh")
1014	U.S. Patent Application Pub. No. 2012/0042005 A1 to Papakosta ("Papakosta")
1015	U.S. Patent No. 7,783,699 B2 to Rasin ("Rasin")
1016-1049	*Intentionally left blank*
1050	Bosch Handbook, (Automotive Handbook October 2004 6th Edition) ("Bosch")
1051	IEEE Dictionary, (IEEE 100 The Authoritative Dictionary of IEEE Standards Terms 2000 7th Edition) ("IEEE Dictionary")
1052	"Specification of The Bluetooth System" (June 30, 2010). Version 4.0 (Volumes 0-6) Available at https://www.bluetooth.com/specifications/specs/core-specification-4-0/ (Accessed June 27, 2025) ("Bluetooth Specification")

Exhibit No.	Description
1053	Hossain et al., "A Comprehensive Study of Bluetooth Signal Parameters for Localization," 2007 IEEE 18th International Symposium on Person, Indoor and Mobile Radio Communications Available at https://www.ieeexplore.ieee.org/document/4394215 (Accessed June 27, 2025) ("Hossain")
1054	McCartt et al., "Driver Cellphone and Texting Bans in the United States: Evidence of Effectiveness," Engaged Driving Symposium Annals of Advances in Automotive Medicine, March 31, 2014 Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC4001674/ (Accessed July 1, 2025) ("McCartt")
1055	NHTSA Traffic Safety Facts Research Note "Distracted Driving 2010" published September 2012. Available at https://www.nrd.nhtsa.dot.gov/CATS/index.aspx (Accessed June 24, 2025) ("NHTSA")
1056	Peterson, Andrew, "Do not disturb, Ford Fights Distracted Driving with Limited In-Motion Sync Access," July 12, 2010 Available at https://www.motortrend.com/news/163-news100712-ford-sync-do-not-disturb (Accessed June 24, 2025) ("Motor Trend")
1057	Allen, Leslie "Ford launches parental control technologies," October 7, 2008. Available at https://www.autonews.com/article/20081007/ZZZ_SPECIAL/310079921/ford-launches-parental-control-technologies/ (Accessed June 24, 2025) ("Auto News")
1058	Ghangurde, Mujund "Ford SNYC and Microsoft Windows Embedded Automotive Make Digital Lifestyle a Reality on the Road," *SAE International*, Volume 3, Issue 2, October 19, 2010 SAE2010-01-02319 (Accessed April 25, 2025) ("Ghangurde")
1059	Austin, Michael "Ford introduces Next-Gen Connectivity Suite Called MyFord; Should be Awesome," January 6, 2010. Available at https://www.caranddriver.com/news/a15128939/ford-introduces-next-gen-connectivity-suite-called-myford-should-be-awesome-car-news/ (Accessed June 25, 2025) ("Car and Driver")

Exhibit No.	Description
1060	TCP/IP Tutorial and Technical Overview 6th Ed. (International Business Machines Corporation – October 1998) ("IBM TCP/IP Tutorial")
1061	Ford SYNC Supplemental Guide, November 2007 ("Sync Guide 2007")
1062	Ford SYNC Supplemental Guide, January 2010 ("Sync Guide 2010")
1063	Saltzstein, William E. "Bluetooth: The Future of Wireless Medical Technology?" February 1, 2002. Available at https://www.mddionline.com/new-technologies/bluetooth-the-future-of-wireless-medical-technology- (Accessed June 30, 2025) ("MDDI")
1064	MyFord Touch Ford User Guide Ford Motor Company, February 2012 ("MyFord Touch Guide")
1065	SUSE LINUX – Administration Guide. Published by SUSE LINUX AG, 2004 ("Linux")
1066	"Universal Serial Bus 3.0 Specification" (November 12, 2008). Revision 1.0, Available at https://manuais.iessanclemente.net/images/4/4b/USB30-Specification-2008.pdf (Accessed August 12, 2025) ("USB 3 Spec")
1067	"Specification of the Bluetooth System" (December 1, 1999). Version 1.0 B Available at https://engweb.eng.wayne.edu/ad/ad57/ad5781/public_html/BluetoothWeb/BTooth_Spec1.0B_Vol1.pdf (Accessed August 12, 2025) ("Bluetooth Spec. V1.0 B ")
1068-1099	*Intentionally left blank*
1100	United States District Courts – National Judicial Caseload Profile, March 2025

Mandatory Notices under 37 C.F.R. §42.8

Real Party-In-Interest - 37 C.F.R. §42.8(b)(1)

Petitioner certifies that Ford Motor Company ("Petitioner") is the real party-in-interest.

Related Matters - 37 C.F.R. §42.8(b)(2)

Petitioner identifies the following related judicial matter: *AutoConnect Holdings, LLC v. Ford Motor Company*, 1:24-cv-01327-JCG (D. Del) (pending) served December 6, 2024. U.S. Patent No. 9,290,153 is being asserted in this proceeding, along with twelve other related patents: U.S. 9,020,491; U.S. 9,020,697; U.S. 9,082,239; U.S. 9,098,367; U.S. 9,116,786; U.S. 9,123,186; U.S. 9,140,560; U.S. 9,147,296; U.S. 9,147,297; U.S. 9,173,100; U.S. 10,862,764; and U.S. 11,163,931.

Petitioner filed IPR2025-01342 challenging the related 9,020,697 Patent.

Petitioner is also aware that U.S. Patent No. 9,290,153 is being asserted in *AutoConnect Holdings LLC v. Toyota Motor Corporation et al.* 2-24-cv-00802 (EDTX) (pending) filed October 3, 2024, and in *AutoConnect Holdings LLC v. General Motors LLC* 2-24-cv-00877 (EDTX) (pending) filed October 30, 2024.

Lead and Back-Up Counsel - 37 C.F.R. §42.8(b)(3)

The Petitioner identifies the following lead and back-up counsel:

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An appropriate Power of Attorney is filed concurrently herewith.

Service Information - 37 C.F.R. §42.8(b)(4)

Service information for lead and back-up counsel is provided in the designations above. Petitioner hereby consents to service by email at the following email address: FPGP0156IPR@brookskushman.com.

Fees - 37 C.F.R. §42.15(a)

The filing fees associated with this Petition are being charged to Deposit Account 06-1510. The Board is authorized to charge any additional fees or credit any refunds pertaining to this Petition to Deposit Account 06-1510.

I. Introduction

Petitioner requests *inter partes* review of claims 1-21 of U.S. Patent No. 9,290,153 ("the '153 Patent"; Ex.1001). The supporting Declaration of Dr. Todor Cooklev is filed as Ex.1003.

The '153 Patent is directed to the control of a vehicle subsystem that communicates with a mobile communication device, including aspects of device discovery and customization. (Ex.1003,¶¶43,91.) For example, claim 1 requires "*discovering…one or more communication devices*" and "*refreshing…graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices*." (Ex.1003,¶72.) Such infotainment system control and customization technology was well known in the art at the time of the alleged invention. *See* e.g., Moinzadeh (Ex.1013), and Rasin (Ex.1015). (Ex.1003,¶122.)

By the mid-2000s, as mobile phones became more advanced, vehicle systems that interacted with mobile devices became widely available. Such vehicle systems provided information and entertainment (infotainment) and included features to provide user comfort and convenience and to address safety and security. (Ex.1054,1;Ex.1055,4;Ex.1003,¶¶100-101,125.)

Petitioner released its first-generation SYNC infotainment system in 2007 and its second-generation SYNC system in 2010—years before the earliest claimed filing date of the '153 Patent. Both SYNC systems included user convenience

features and customization features, e.g., hands-free phone control, hands-free texting, and customized voice-command shortcuts for frequently accessed features such as climate control or selecting radio stations. (Ex.1003,¶¶102-104,126-127; Ex.1062,2,30-32;Ex.1064,9,11;*see also* Ex.1058,100-103;Ex.1059,1-2;Ex.1061,2-5,34,38-39,43-44;Ex.1057,1-6;Ex.1056,1-4.) Ford also released its MyKey system in 2009, which enabled a user (*e.g.*, a vehicle owner) to associate user-selectable settings and limits with designated keys. (Ex.1057,1-6;Ex.1003,¶123.)

The ’153 Patent claims recite well-known device customization features and other common features, such as limiting access to vehicle functionality based on device location (claims 4, 8, 15, 19), the mobile device determining its location (claims 5, 16), device discovery (claims 2-3, 6, 13-14, 17), and device positioning strategies (claims 7, 9-10, 18, 20-21). (Ex.1003,¶74.) Mobile device discovery and positioning techniques were well known for Bluetooth communication and Passive-Entry Passive-Start (PEPS) systems. (Ex.1003, ¶¶105-121, 131-133; Ex.1052,Vol.2,150-151,160-163; Ex.1053,5; Ex.1012,[0001]-[0006]; Ex.1014,[0013],[0016]-[0017],[0022].) As set forth in detail below, the challenged claims of the ’153 Patent are obvious over various references in the prior art—none of which were considered during the examination of the ’153 Patent. (Ex.1003,¶¶81.)

Additionally, the litigation filed by Patent Owner (“AutoConnect Holdings,

LLC or "AutoConnect") is in its early pleadings stage, and trial will likely occur (if at all) in late 2027, long after the projected final decision here. (Ex.1100,14.) Additionally, although the '153 Patent issued over nine years ago, Petitioner had settled expectations that it would not be asserted against Petitioner because, *inter alia*, since acquiring the '153 Patent in 2015, Patent Owner had not commercialized, asserted, marked, licensed, or otherwise applied the '153 Patent before contacting Petitioner in December 2023. (Ex.1005,9.)

II. Grounds for Standing Requirements under 37 C.F.R. §42.104

A. Grounds for Standing - 37 C.F.R. §42.104(a)

Petitioner certifies that the '153 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR.

B. Challenged Claims - 37 C.F.R. §42.104(b)(1)

Petitioner requests *inter partes* review for claims 1-21 of the '153 Patent and requests that the Patent Trial and Appeal Board ("PTAB") find these claims unpatentable.

C. Prior Art Relied Upon

The following prior art references are all prior art to the earliest claimed

priority date of the '153 Patent of April 15, 2013[1][2]:

- Moinzadeh – U.S. 2011/0093153 (Ex.1013) published April 21, 2011 (AIA 35 U.S.C. §§102(a)(1) and 102(a)(2))
- Clement – U.S. 8,768,539 B1 (Ex.1010) filed September 28, 2012, issued July 1, 2014 (AIA 35 U.S.C. §102(a)(2))
- Rasin – U.S. 7,783,699 (Ex.1015) issued August 24, 2010 (AIA 35 U.S.C. §§102(a)(1) and 102(a)(2))
- Ghabra – U.S. 7,388,466 B2 (Ex.1011) issued June 17, 2008 (AIA 35 U.S.C. §§102(a)(1) and 102(a)(2))
- Bosch – Bosch Automotive Handbook 6th Edition, Robert Bosch GmbH (2004) (Ex.1050) U.S.C. §§102(a)(1) and 102(a)(2))

D. Grounds of Challenge – 37 C.F.R. §42.104(b)(2)

Ground	Basis	References	Claims Challenged
1	§ 103	Moinzadeh	1-3 and 11-14
2	§ 103	Moinzadeh and Clement	4-5, 7-10, 15-16, and 18-21

[1] AIA Sections 102, 103 and 112 apply.

[2] Petitioner reserves the right to argue one or more claims are not entitled to this date in district court.

Ground	Basis	References	Claims Challenged
3	§ 103	Rasin and Bosch	1, 3, 11-12, and 14
4	§ 103	Rasin, Bosch, and Clement	4-5, 7-10, 15-16, and 18-21
5	§ 103	Rasin, Bosch, and Ghabra	2 and 13
6	§ 103	Rasin, Bosch, Clement, and Ghabra	6 and 17

There is a reasonable likelihood that at least one Challenged Claim is unpatentable as explained herein. Petitioner requests review of the Challenged Claims, and judgment finding them unpatentable.

III. Person of Ordinary Skill in the Art (POSA)

A person of ordinary skill in the art (POSA) of the ’153 Patent would have had, as of April 15, 2013, a Bachelor’s degree in Electrical Engineering, Mechanical Engineering, or an equivalent degree with at least two years of experience in communication systems, vehicle sensor systems, electronic user interface systems, or related technologies. Additional industry experience could make up for less education and vice versa. (Ex.1003,¶¶43-46.)

IV. The Challenged ’153 Patent

A. Priority Claim

The ’153 Patent matured from U.S. Application 14/684,856 filed April 13, 2015. The ’153 Patent claims priority to U.S. Application No. 14/253,312 filed on April 15, 2014, which issued as U.S. 9,020,697 and claims priority to seven provisional patent applications including the earliest filed U.S. provisional patent application No. 61/811,981 filed April 15, 2013. (Ex.1003,¶¶48-49.)

B. Overview

The ’153 Patent relates to “[m]ethods and systems for a device discovery daemon that bases access of a communication device to an on board vehicle network on device location.” (Ex.1001,Abstract.) The ’153 Patent explains that the device discovery daemon utilizes a desktop manager to enable customizable “desktop configuration[s]” on “the user interface of the vehicle control system 204” based on the device’s information and capabilities. (Ex.1001,57:63-58:6.) The ’153 Patent explains that “[t]he overall design and functionality of the systems provide for an enhanced user experience making the automobile more useful and more efficient.” (Ex.1001,23:34-36;Ex.1003,¶¶50-51.)

The ’153 Patent seeks to “reduce driver distractions while enabling the driver to perform permissible computational tasks” and “not only comply with prevailing legal requirements but also enhance passenger enjoyment.” (Ex.1001,14:63-

15:43;Ex.1003,¶¶52-53.)

The ’153 Patent discloses a “vehicle control system 204 [that] may communicate with a device[3] or user interface 212, 248.” (Ex.1001,24:19-20,Fig.2.) “The device 212, 248 can be a mobile device…that is either permanently located in or temporarily associated with…the vehicle 104” and “the vehicle control system 204 can interface with the device 212, 248 and leverage the device's computing capability to provide one or more of the features or functions.” (Ex.1001,24:27-35;Ex.1003,¶¶54-56.)

[3] The ’153 Patent refers to the devices 212, 242 using a plurality of interchangeable terms, such as a “mobile,” “portable,” “communication,” and “computational” device. (Ex.1001,86:40-42,17:3-14,24:27-32.)

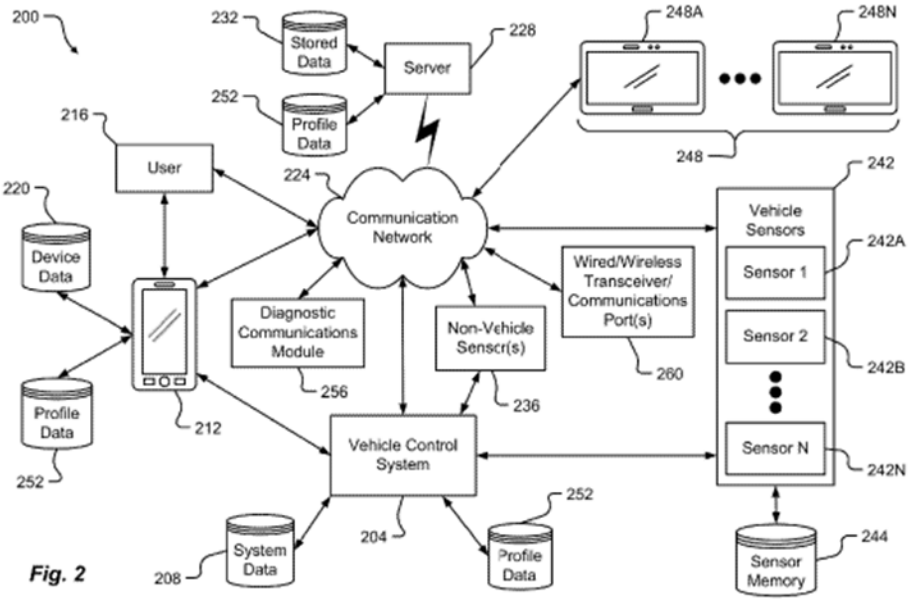


Fig. 2

Ex.1001,Fig.2

"The vehicle control system 204 may also communicate with or through a communication network 224" that "can represent any type of wireless and/or wired communication system that may be included within the vehicle 104 or operable to communicate outside the vehicle 104" such as "a Bluetooth® wireless system." (Ex.1001,25:52-64;Ex.1003,¶57.)

The '153 Patent discloses accessing a vehicle's passive entry / passive start ("PEPS") system functionality from a mobile device external to the vehicle. (Ex.1001,34:3-13,Fig.5A;Ex.1003,¶¶58-59.) The '153 Patent also discloses accessing vehicle system functionality from a mobile device within the vehicle. (Ex.1001,35:22-28,Fig.5B;Ex.1003,¶60.)

The '153 Patent further discloses that a "[a] device discovery daemon 1020

may be a computer program that runs as a background process that can discover new devices that connect with the network 356 or communication subsystem 1008 or devices that disconnect from the network 356 or communication subsystem 1008." (Ex.1001,57:32-36.) Further, "[t]he device discovery daemon 1020 can ping the network 356 (the local subnet) when the vehicle 104 starts, when a vehicle door opens or closes, or upon the occurrence of other events." (Ex.1001,57:36-39.) "For each device that responds to the ping, the device discovery daemon 1020 can populate the system data 208 with device information and capabilities, using any of one or more protocols." (Ex.1001,57:40-44,Fig.10;Ex.1003,¶61.)

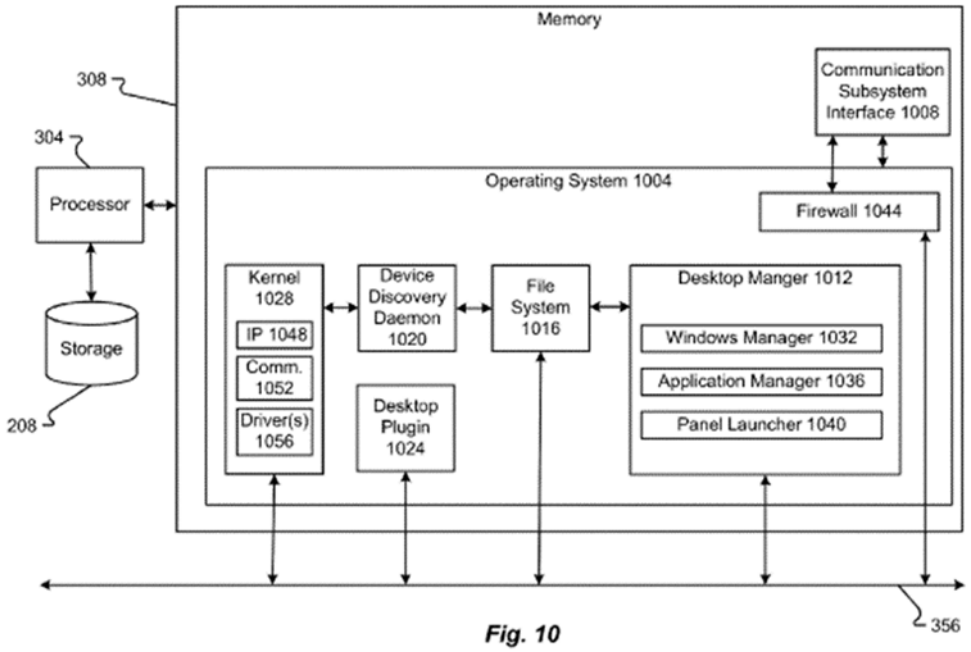


Fig. 10

Ex.1001,Fig.10

The '153 Patent discloses that "the device discovery daemon 1020 can

determine device capabilities based on the opened ports the device exposes" e.g., "[i]f a camera exposes port 80, then the device discovery daemon 1020 can determine that the camera is using a Hypertext Transfer Protocol (HTTP)." (Ex.1001,57:52-56.) Further, "[w]hen a scan stops, the device discovery daemon 1020 can trigger a dashboard refresh to ensure the user interface reflects the new devices on the desktop." (Ex.1001,57:60-62;Ex.1003,¶62.)

The '153 Patent further explains that "device capabilities" include communication ability and software revision and status:

> Examples of device capabilities may include, but are not limited to, a communications ability (e.g., via wireless network, EDGE, 3G, 4G, LTE, wired, Bluetooth®, Near Field Communications (NFC), Infrared (IR), etc.), hardware associated with the device (e.g., cameras, gyroscopes, accelerometers, touch interface, processor, memory, display, etc.), software (e.g., installed, available, revision, release date, etc.), firmware (e.g., type, revision, etc.), operating system, system status, and the like.

(Ex.1001,66:26-35;*see also* 92:63-93:6;Ex.1003,¶63.)

The '153 Patent further discloses that a "desktop manager 1012 may be a computer program that manages the user interface of the vehicle control system 204." (Ex.1001,57:63-58:6.) "[A] desktop manager 1012 can manage one or more graphical user interfaces (GUI) in a desktop environment." (Ex.1001,56:42-44.)

Further, "[t]he desktop environment may be designed to be customizable and allow the definition of the desktop configuration look-and-feel for a wide range of appliances or devices from computer desktops, mobile devices, computer tablets, etc." (Ex.1001,57:65-58:1;Ex.1003,¶64.)

The '153 Patent describes "an operation of the device discovery daemon 1020" with reference to Figure 20. (Ex.1001,91:53-60.) "In step 2000, the device discovery daemon 1020 detects a computational device connectable with the vehicle network 356 or communication subsystem 1008." (Ex.1001,92:29-31; Ex.1003,¶65.)

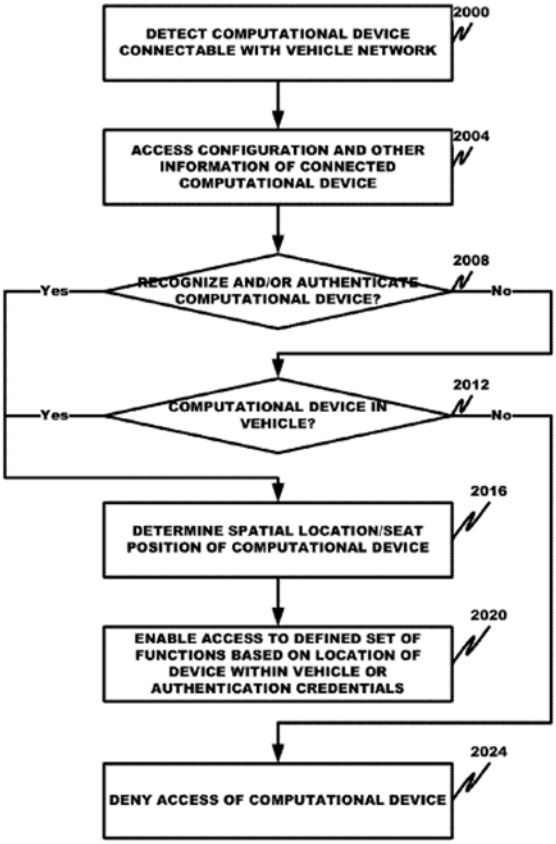


Fig. 20

Ex.1001,Fig.20

At step 2020, the device discovery daemon "ENABLE[s] ACCESS TO [a] DEFINED SET OF FUNCTIONS BASED ON [the] LOCATION OF [the] DEVICE." (Ex.1001,96:17-25.) At step 2024, the device discovery daemon 1020 denies access to the defined set of functions if the device is outside a defined area or zone. (Ex.1001,96:26-33;Ex.1003,¶¶66-68.)

The '153 Patent discloses that "[a] level of confidence can be assigned by the device discovery daemon 1020 to the computational device indicating a likelihood

or probability that the computational device is located within the passenger compartment." (Ex.1001,93:47-50.) "This level of confidence can be based on consideration and analysis of multiple of the factors" and "[w]hen multiple factors indicate that the user is within the passenger compartment, a higher likelihood is assigned to that determination; likewise, when multiple factors indicate that the user is outside of the passenger compartment, a lower likelihood is assigned to the determination." (Ex.1001,93:50-57;Ex.1003,¶¶69-70.)

Independent claims 1 and 12 of the '153 Patent are directed to a vehicle system and method for discovering wireless communication devices connecting to a vehicle network, collecting the devices' information and capabilities, and updating the vehicle's graphical user interface to reflect the connected devices. (Ex.1003,¶¶71-72.) Independent claim 1 is representative of claim 12 and is reproduced below:

> 1[pre] A method, comprising:
>
> [1a] discovering, by a microprocessor executing a microprocessor executable device discovery daemon, one or more communication devices connected wirelessly to a network and/or communication subsystem of a vehicle;
>
> [1b] for each of the discovered one or more communication devices, populating, by the microprocessor executing the device discovery daemon, system data with device information and capabilities; and

> [1c] refreshing, by the microprocessor executing a microprocessor executable desktop manager, graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.

The technology of the challenged independent claims was well-known in the art by April 15, 2013. (Ex.1003,¶73.)

The dependent claims add common features, e.g., limiting access to certain vehicle system functionality based on the location of a device (claims 4, 15), the communication device determining its own location (claims 5, 16), device discovery (claims 2-3, 6, 13-14, 17), device positioning strategies (claims 7, 9-10, 18, 20-21) and limiting access to a set of tasks/operations based on the location of the device (claims 8, 19). (Ex.1003,¶74.)

C. Prosecution History

The ’153 Patent issued from patent application serial no. 14/684,856. The patentee filed multiple information disclosure statements citing hundreds of references during prosecution. (Ex.1002,284-291,559.) Nonetheless, the Examiner issued a first action notice of allowance of all claims without rejection or objection. (Ex.1002,499-507.) The Examiner’s reasons for allowance focused on the claim limitations directed to populating vehicle system data with device information/capabilities and refreshing a graphical user interface based on that system data. (Ex.1002,506;Ex.1003,¶¶75-81.)

V. Claim Construction — 37 C.F.R. §42.104(B)(3)

In an IPR proceeding, the claims are construed "in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. §42.100(b); *Phillips v. AWH Corp*., 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). Petitioner applies the plain and ordinary meaning of the Challenged Claims to the asserted prior art references in support of all grounds herein.

Petitioner proposes the following claim constructions for the purposes of this Petition only.

A. (Claims 1, 12) "*daemon*" means "computer program"

Independent claims 1 and 12 require that the device discovery *"daemon*[4]" is executed by a microprocessor, which indicates that it is software or a computer program. For example, representative claim 1 requires "*discovering, by a microprocessor executing a microprocessor executable device discovery daemon, one or more communication devices connected wirelessly to a network and/or communication subsystem of a vehicle.*" A POSA would have understood that a microprocessor executes a computer program, i.e., software. (Ex.1003,¶84.)

In addition to the claims, "the specification 'is always highly relevant to the

[4] Petitioner uses italics to indicate claim language.

claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 *quoting Vitronics*, 90 F.3d at 1582. The specification confirms that the device discovery *"daemon"* is a computer program, or software. The '153 Patent discloses that the "device discovery daemon 1020 may be a computer program that runs as a background process that can discover new devices that connect with the network…or devices that disconnect from the network." (Ex.1001,57:32-36.) Accordingly, Petitioner construes "*daemon*" as a "computer program" based on the claim language, as confirmed by the specification. (Ex.1003,¶¶83-85.)

B. (Claims [4c] and [15c]) "*access or attempt to access the vehicle network and/or communication subsystem"* means "*access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem*"

Dependent claims [4c] and [15c] require "*(C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permit[ting] the computational device to access or attempt to access the vehicle network and/or communication subsystem*." Each claim includes three steps and the "*permitting*" sub-step C1 follows a "*determin[ation]*" "*that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*." Since the first step provides for determining that the computational device is "*connected to…a network and/or communication subsystem"* the term "*access*"

in step (C1) must indicate more than mere connection to the network and/or communication subsystem, e.g., access to functions available through the vehicle network and/or communication system. (Ex.1003,¶¶86-87.)

The ’153 Patent specification confirms that the claim term “*access*” in substeps (C1) and (C2) is used to describe accessing functionality of a vehicle system. The ’153 Patent describes in step 2020 of Figure 20 below, that the device discovery daemon “ENABLE[s] ACCESS TO [a] DEFINED SET OF FUNCTIONS BASED ON [the] LOCATION OF [the] DEVICE.” (Ex.1001,91:60-61,Fig.20;Ex.1003,¶¶65-66.)

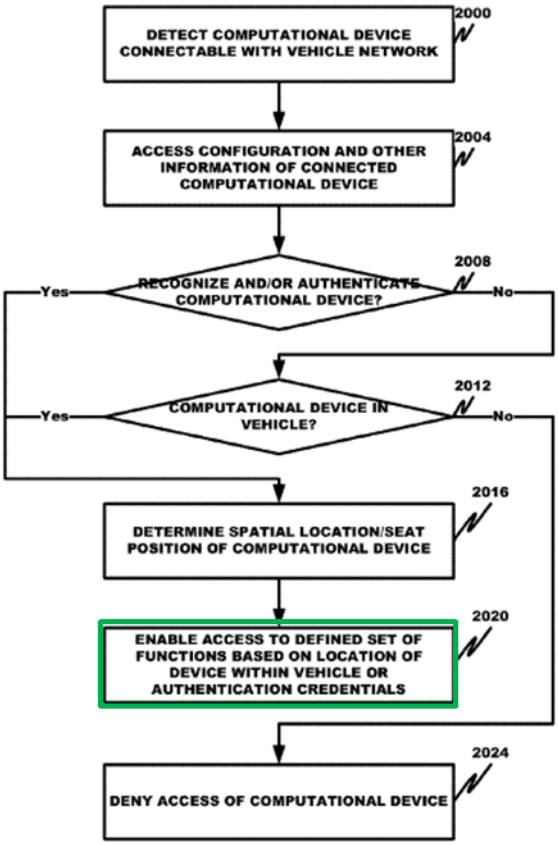


Fig. 20

Ex.1001,Fig.20 (Annotated)

The ’153 Patent specification clarifies that enabling access in claim 1 means permitting the computational device to connect with the vehicle network 356 or communication subsystem 1008 to perform a task, function and/or operation based on the location of the computational device. (Ex.1001,96:17-25;Ex.1003,¶66.)

The ’153 Patent specification describes PEPS functionality with reference to Figure 5A using the term “access” and explains that “the location of the device 212, 248 relative to the vehicle 104 may determine vehicle functionality and/or features

to be provided and/or restricted to a user 216." (Ex.1001,34:3-5.) For example, "a device 212, 248 associated with a user 216 may be located at a second outside area 520" that is far away from the vehicle 104 and therefore "the vehicle 104 may lock one or more features (e.g., ignition access, vehicle access, communications ability, etc.) associated with the vehicle 104." (Ex.1001,34:5-13;Ex.1003,¶88.)

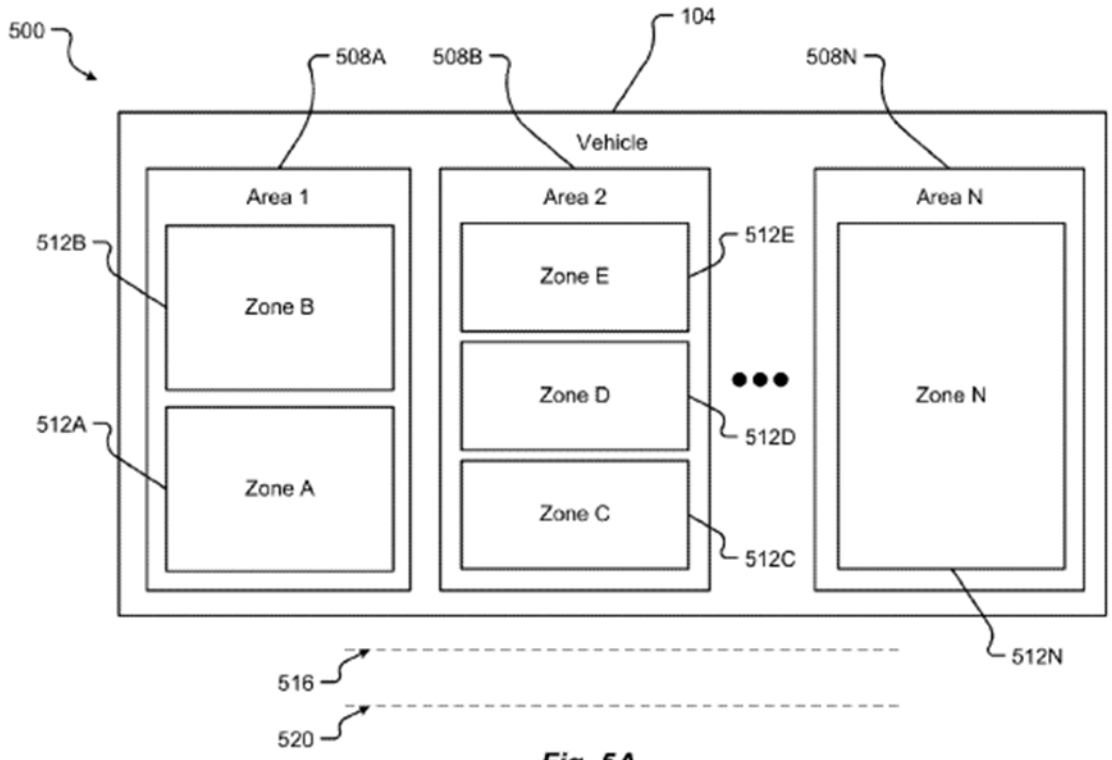


Fig. 5A

Ex.1001,Fig.5A

The '153 Patent also describes, with reference to Figure 5B below, connected devices "accessing" vehicle system functionality. For example, "[o]nly devices in [the front seat] area 1 508A may be able to access vehicle control functions such as when 'parents' are located in area 1 508A and the children are located in area 2

508B." (Ex.1001,35:22-28;Ex.1003,¶60.)

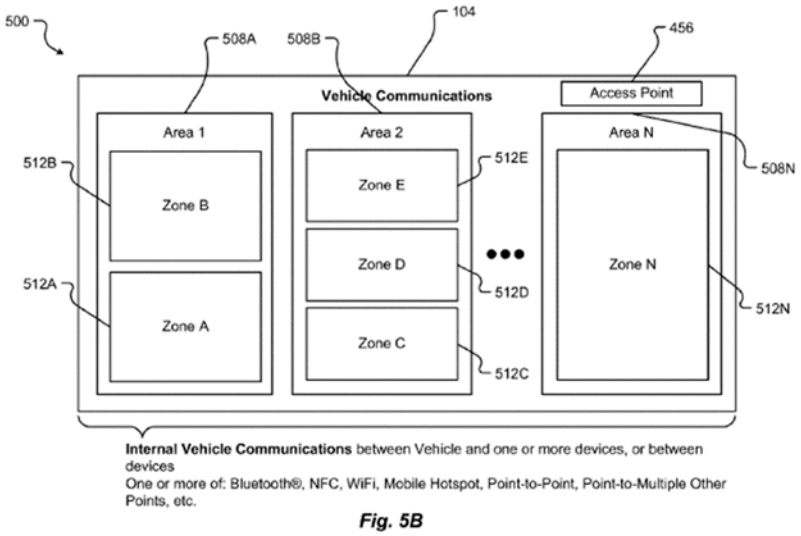


Fig. 5B

Ex.1001,Fig.5B

For these reasons, Petitioner construes the term "*access or attempt to access the vehicle network and/or communication subsystem*" as "*access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem*" and not merely "*accessing*" or connecting to a network or subsystem, as the computational device is already connected as recited in claim limitation (a). (Ex.1003,¶89.)

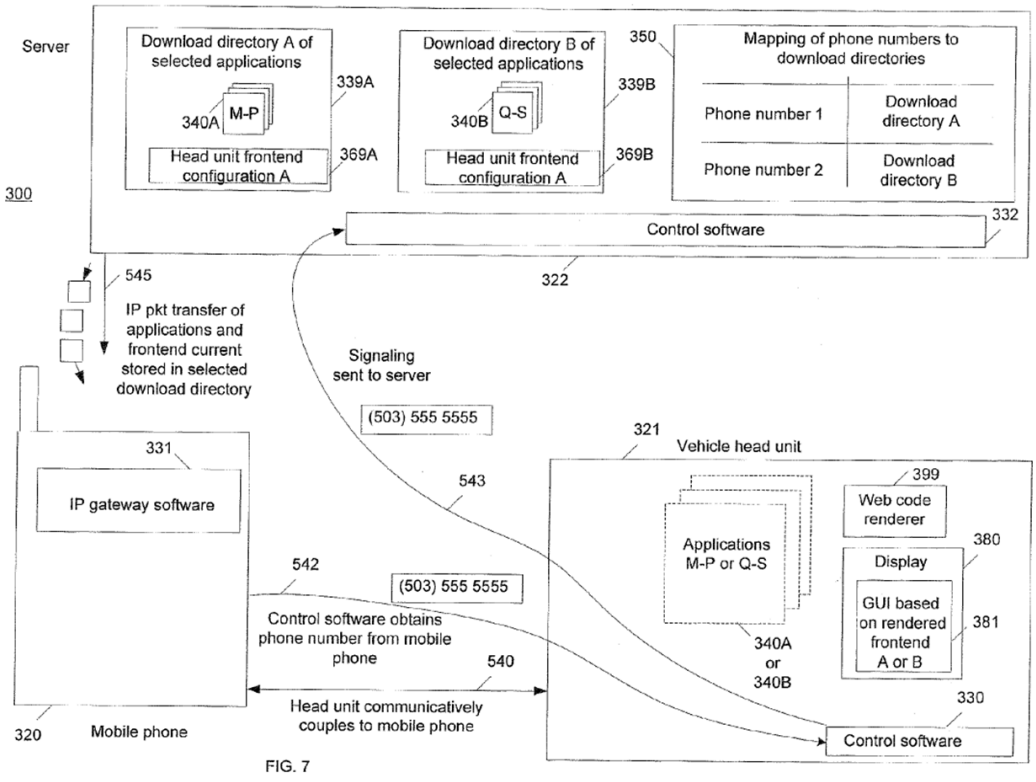
VI. Prior Art Overview

A. U.S. 2011/0093153 ("Moinzadeh" Ex.1013)

Moinzadeh discloses a vehicle system that includes a mobile phone 320, vehicle head unit 321, and a server 322, with software 330-332 that "enables a provider to select which applications can be installed on the head unit 321 and

control distribution of the selected applications to the vehicle." (Ex.1013,[0016],[0065],[0066].) A "connection can be established by a user connecting the mobile phone 320 to the head unit 321 using a USB connection" or "via Bluetooth pairing," which may be triggered when "the vehicle [is] powered up." (Ex.1013,[0069].)

Moinzadeh explains that after a connection is formed, the system retrieves a phone number, identifies an associated user directory, and downloads applications and "head unit frontend configurations A–B," which the head unit then "processes…to generate a particular graphical user interface" with user-specific customizations. (Ex.1013,[0077],[0087],Fig.8.) Moinzadeh further explains that any function "performed by the software [330-332] of the head unit 321…can alternatively be performed by the software of the mobile phone" 320 or the server 322. (Ex.1013,[0090];Ex.1003,¶¶137-148.)



Ex.1013,Fig.7

B. U.S. 8,768,539 B1 ("Clement" Ex.1010)

Clement discloses a vehicle permission management system that includes a "vehicle control unit 320 [that] determines the current location of the control device 230" and based on the determined location, the "vehicle control unit 320 determines whether [an] instruction is permitted to be invoked." (Ex.1010,10:37-38,10:55-57,10:62-67,Fig.8;Ex.1003,¶¶149-159.)

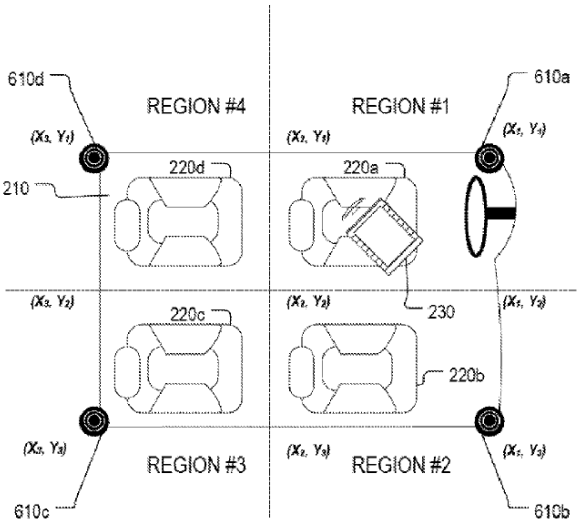


Fig. 6

Ex.1010,Fig.6

C. U.S. 7,388,466 B2 ("Ghabra" Ex.1011)

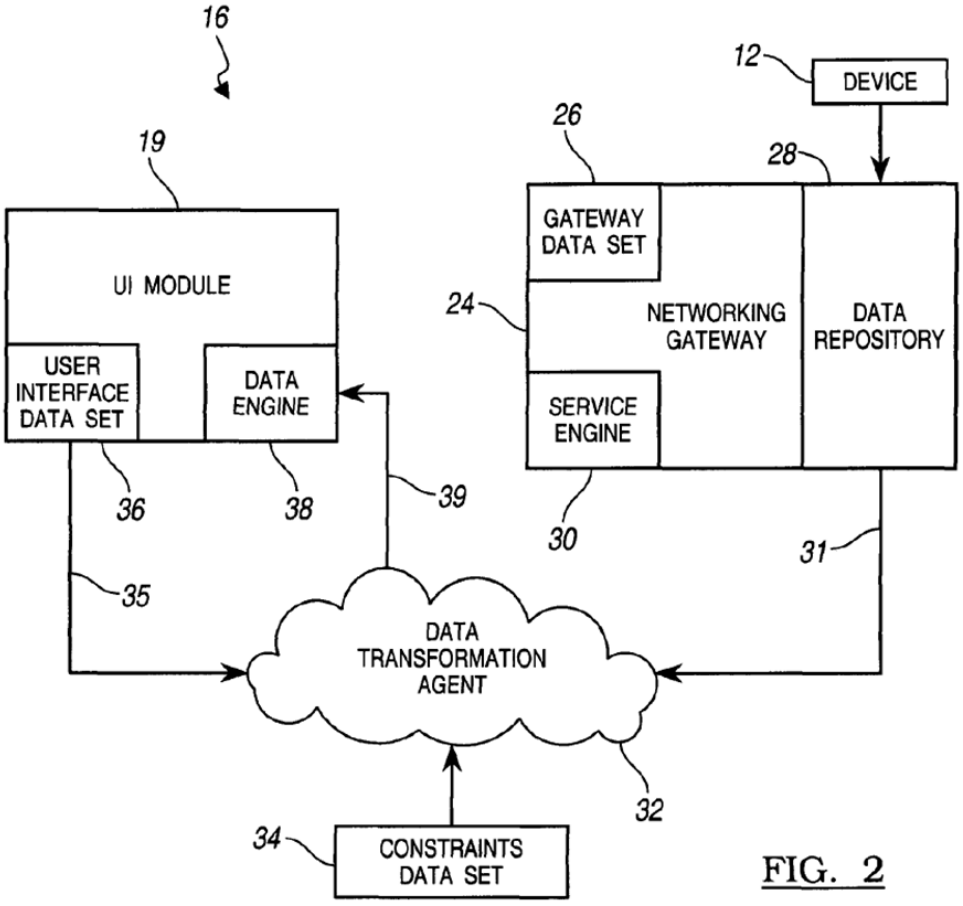
Ghabra discloses a PEPS system that allows a vehicle to communicate wirelessly with a key fob for hands-free access and ignition. (Ex.1011,2:13-16,2:63-65.) The system starts when a user pulls a door handle, "generat[ing] a trigger pulse provided to microcontroller 13 resulting in executing a trigger generation function," or when a user "press[es] a start button inside the vehicle (Ex.1011,3:48-51,5:22-25;Ex.1003,¶¶160-165.)

D. U.S. 7,783,699 ("Rasin" Ex.1015)

Rasin discloses a vehicle user interface system "configured to communicate and enable access to electronic devices including services and/or applications…available via the electronic devices." (Ex.1015,2:27-30.) A user interface system 16 within the vehicle "provides vehicle occupants information/data

pertaining to vehicle 10, its systems, and devices, including services available through an electronic device 12," which may be a PDA, smartphone, laptop, or similar. (Ex.1015,2:40-42,2:62-65.) Rasin discloses that communication between the user interface system 16 and device 12 can occur through USB or "via a wireless protocol including…bluetooth." (Ex.1015,3:4-13.)

Rasin explains that upon connection, the device 12 sends a data set to a networking gateway 24, which includes "a data repository 28, a gateway data set 26, and a service engine 30" to identify available services of the device 12. (Ex.1015, 3:33-35,3:39-62.) A data transformation agent 32 and constraints 34 "control[s] the appearance of information displayed by the user interface system," while a data engine 38 manages user interaction. (Ex.1015,3:65-4:42.) Rasin also discloses a method for service discovery and GUI update, involving receiving constraints and transforming data into a displayable format. (Ex.1015,4:50-5:18,Fig.3;Ex.1003, ¶¶166-176.)



Ex.1015,Fig.2

E. Bosch Automotive Handbook 6th Edition ("Bosch" Ex.1050)

Bosch is a reference handbook that is "all about automotive engineering in a pocketbook." (Ex.1050,Back Cover.) Bosch describes the common structure of an automotive electronic control unit (ECU) as of 2004, including a "[m]icroprocessor" and "memory." (Ex.1050,94,96.) Bosch explains that:

> The microprocessor represents the integration of a computers central processing unit on a single chip. Microprocessor design seeks to avoid individualization in the face of large-scale integration, and the units can

be programmed to meet the varied requirements associated with specific operation conditions.

(Ex.1050,94;Ex.1003,¶177.)

VII. Unpatentability Grounds

The references below render the claimed subject matter invalid under 35 U.S.C. §103 and the Petitioner therefore has a reasonable likelihood of prevailing as to each of the following grounds of unpatentability. 35 U.S.C. § 314(a); 37 C.F.R. § 42.104(b)(4).

A. Ground 1: Claims 1-3 and 11-14 are Unpatentable as Obvious Over Moinzadeh

1. Independent Claims 1 and 12[5]

1[pre] A method, comprising:

12[pre] A vehicle, comprising:

Moinzadeh discloses "a system to select and distribute applications to a vehicle in a safe and intelligent manner according to user preferences." (Ex.1013,[0065];Ex.1003,¶¶180,233-235.) As illustrated in Figure 7 below, the system 300 includes a vehicle head unit 321, which is part of the vehicle:

[5] Appendix A includes a listing of all challenged claims and Appendix B includes a table comparing claims that are treated together.

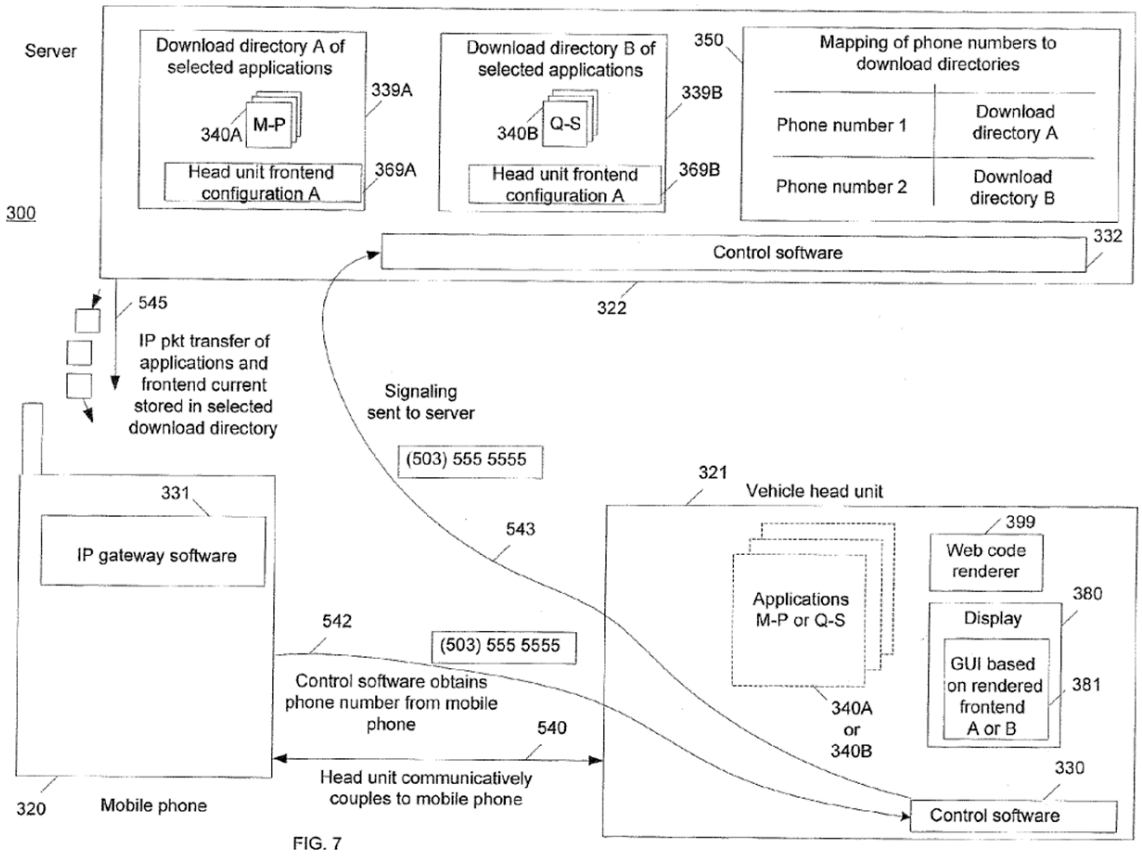
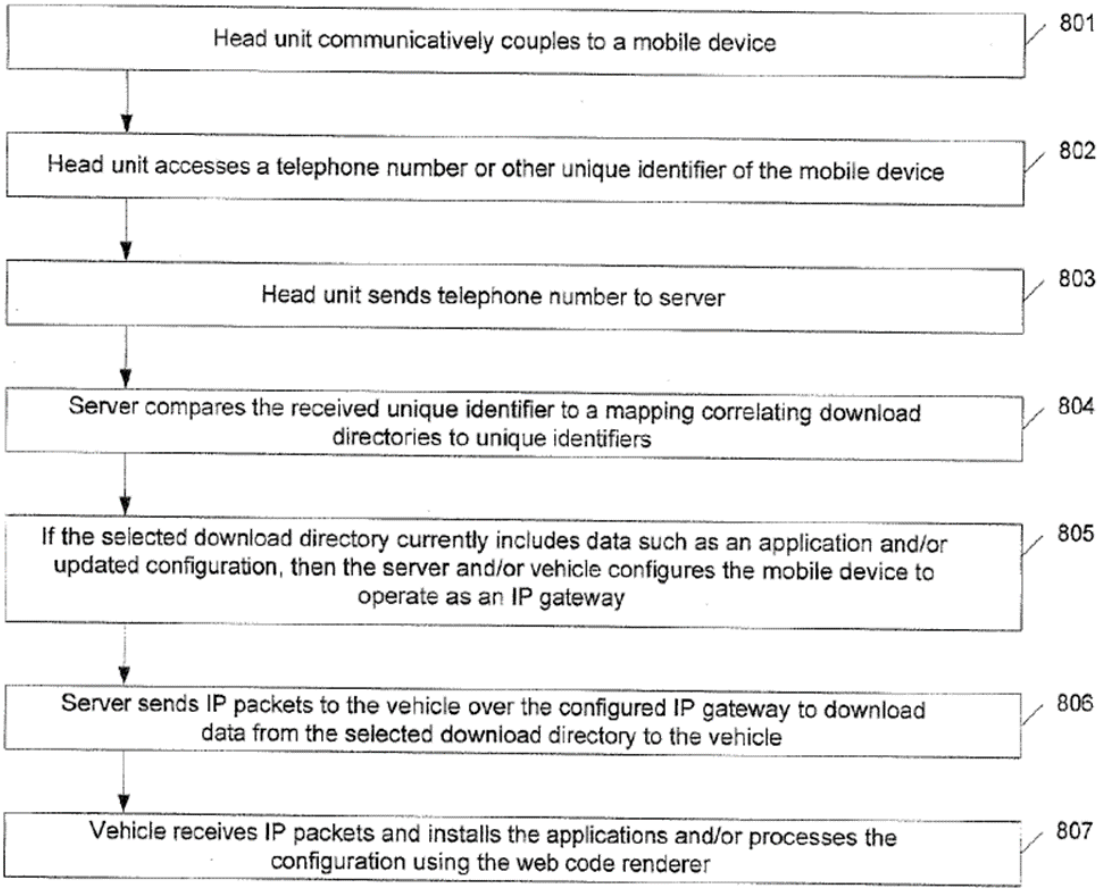


FIG. 7

Ex.1013,Fig.7

Moinzadeh discloses that "FIG. 8 illustrates a flow chart showing operation of the software of FIG. 7." (Ex.1013,[0068].) Moinzadeh also describes the process of Figure 8 as a "method." (Ex.1013,claims 15-25;Ex.1003,¶¶181-183.)



Ex.1013,Fig.8

[1a] discovering, by a microprocessor executing a microprocessor executable device discovery daemon, one or more communication devices connected wirelessly to a network and/or[6] communication subsystem of a vehicle;

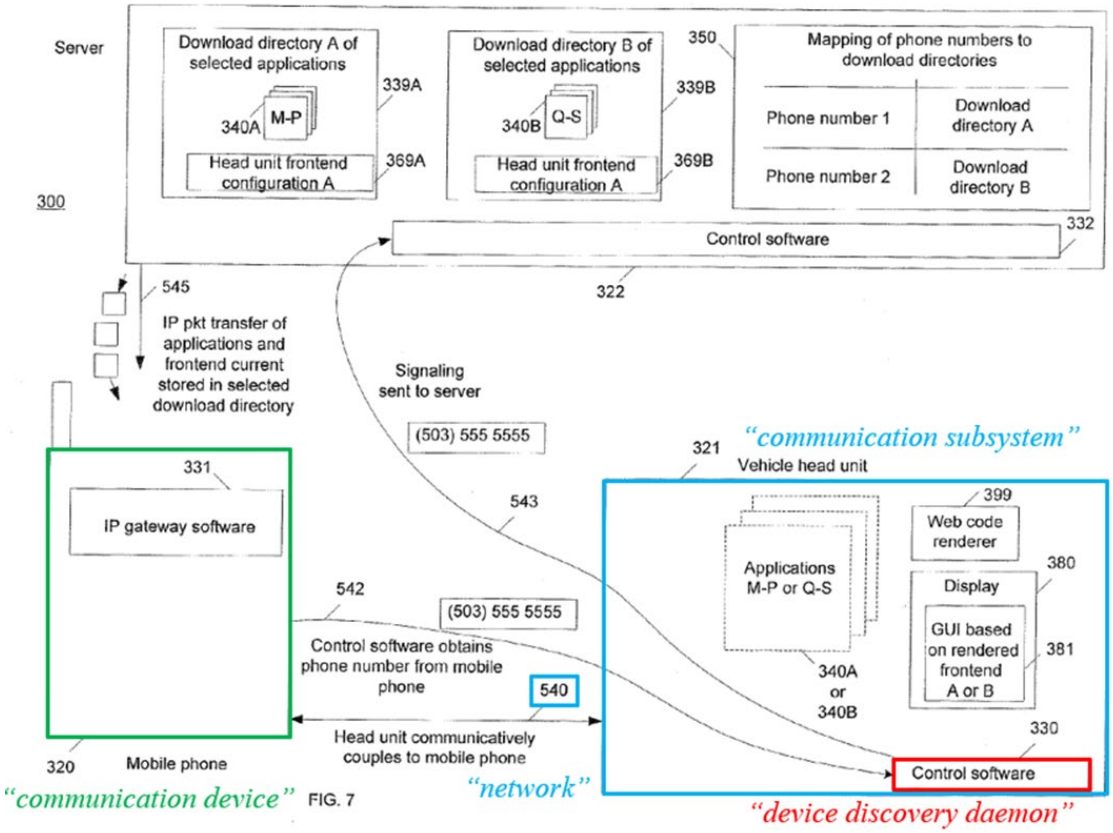
[12a] a microprocessor;

[6] Petitioner interprets the phrase "*a network and/or communication subsystem*" in claims 1 and 12 as "one or more" of a network and communication subsystem, in accordance with Patent Owner's position in the related litigation. *See* Ex.1006,6.

[12b] a network and/or communication subsystem of a vehicle;

[12c] a microprocessor executable device discovery daemon stored in a computer readable medium and configured to discover one or more communication devices connected wirelessly to the network and/or communication subsystem of a vehicle and,

Petitioner construes the term "*daemon*" as "computer program." (Ex.1003,¶¶83-85.) Moinzadeh discloses, with reference to Figure 7 below, that the system 300 includes a server 322, a mobile phone 320 ("*communication device*") and a vehicle head unit 321 ("*communication subsystem*") that communicate with each other and include software 330-332 that "enables a provider to select which applications can be installed on the head unit 321 and control distribution of the selected applications to the vehicle." (Ex.1013,[0066];Ex.1003,¶¶184-187,236-237.)

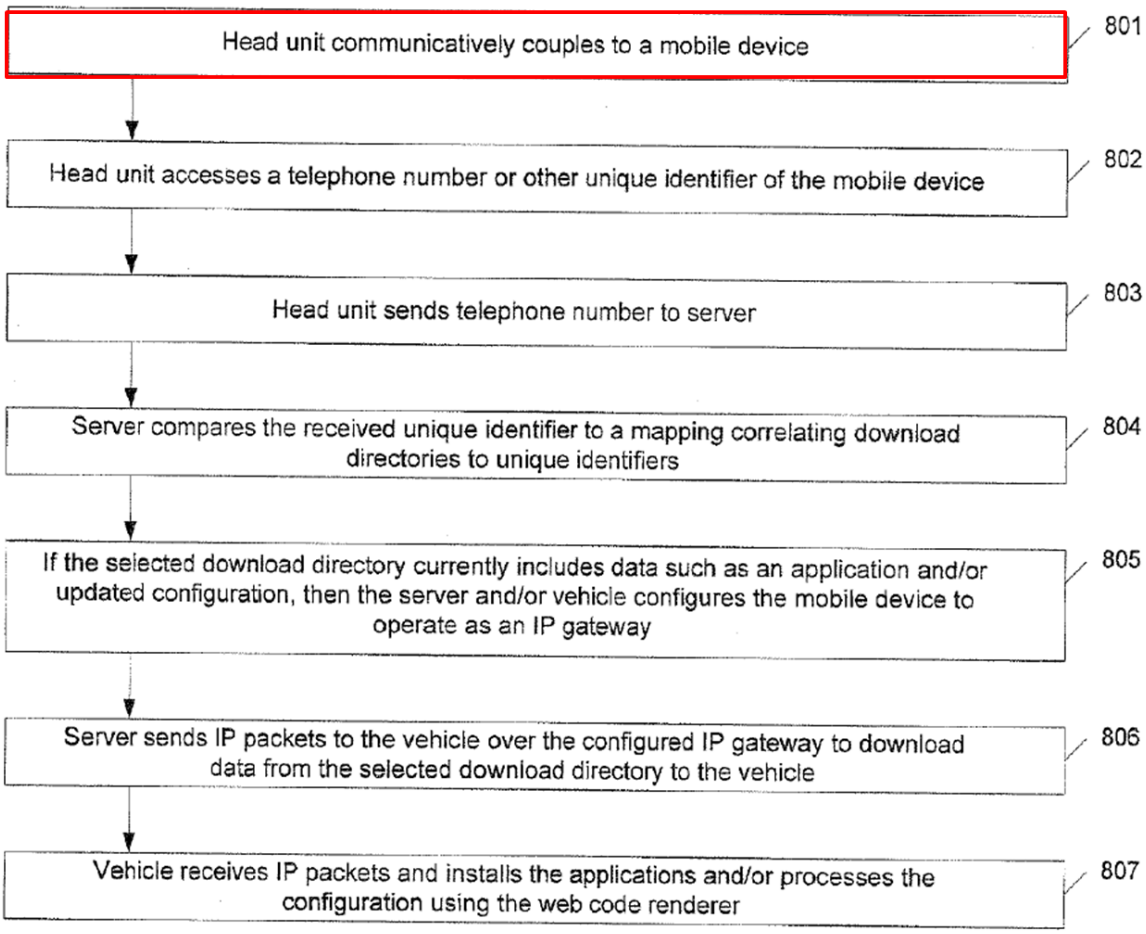


Ex.1013,Fig,7 (Annotated)

Moinzadeh discloses that its system(s) (e.g. system 300) includes hardware and associated software, which includes "one or more processors and software executable on those processors to carry out the operations described" and "various processors, embedded or otherwise, may be used in equipment such as the components described herein." (Ex.1013,[0092].) Moinzadeh further discloses that "memory associated with a given processor may be stored in the same physical device as the processor …for example, RAM or FLASH memory disposed within an integrated circuit microprocessor or the like." (Ex.1013,[0093].) Accordingly, Moinzadeh teaches that the vehicle head unit 321 may include various processors,

such as a microprocessor, for executing the control software 330 i.e., a "*microprocessor executable device discovery* [computer program]." (Ex.1003,¶¶188-191,236.)

With reference to Figure 8, block 801, Moinzadeh discloses that the vehicle head unit 321 ("*communication subsystem*") communicatively couples with the mobile phone 320 ("*communication device*") over wireless connection 540 ("*network*") "via Bluetooth pairing," "causing the head unit to power up and search for ["*discover*"] a Bluetooth device." (Ex.1013,[0069];Ex.1003,¶¶192,237.)



Ex.1013,Fig.8 (Annotated)

A POSA would have understood that Bluetooth was a very popular protocol at the time of the invention, for transmitting wireless signals to/from wireless devices. Bluetooth includes aspects of device discovery in which a computer program runs in the background to discover such wireless devices. (*See* Ex.1003,¶193;Ex.1063,7;Ex.1065,2,206.)

Accordingly, Moinzadeh discloses "*discovering, by a microprocessor executing a microprocessor executable* [computer program] [head unit 321 control

software 330 searching for a Bluetooth device], *one or more communication devices* [mobile phone 320] *connected wirelessly to a network* [connection 540] *and/or communication subsystem of a vehicle* [e.g., head unit 321]." (Ex.1003,¶¶194,238,242.)

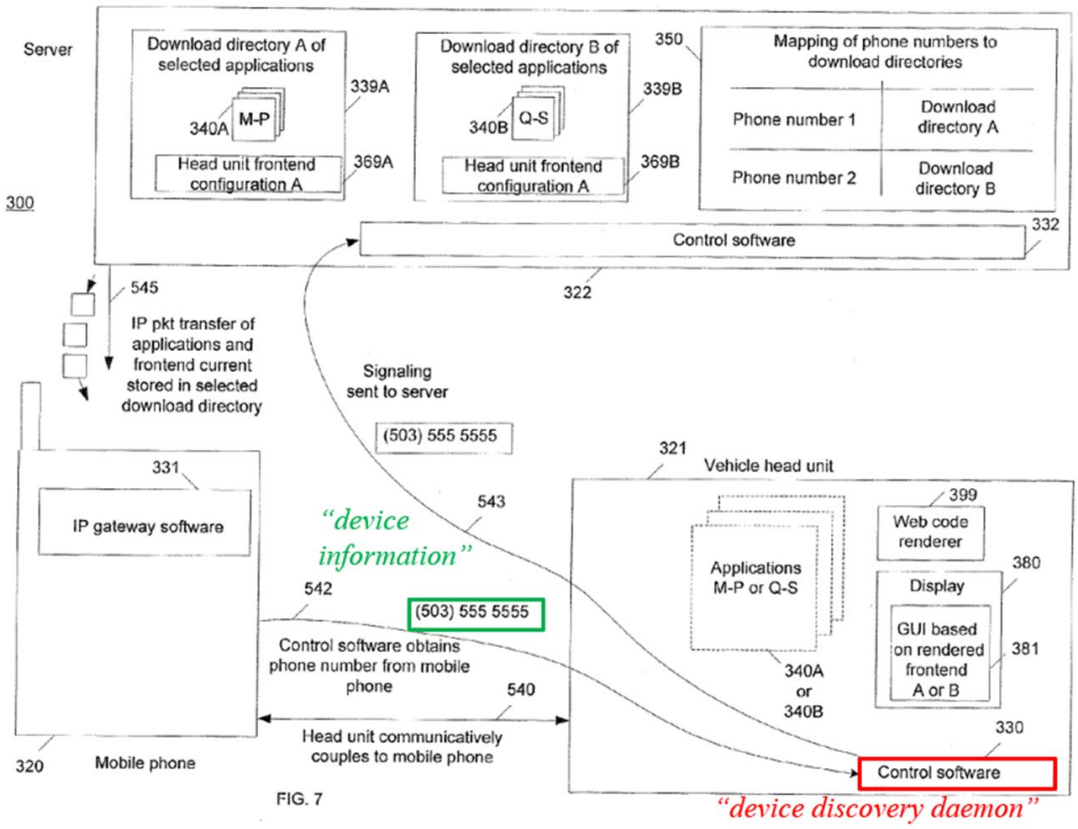
Regarding claim [12c], Moinzadeh further discloses that "computer programs generally comprise instructions that are stored in machine-readable or computer-readable storage media" and that "the present invention may include executable programs or instructions that are stored in…computer-readable storage media." (Ex.1013,[0092];Ex.1003,¶¶238-242.)

[1b]/[12d] for each of the discovered one or more communication devices, populat[ing, by the microprocessor executing the device discovery daemon,] system data with device information and capabilities; and

Moinzadeh discloses that "the communicative connection" between the head unit 321 and the mobile phone 320 can be "established via Bluetooth pairing" or by "using a USB connection." (Ex.1013,[0069].) Moinzadeh further discloses that after establishing the connection, the head unit "control software 330 accesses a telephone number ["*device information*"] of the mobile phone 320" "using Bluetooth signaling" 542. (Ex.1013,[0070];Ex.1003,¶¶195-196,238.)

Moinzadeh further discloses that the mobile phone 320 "operate[s] as an IP

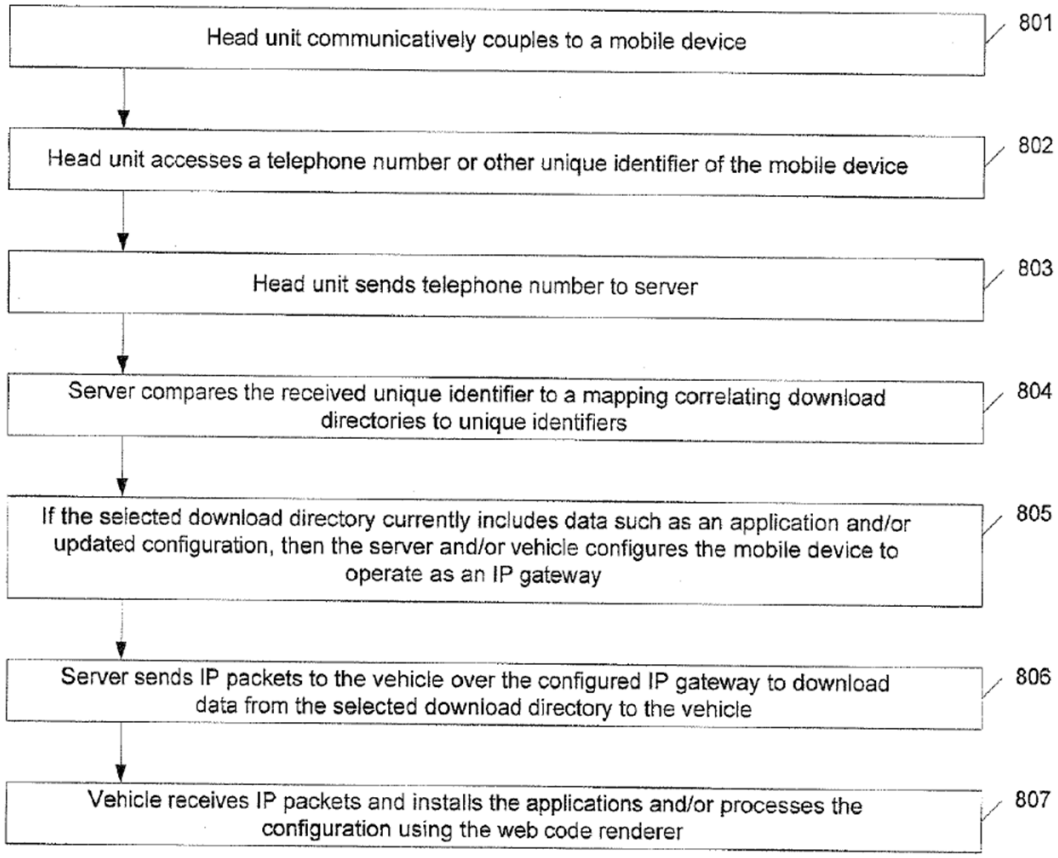
gateway for forwarding applications to the head unit 321" in response to "signaling" "from the control software 330 on the head unit 321 after the connection 540 is established. (Ex.1013,[0075].) A POSA would have understood that communication ability, e.g., wired communication via USB and wireless communication via Bluetooth and cellular network technologies (e.g., 3G, 4G, and LTE) that are available through the mobile phone acting as an IP Gateway, and information regarding the installed software applications, are examples of the "*capabilities*" of the mobile phone 320. (Ex.1003,¶¶197,238.)



Ex.1013,Fig.7 (Annotated)

With reference to Figure 8, Moinzadeh discloses that when the vehicle is

powered up, the head unit control software 330 couples with the mobile device e.g., using Bluetooth (Block 801); accesses a phone number ("*device information*") of the mobile device (Block 802); and provides the phone number to the server (Block 803). (Ex.1013,[0069]-[0071].) Then the server selects a directory associated with the phone number (Block 804). (Ex.1013,[0072];Ex.1003,¶¶195-197,238.) In Block 805 the control software 330 signals the mobile phone 320 to act as an IP gateway to forward the IP Packets including the applications to the head unit 321, which are sent and installed at the head unit. (Blocks 806-807). (Ex.1013,[0073]-[0077];Ex.1003,¶¶197-205,238-240.)



Ex.1013,Fig.8 (Annotated)

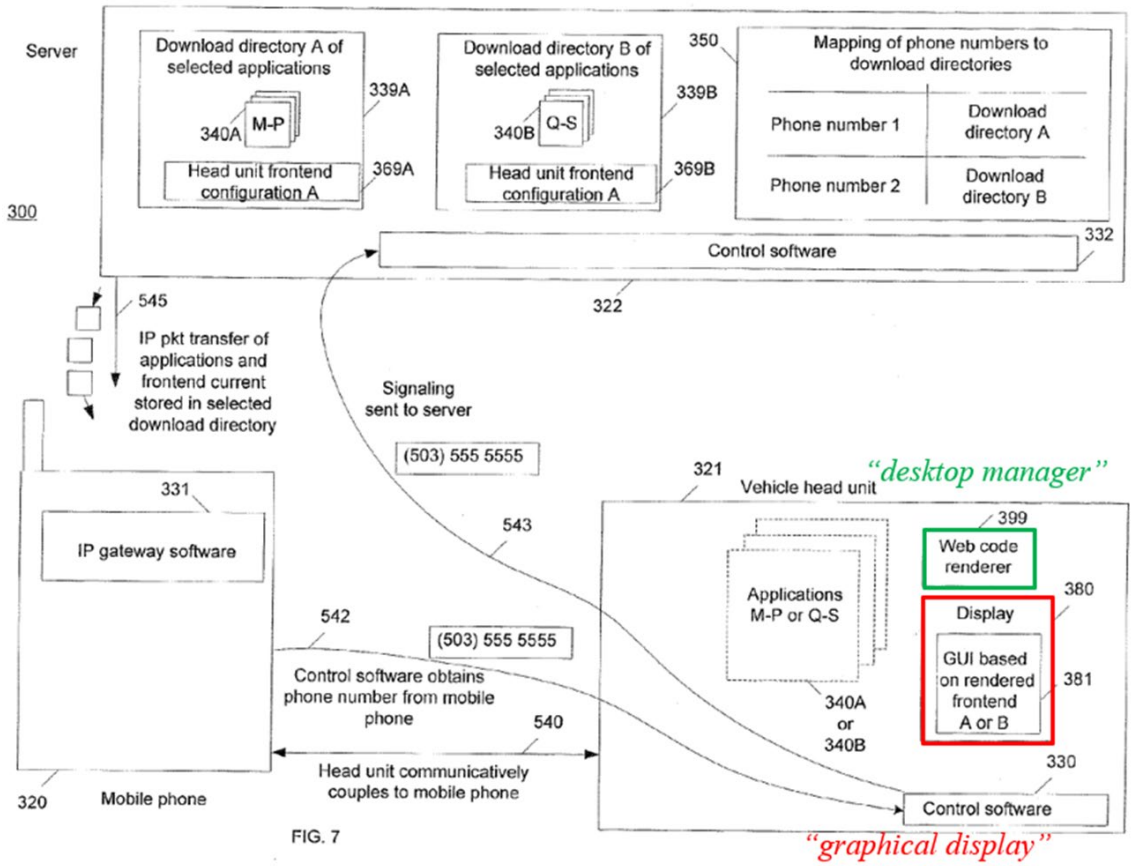
A POSA would have understood that by receiving the phone number ("*device information*") and communication "*capabilities*" of the mobile device; and then receiving IP packets 545 and installing the applications on the head unit 321, the head unit software 330 ("*device discovery* [computer program]") "*populat[es]*" the system data with the "*device information and capabilities.*" (Ex.1003,¶¶202-205,241-242.)

[1c] refreshing, by the microprocessor executing a microprocessor executable desktop manager, . . .

[12e] a microprocessor executable desktop manager stored in the computer readable medium and configured to refresh . . .

. . . graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.

Moinzadeh discloses that the head unit 321 includes a web code renderer 399 ("*desktop manager*") and a display 380 ("*graphical display*") that displays a "graphical user interface" (GUI). (Ex.1013,[0074],Fig.7;Ex.1003,¶¶206-207,243-244.)



Ex.1013,Fig.7 (Annotated)

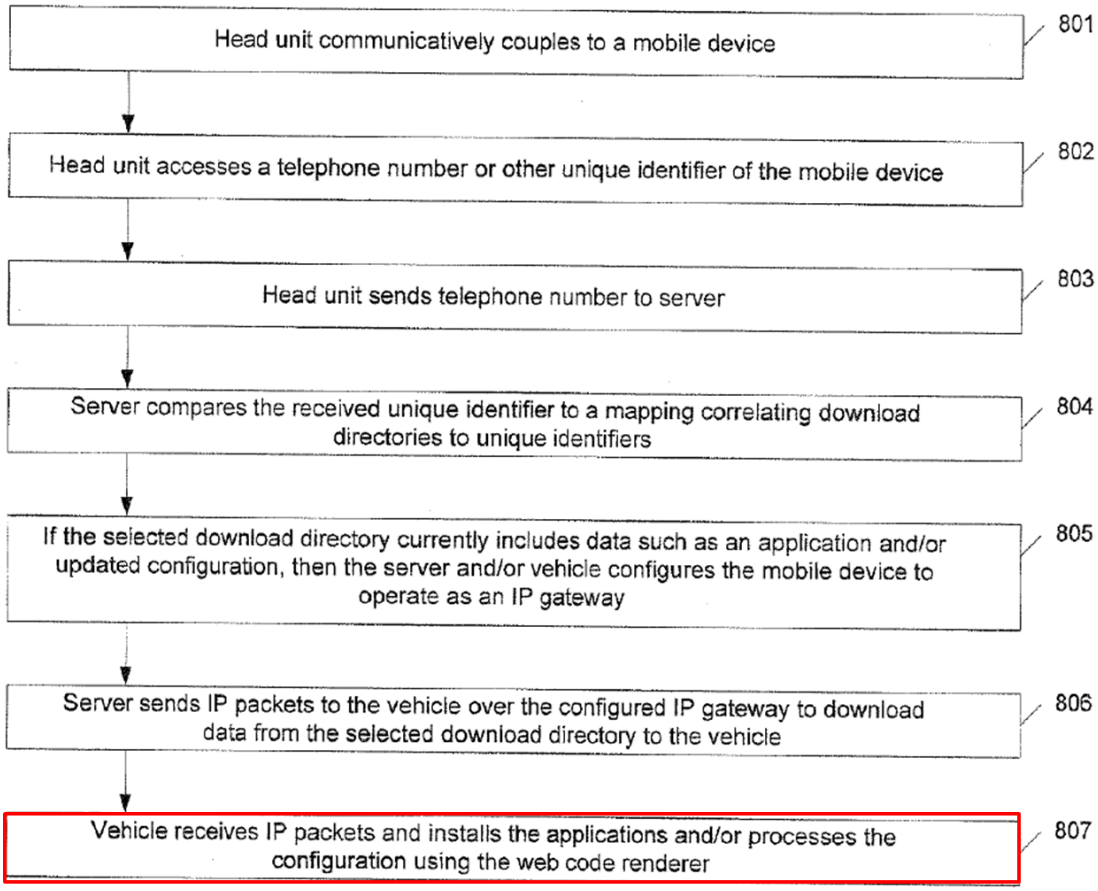
Moinzadeh discloses that "[d]epending on which one of the head unit frontend

configurations A-B is downloaded to the head unit 321, a display 380 of the head unit 321 will display a different graphical user interface," "[f]or example, each graphical user interface could have its own user customized settings such as a particular wallpaper selected by a user." (Ex.1013,[0074].) Moinzadeh further discloses that "[o]ther customizations can include customized graphical interface buttons, customized graphical user interface layout, custom images, etc." ("*graphical elements*"). (Ex.1013,[0087];Ex.1003,¶¶207,243-244.)

Moinzadeh discloses that "[t]he configurations A-B can be stored as HTML code or other web code processable by the web code renderer of the 399." (Ex.1013,[0074].) Moinzadeh further discloses that its system includes hardware and associated software, which includes "various processors" e.g., a "microprocessor" and that "the present invention may include executable programs or instructions that are stored in…computer-readable storage media[.]" (Ex.1013,[0092]-[0093].) A POSA would have understood that for the web code renderer 399 to process stored HTML code, this instruction requires execution by the microprocessor and storage in memory on the head unit 321. (Ex.1003,¶¶208-210.) Accordingly, Moinzadeh teaches that the vehicle head unit 321 includes a "*microprocessor*" for executing the web code renderer 399 software ("*desktop manager*") (Ex.1003,¶¶211,243-244.)

Moinzadeh discloses with reference to Figure 8 that "[t]he software 330 also

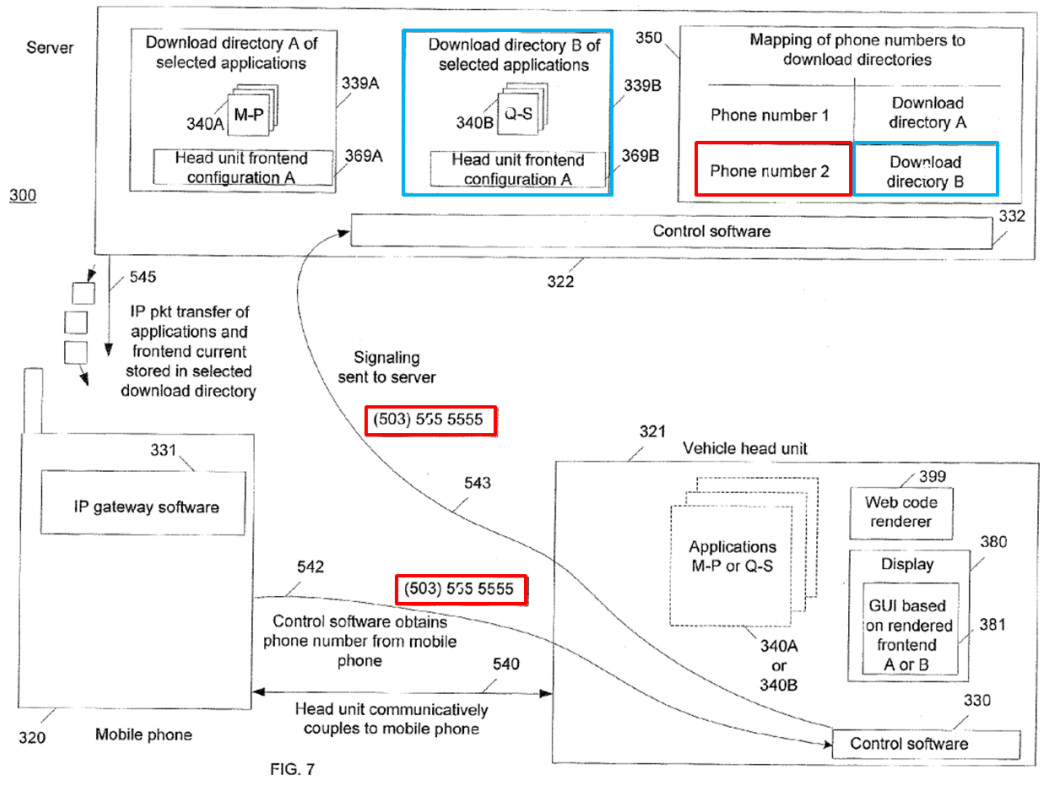
processes the configuration from the IP packets 545 using the web code renderer 399 ["*desktop manager*"] to generate a particular graphical user interface based on the detected phone number." (Ex.1013,[0077];Ex.1003,¶¶212,243-244.)



Ex.1013,Fig.8 (Annotated)

Moinzadeh discloses that the head unit 321 initiates Bluetooth pairing in response to multiple circumstances, including "re-pairing after another Bluetooth device is disconnected from the head unit 321[.]" (Ex.1013,[0069].) A POSA would have understood that after the head unit control software 330 detects that a first device disconnected, and initiates re-pairing to discover a second device with "Phone

number 2" (annotated in red below), that is different from the first device with "Phone number 1", and receives a directory (Directory B, annotated in blue below) that is different than a prior directory, the web code renderer 399 updates, or "*refresh[es]*" the display 380 corresponding to the second device's preferences according to the frontend configuration 369B[7]. (Ex.1003,¶¶213-214.)



Ex.1013,Fig.7 (Annotated)

Thus, Moinzadeh discloses "*refreshing, by the microprocessor executing a*

[7] Element 369B is mislabeled as "Head unit frontend configuration A" instead of "Head unit frontend configuration B" in Fig. 7.

microprocessor executable desktop manager [web code renderer 399]*, graphical elements* [e.g. wallpaper, buttons, etc.] *of a graphical display* [display 380] *of the vehicle to reflect the discovered one or more communication devices.*" (Ex.1003,¶¶215,243-244.)

2. Dependent Claims 2-3, 11, and 13-14

[2] The method of claim 1,

[13] The vehicle of claim 12,

… ***wherein the device discovery daemon pings the network and/or communication subsystem when a predetermined event occurs, the predetermined event being one or more starting the vehicle and a vehicle door opens or closes.***

Moinzadeh discloses that "the connection 540…of the head unit 321 and the mobile phone 320" "is established via Bluetooth pairing" which involves the head unit "search[ing] for a Bluetooth device[.]" (Ex.1013,[0069].) Moinzadeh further discloses that "[t]he Bluetooth pairing can be in response to the vehicle being powered up (causing the head unit to power up and search for a Bluetooth device)." (Ex.1013,[0069];Ex.1003,¶¶216-218,234-247.)

A POSA would have understood that Moinzadeh's disclosure of the head unit 321 establishing a connection 540 "via Bluetooth pairing" and searching for a Bluetooth device "in response to the vehicle being powered up" (Moinzadeh, Ex.1013,[0069]) indicates that the head unit control software 330 ("*device discovery*

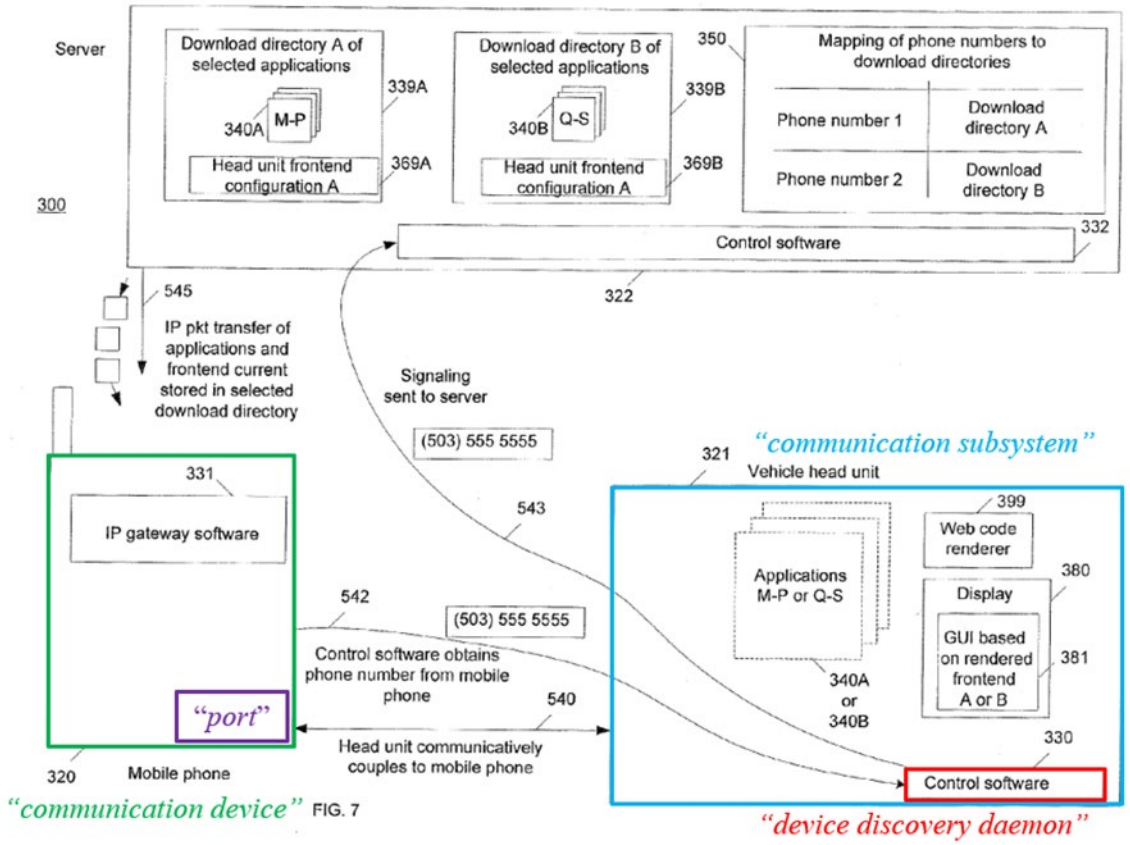
[computer program]") "*pings*" the vehicle head unit 321 ("*communication subsystem*") to emit a signal over the wireless "*network*" connection 540 to initiate device discovery in response to "*starting the vehicle*." (Ex.1003,¶¶219-221,234-247.)

[3] The method of claim 1,

[14] The vehicle of claim 12,

… ***wherein the device discovery daemon determines capabilities of the one or more communication devices based on which open port the one or more communication devices exposes to the device discovery daemon.***

Moinzadeh discloses that "the head unit 321 communicatively couples to a mobile device such as mobile phone 320" "via Bluetooth pairing", WiFi, or by "using a USB connection." (Ex.1013,[0069],[0037].) Moinzadeh further discloses that the mobile phone 320 "operate[s] as an IP gateway for forwarding applications to the head unit 321." (Ex.1013,[0075].) A POSA would have understood that the mobile device includes one or more "*port[s]*" or communication interface points (annotated in purple below) that "*expose[]*" as "*open*" to facilitate communication with the head unit 321 over communication channel or connection 540. (Ex.1003,¶¶222-225,233-242,248-250.)



Ex.1013,Fig.7 (Annotated)

A POSA would have understood that by connecting to the head unit 321 with a Bluetooth, Wi-Fi, or USB connection, the "*communication device[]*" is "*expos[ing]*" its communication capabilities to the vehicle head unit to initiate discovery of the phone number of the "*communication device[]*" and the control software 330 would have distinguished the data based on the port and format of data received and utilize the corresponding drivers and protocol handlers to convert the data. (Ex.1003,¶¶225-228, 92-98,233-242,249-250; Ex.1066,1-3,3-12,4-2,8-25,9-6-8;Ex.1067, 272,373,393,395-396,1024.)

[11] A non-transitory and tangible computer readable medium

comprising processor executable instructions that, when executed, perform the steps of claim 1.

Moinzadeh discloses that its systems (e.g. system 300) include at least one processor and memory and that the "memory associated with a given processor may be stored in the same physical device as the processor ('on-board' memory); for example, RAM or FLASH memory[.]…" Moinzadeh further discloses that "[a]ll such memories are 'machine readable' or 'computer-readable' and may be used to store executable instructions for implementing the functions described herein." (Ex.1013,[0093].) A POSA would have understood that Moinzadeh's computer readable memory is also non-transitory because a "non-transitory medium is a physical object where data can be stored, like a hard drive, Random Access Memory (RAM), Read-Only Memory (ROM), CD-ROM storage, or memory card." (Ex.1003,¶¶216-217,229-232.)

B. Ground 2: Dependent Claims 4-5, 7-10, 15-16, and 18-21 are Unpatentable as Obvious over Moinzadeh and Clement

1. Rationale to Combine

It would have been obvious to a POSA at the time of the alleged invention to combine the vehicle system disclosed in Moinzadeh, with the known technique of location-based vehicle function permission management disclosed in Clement to provide additional functionality e.g., to improve safety and security. A POSA would have understood that Moinzadeh and Clement are complementary technologies that

are combinable, e.g., "the invention may be modified in arrangement and detail without departing from such principles." (Ex.1013,[0095];Ex.1003,¶¶251,258.)

Moinzadeh and Clement are from the same field – communication between a vehicle system and one or more electronic devices. (Ex.1013,[0008],[0066];Ex.1010,4:42-46,7:8-11.) Moinzadeh discloses a system that permits access to vehicle applications on fixed electronic devices in the vehicle based on multiple factors, including the location of fixed electronic devices. (Ex.1013,[0026].) However, Moinzadeh does not expressly disclose regulating user access to vehicle applications based on the location of a portable device. (Ex.1003,¶¶252-254.)

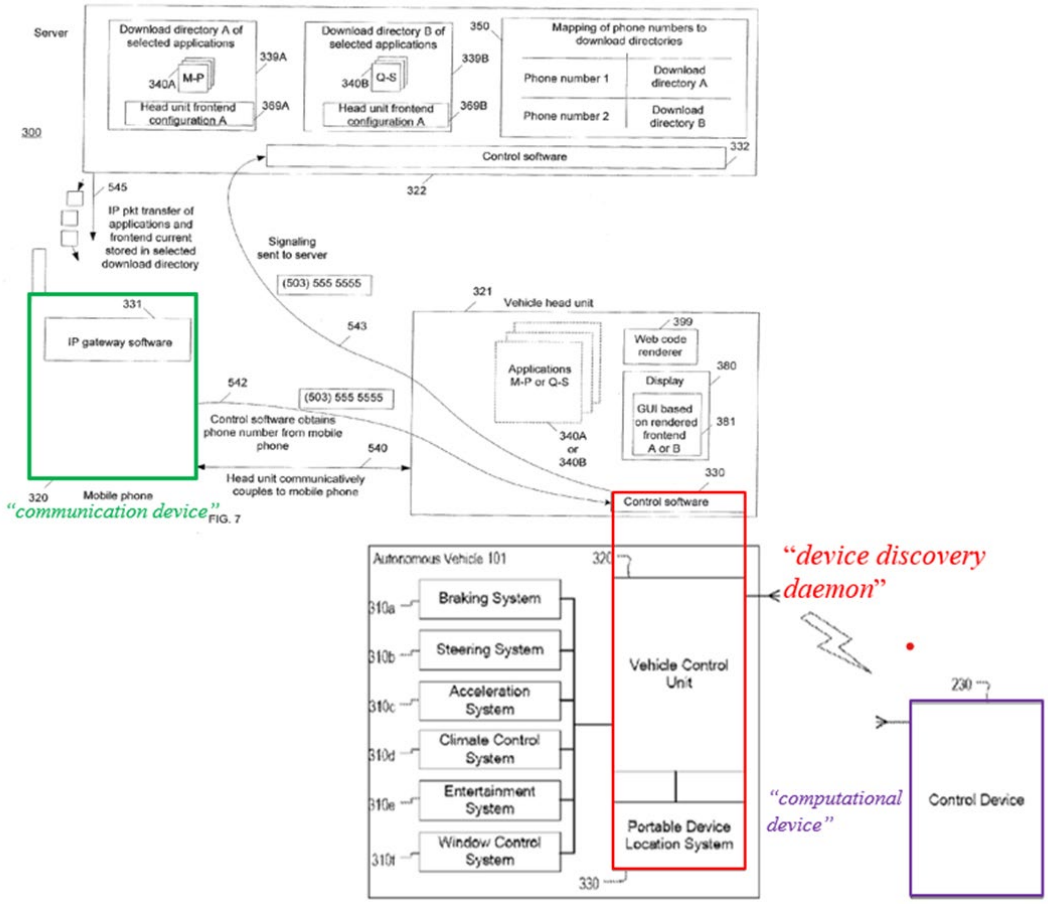
Clement discloses a permission management system with a vehicle control unit 320 that can identify a "current location of the portable control device [230] within a passenger compartment of the vehicle, and depending on the current location of the portable control device [230]," permit certain vehicle functions. (Ex.1010,1:42-51;*see also*,7:40-50,10:55-67,Fig.8;Ex.1003,¶¶255-257.) Clement explains that its location-based permission management technique ("is important with respect to ensuring the safety of the vehicle." (Ex.1010,5:6-17;Ex.1003¶255.)

A POSA at the time of the alleged invention would have been motivated to combine the vehicle system disclosed in Moinzadeh with the location-based permission management techniques disclosed in Clement to yield predictable

results, e.g., to expand the functionality of Moinzadeh's system to also control vehicle system functionality, by being able to determine the specific location of a portable/mobile device and restrict access to vehicle systems based on that location. (Ex.1003,¶258.)

A POSA would have understood how to combine Moinzadeh and Clement with a reasonable expectation of success. This modification would have been a simple combination of known elements in the prior art, e.g., Clement's vehicle control unit 320, location system 330, and corresponding software for detecting the location of a portable electronic device within a vehicle and limiting access to vehicle system functionality based on the location of the portable electronic device. (Ex.1003,¶259.)

As illustrated in the figure below, a POSA would have understood that due to the complementary nature of the systems, Moinzadeh's head unit 321 and Clement's vehicle control unit 320 could have been combined to share hardware and software. (Ex.1003,¶¶260-266.)



Ex.1013,Fig.7 (Annotated);Ex.1010,Fig.3 (Annotated)

Regarding software, both Moinzadeh and Clement disclose strategies for discovering and pairing electronic devices. A POSA would have known how to modify Moinzadeh's vehicle system to include the associated software needed to operate Clement's vehicle control unit 320 and the location system 330, to enable determining the position of a mobile device within the vehicle, e.g., based on signal strength and/or triangulation. (Ex.1010,7:23-32;Ex.1003,¶¶267-268.)

2. Dependent Claims 4-10 and 15-21

[4a] The method of claim 1, further comprising: determining, by the

microprocessor executable device discovery daemon,

[15a] The vehicle of claim 12, wherein the device discovery daemon is further configured to: determine

… ***that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle[8];***

Petitioner construes the term "*daemon*" as "computer program." As explained for claims [1a]/[12c], Moinzadeh discloses that the control software 330 of the head unit 321 searches for a Bluetooth device to establish a connection with the mobile device 320 ("*communication device*"). (Ex.1013,[0069].) Further, Clement discloses that its vehicle control unit 320 software performs a similar device discovery procedure, allowing the combined Moinzadeh/Clement system to also discover Clement's control device 230 ("*computational device*"). (Ex.1003,¶¶269-275,378-380.)

Clement discloses a vehicle 101 that includes "a vehicle control unit 320, and a portable device location system 330." (Ex.1010,6:27-30.) Clement discloses that the vehicle control unit 320 and the location system 330 "may be (completely or partially) integrated together." (Ex.1010,7:32-36;Ex.1003,¶¶276-277,379-380.)

[8] Petitioner interprets "*a network…of a vehicle*" as "*<u>the</u> network…of <u>the</u> vehicle*" for antecedent basis.

The "[v]ehicle control unit 320 may also be operatively connected to one or more of the vehicle systems 310*a-f* and it may be operable to change the state of any one of these systems." (Ex.1010,6:63-66.) A POSA would have understood that the vehicle control unit 320 and the vehicle systems 310*a-f* would have been connected to each other over a wired connection to facilitate the vehicle control unit 320 controlling, or changing the state of, the vehicle systems 310*a-f*. As illustrated in the image below, the wireless and wired connections collectively provide a "*network*" to enable the control device 230 to control vehicle system functionality through the vehicle control unit 320. (Ex.1003,¶278,379-380.)

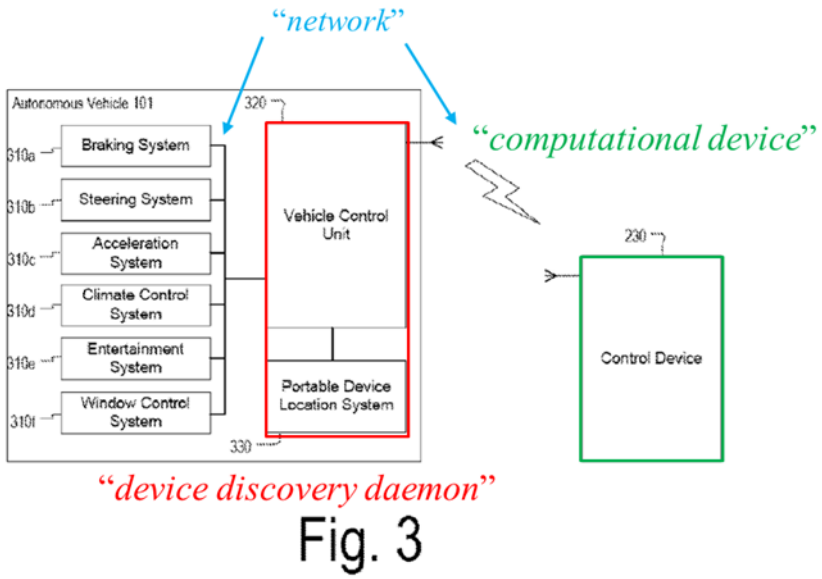


Fig. 3

Ex.1010,Fig.3 (Annotated)

Clement discloses that "the vehicle control unit 320 may include a processor 410 and memory 420" that "may store information accessible by processor 410,

including executable code 440 that may be executed by the processor 410." (Ex.1010,7:51-57.) Clement further discloses that "the executable code 440 may include a location-based permissions module 442 that is configured to enforce location-based restriction policies." (Ex.1010,8:13-17,Figs.4,8;Ex.1003,¶¶279-280,379-380.)

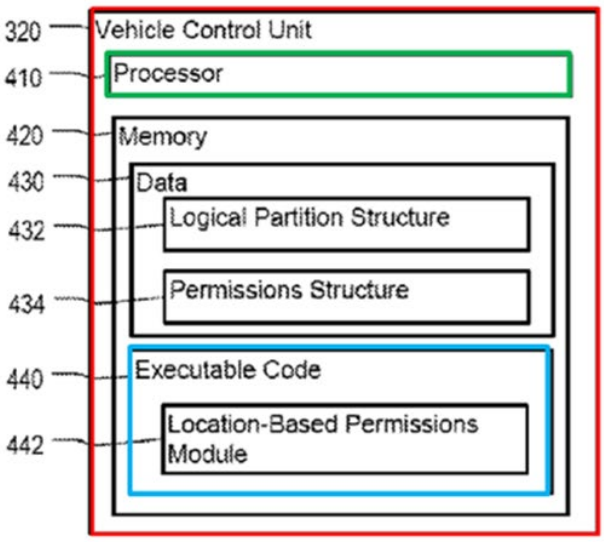


Fig. 4

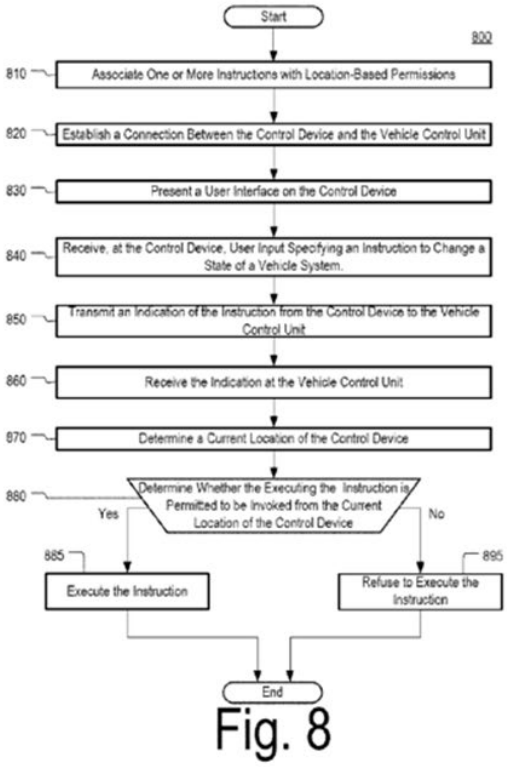


Fig. 8

Ex.1010,Figs.4,8 (Annotated)

The vehicle control unit 320 controls the vehicle using the process illustrated in Figure 8. (Ex.1010,4:27-29.) At task 820, Clement discloses that the vehicle control unit 320 establishes "a connection between the control device 230 and the vehicle control unit 320" utilizing "any communications protocol" such as

"Bluetooth." (Ex.1010,9:45-50,Fig.8;Ex.1003,¶¶281-282,379-380.)

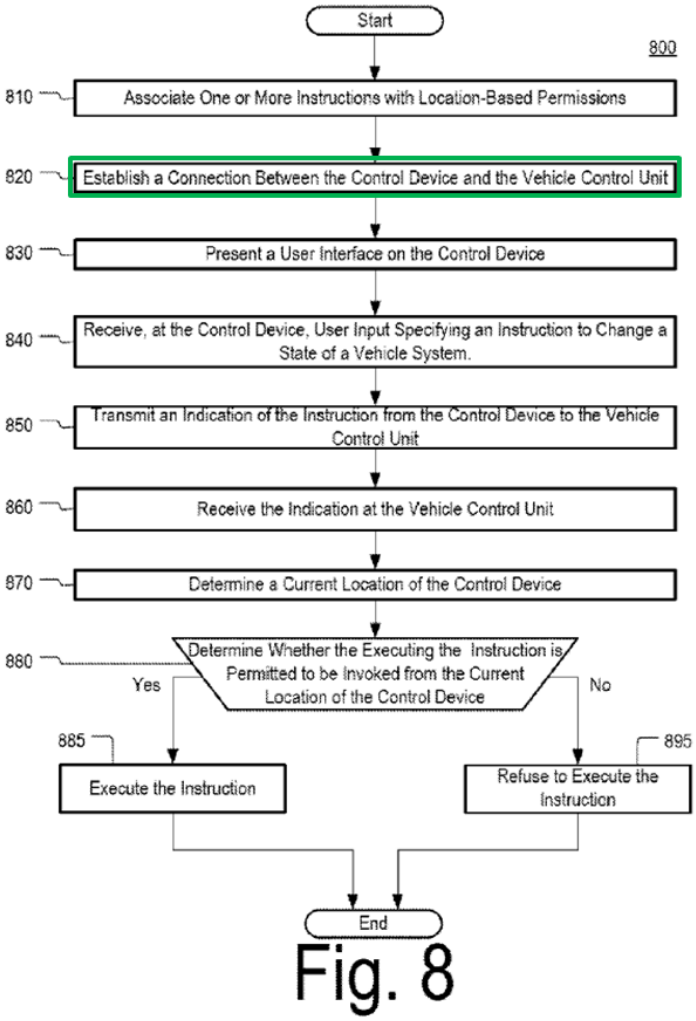


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement discloses that the vehicle control unit 320 communicates with the control device 230 ("*computational device*") and that "it may be operable to receive instructions from the control device 230 to change the state of one or more of the vehicle systems 310*a-f*." (Ex.1010,7:8-11,Fig.3;Ex.1003,¶¶283,379-380.)

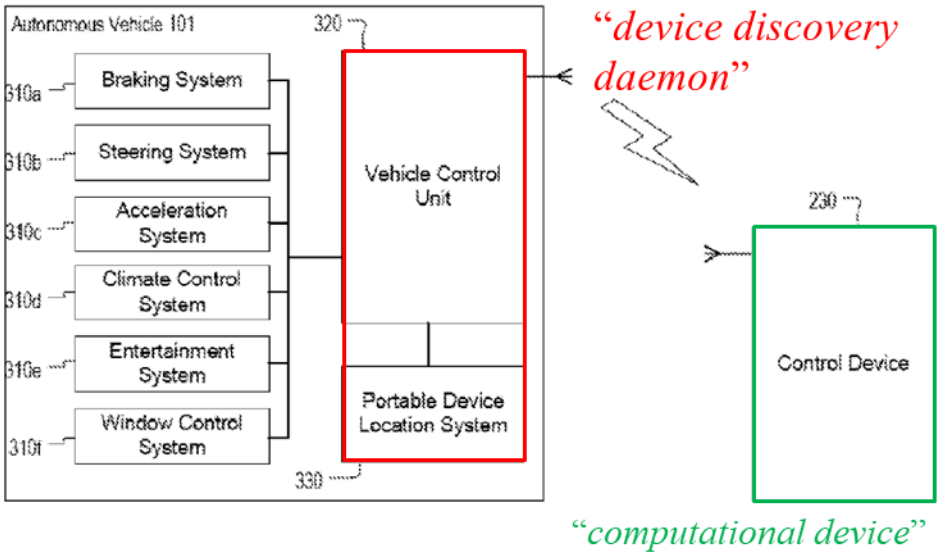


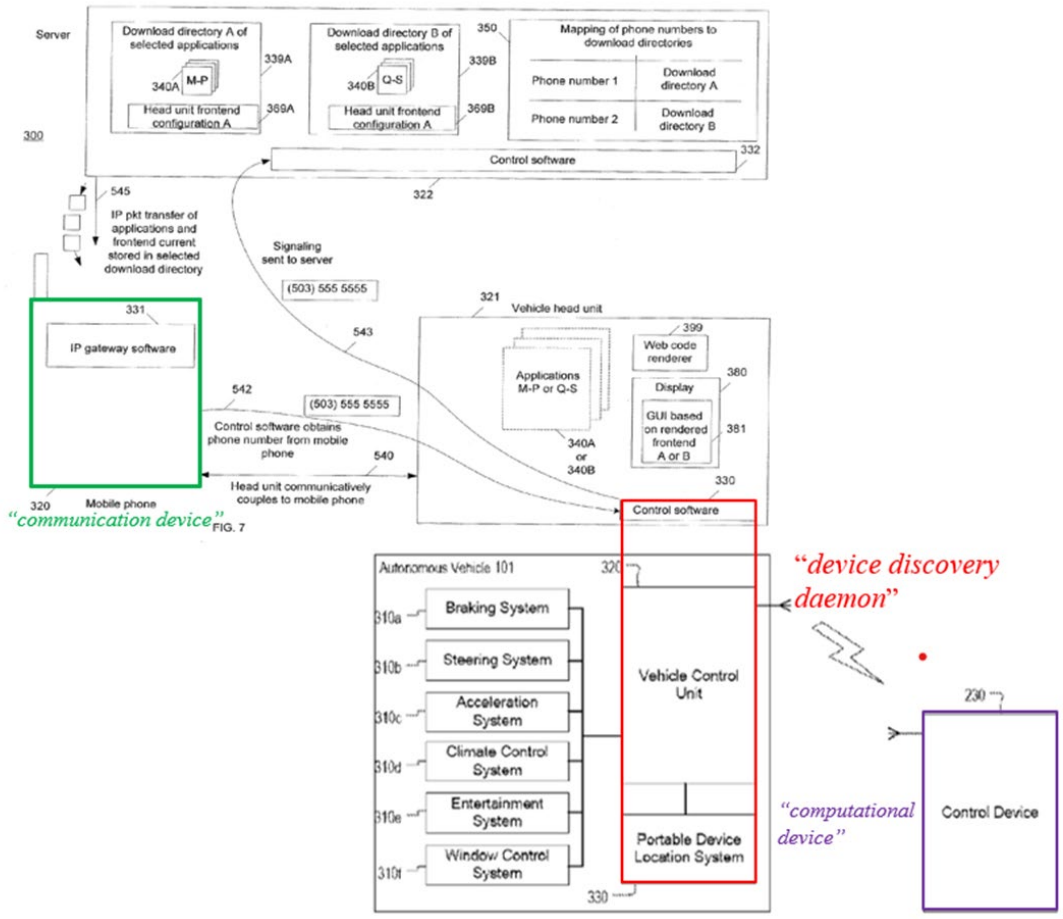
Fig. 3

Ex.1010,Fig.3 (Annotated)

A POSA would have understood that Clement's disclosure of the vehicle control unit 320 "chang[ing] the state of one or more of the vehicle systems 310*a-f*" and the lines connecting the corresponding boxes in Figure 3, indicates that vehicle control unit 320 communicates with the vehicle systems 310*a-f* over a vehicle network ("*network*"). (Ex.1010,7:8-11;Ex.1003,¶¶284,379-380.) A POSA would have further understood that by establishing a connection with, and receiving instructions from, the control device 230, the vehicle control unit 320 "*determines*" that the control device 230 is connected to the vehicle network. (Ex.1003,¶¶284,379-380.)

Moinzadeh's control software 330, combined with Clement's executable code

440, including the location-based permissions module 442, of the vehicle control unit 320 combined with the portable device location system 330, collectively provide a "*microprocessor executable device discovery* [computer program]." (Ex.1003,¶¶281,285,379-380.)

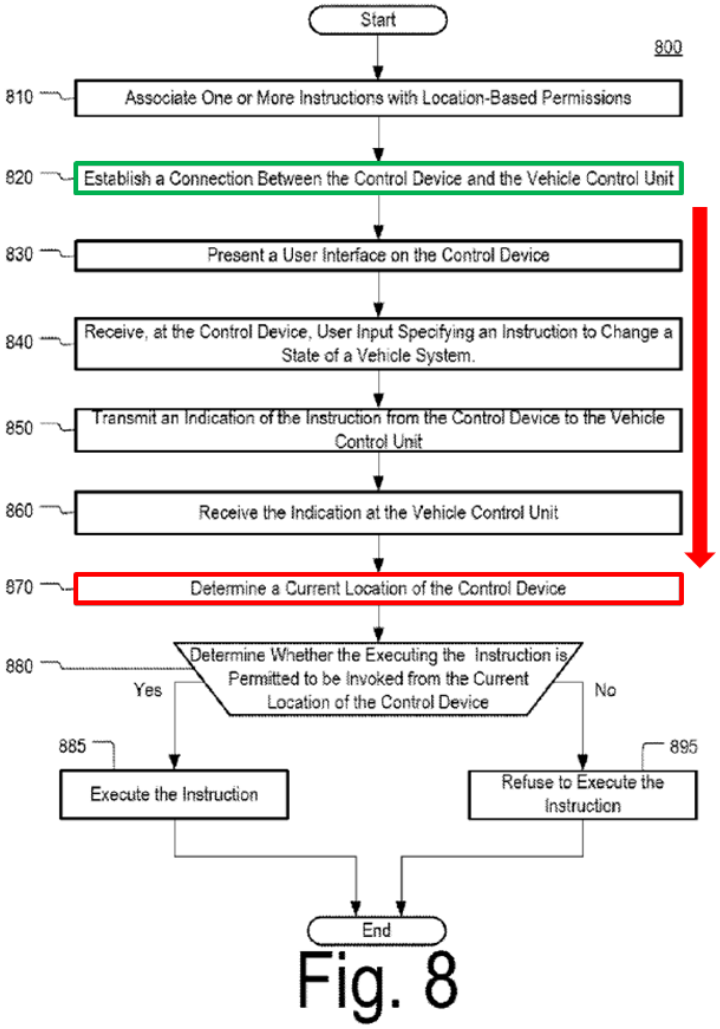


Ex.1013,Fig.7 (Annotated);Ex.1010,Fig.3 (Annotated)

[4b]/[15b] in response, determin[ing, by the device discovery daemon,]

… ***whether the computational device is located within a predetermined area and/or zone of the vehicle; and***

Clement discloses that after establishing a connection at task 820 (annotated in green below), "the vehicle control unit 320 determines the current location of the control device 230" "[a]t task 870" (annotated in red below). (Ex.1010,10:37-45;Ex.1003,¶¶286,378-380.)



Ex.1010,Fig.8 (Annotated)

Clement further discloses that the location of the control device 230 refers to the specific ("*predetermined*") region (e.g., Regions 1-4) of the vehicle that the

control device 230 is located in, e.g., "the module 432 may determine the current location of the control device 230 in the passenger compartment 210 and execute the instruction only if the control device 230 is located in a region of the passenger compartment 210 where the instruction is permitted to be invoked from." (Ex.1010, 8:14-24;Ex.1003,¶¶287-290,379-380.)

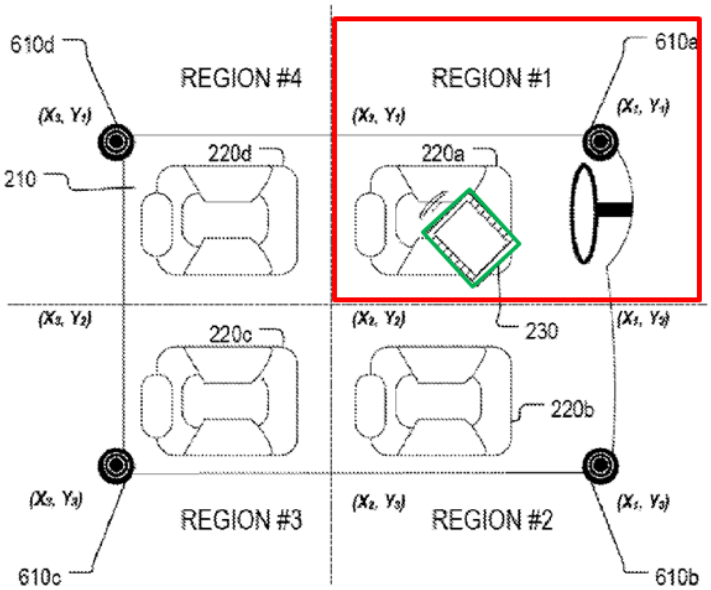


Fig. 6

Ex.1010,Fig.6 (Annotated)

[4c]/[15c] apply[ing, by the device discovery daemon,] at least the following rules:

… ***(C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem; and***

Petitioner construes the term "*access or attempt to access the vehicle network*

and/or communication subsystem" as "*access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem*[.]" (Ex.1003,¶¶86-89,291-292.)

Clement discloses that the vehicle control unit 320 makes a "determin[ation]" whether an instruction is "permitted" at task 880, which a POSA would have understood to be applying rules (Ex.1003,¶293):

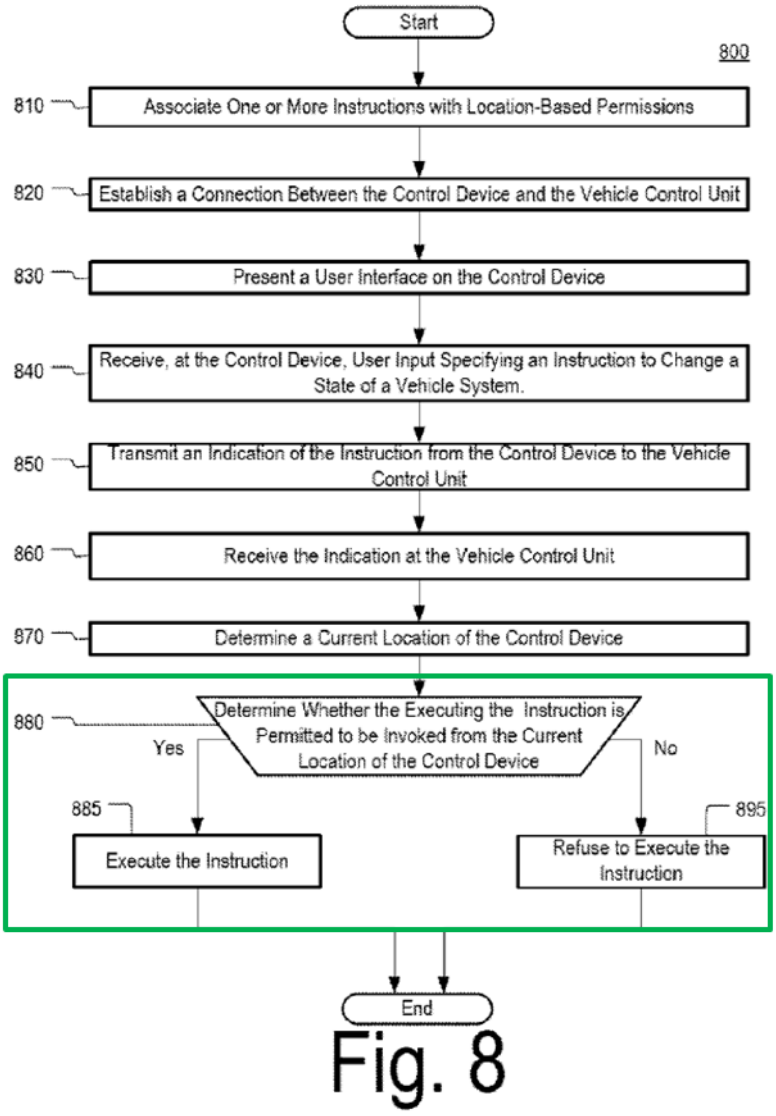


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement further discloses that the "vehicle control unit 320 may use the location system 330 to enforce location-based permissions on instructions received from the control device 230." (Ex.1010,7:40-50.) Clement discloses that "[a]t task 880, the vehicle control unit 320 determines whether the instruction is permitted to be invoked from the current location of the control device 230" and if so "task 885

is executed" i.e., the vehicle control unit 320 "Execute[s] the Instruction." (Ex.1010,10:55-67;Ex.1003,¶¶294-295.)

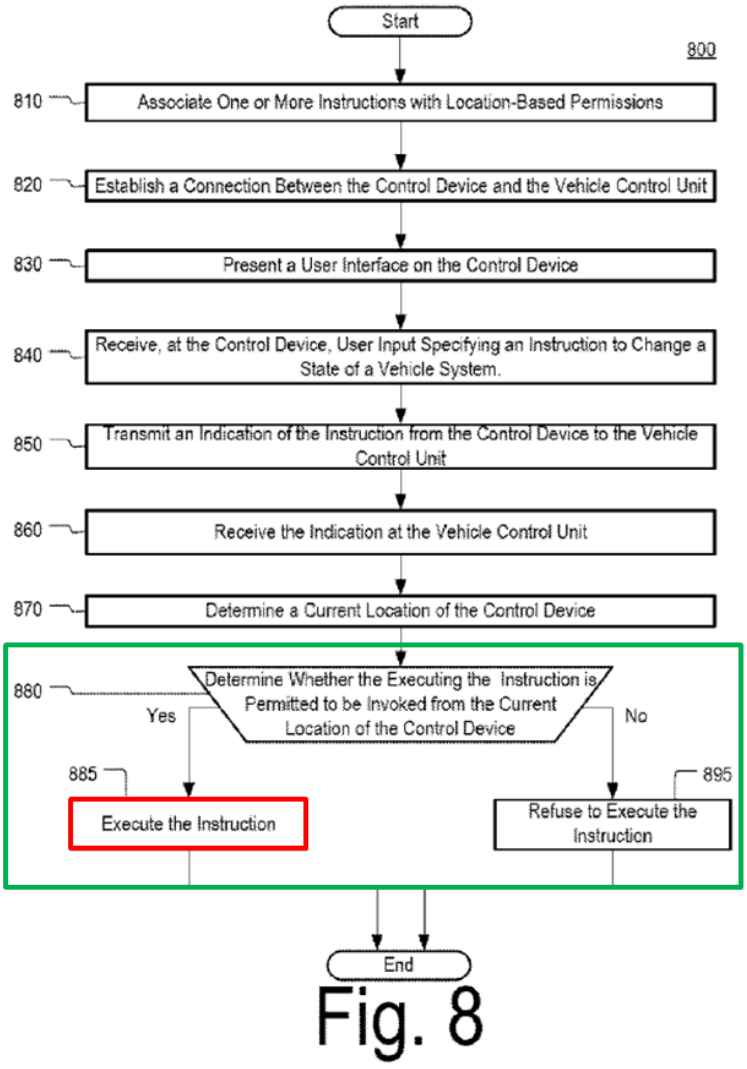


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement discloses an example of such an executed task, e.g., "some instructions, such as steering the vehicle 101, may be invoked only when the control device 230 is located in the area of the driver seat 220*a*." (Ex.1010,7:42-45.) A POSA would have understood that the control device 230 accesses the vehicle

network, through the vehicle control unit 320, to control the steering system 310*b*. (Ex.1003,¶¶294-296,378-380.)

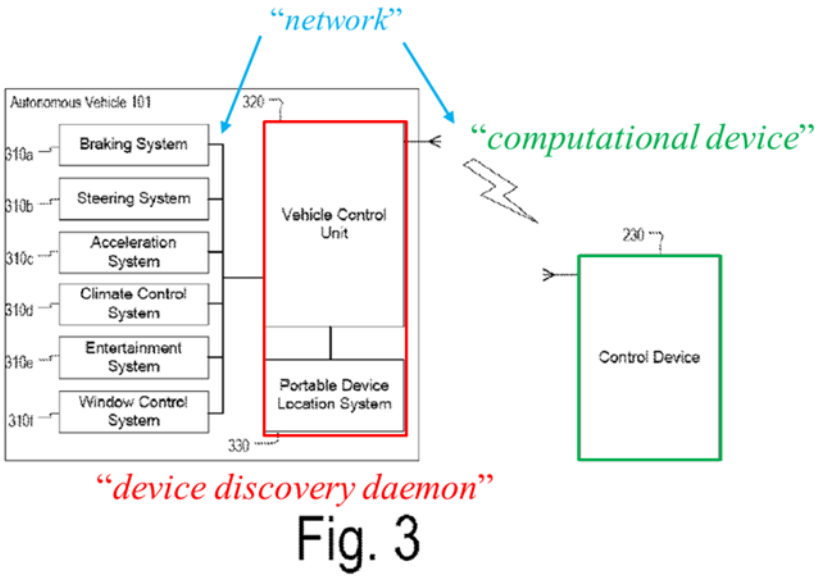


Fig. 3

Ex.1010,Fig.3 (Annotated)

Clement also discloses that the user interface of the control device 230 displays "buttons" 910*a-j* (mislabeled as 900*a-j* in the figures) that allow the user to control different aspects or features, e.g., "clicking on the button 910*a* may lead users to a menu that enables the steering, stopping, or acceleration of the vehicle 101." (Ex.1010,9:55-60;Ex.1003,¶¶297,379-380.)

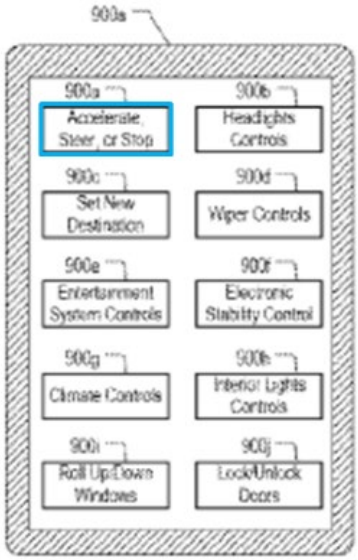


Fig. 9A

Ex.1010,Fig.9A (Annotated)

Clement also discloses varying the menu of available input components displayed on the user interface of control device 230 based on its location, e.g., "only if the control device 230 is located in region #1, the menu 900A may be displayed" which "may include input components…for safety-critical aspects of the operation of the vehicle 101, such as accelerating, steering, and braking[.]" (Ex.1010,10:14-26;Ex.1003,¶¶298-299,379-380.)

[4d]/[15d] (C2) when the computational device is not located within the predetermined area and/or zone of the vehicle, not permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem.

Again, Petitioner construes the term "*access or attempt to access the vehicle*

network and/or communication subsystem" as "*access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem*." (Ex.1003,¶¶86-89.)

Clement discloses controlling access to vehicle functionality based on the location of the computational device, e.g., "[a]t task 880" "if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed." (Ex.1010,10:55-67.) The vehicle control unit 320 "Refuse[s] to Execute the Instruction" at task 895. (Ex.1010,Fig.8;Ex.1003,¶¶300-302,378-380.)

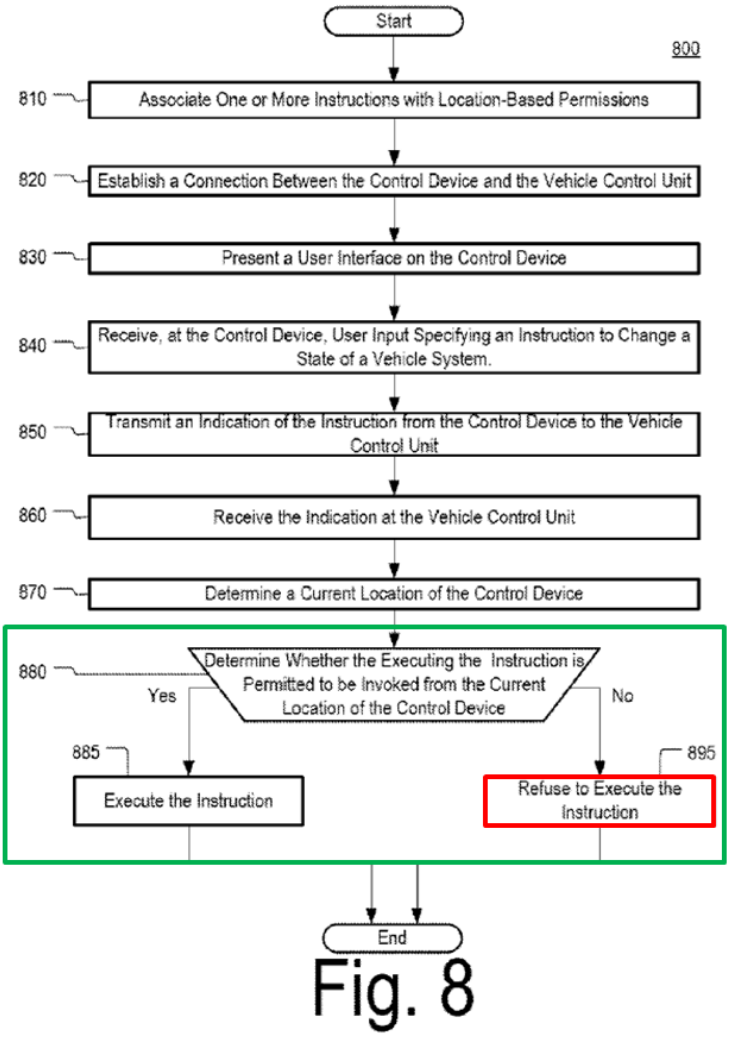


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement discloses that "some instructions, such as steering the vehicle 101, may be invoked only when the control device 230 is located in the area of the driver seat 220*a*." (Ex.1010,7:42-45.) As illustrated below, the steering button 900a (annotated in blue) is displayed on the user interface 900a when the user is located in the driver seat (Fig. 9A), but the steering button 900a is not displayed on the user interface 900b when the user is located in a passenger seat (Fig. 9B).

(Ex.1003,¶¶303-304,379-380.)

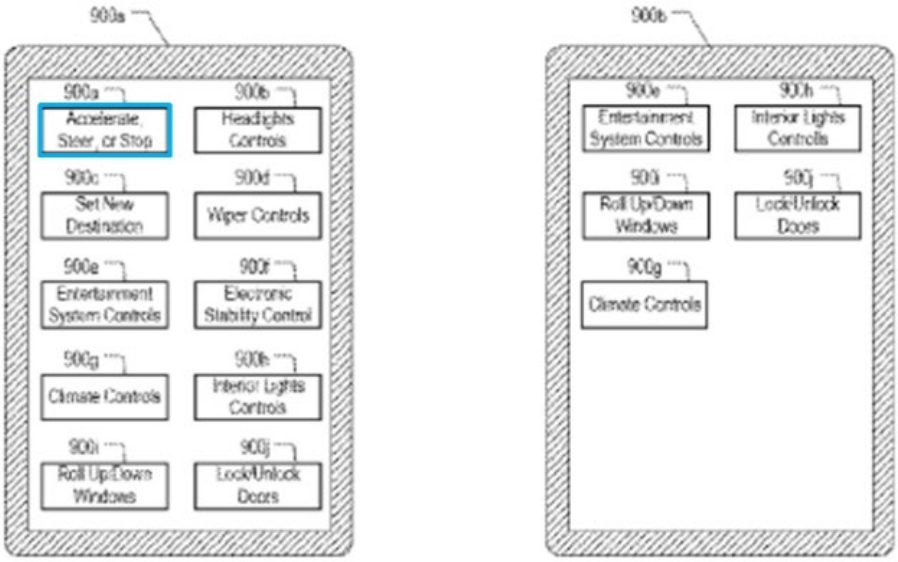


Fig. 9A Fig. 9B

Ex.1010,Figs.9A,9B (Annotated)

[5a] The method of claim 4,

[16a] The vehicle of claim 15,

… ***wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality of predetermined areas and/or zones, to be used in applying the rules,***

Clement discloses that "the control device 230 may determine its location and communicate it to the vehicle control unit 320." (Ex.1010,10:48-49,*see also* 12:14-25.) Clement further discloses that "transmitters may be positioned at various locations in the vehicle 101 and the control device 230 may triangulate signal

strength measurements from those transmitters to independently determine its location within the passenger compartment 210." (Ex.1010,10:50-54.) A POSA would have been motivated to modify Clement's system to shift the processing of the control device 230 location determination to the device itself because this would have been a simple substitution of one known element for another to obtain predictable results, e.g., free up processing capacity on the vehicle control unit 320. (Ex.1003,¶¶305-309,381-383.)

Clement also discloses, with reference to Figure 6 below, determining if the specific location of the control device 230 is within one of the four specific "regions in the passenger compartment 210 where the instruction is permitted to be invoked from." (Ex.1010,10:55-67,*see also* 1:42-51;Ex.1003,¶¶310-312,381-383.)

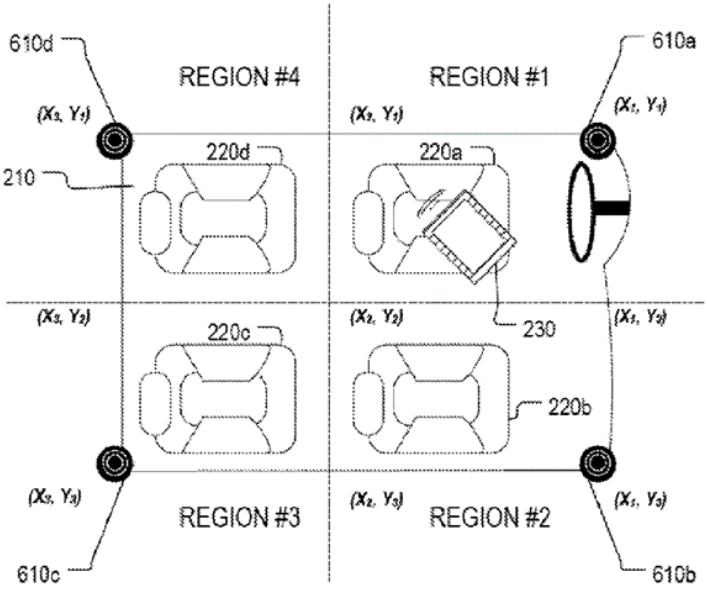


Fig. 6

Ex.1010,Fig.6

[5b]/[16b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and

Clement discloses that the control device 230 ("*computational device*") "may be a tablet, a smart phone, a laptop, or another type of portable computing device." (Ex.1010,6:9-10;Ex.1003,¶¶313-314,381-383.)

[5c]/[16c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment[9].

[9] Petitioner interprets "*the passenger compartment*" as "*a passenger compartment*" for antecedent basis.

Clement discloses that "the control device 230 may triangulate signal strength measurements from those transmitters to independently determine its location within the passenger compartment 210." (Ex.1010,10:50-54;Ex.1003,¶¶315-319,381-383.)

[7] The method of claim 4,

[18] The vehicle of claim 15,

… ***wherein the determining step [operation] (b)[10] bases the determination on whether the computational device is located within the predetermined area and/or zone of the vehicle on <u>one or more</u> of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, <u>triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle</u>, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the***

[10] The term "*step [operation] (b)*" lacks antecedent basis and Petitioner interprets this limitation as referring to claims 4[b]/15[b].

computational device, and input received from a user of the computational device.

Clement discloses that the vehicle control unit 320 and the location system 330 "may be (completely or partially) integrated together." (Ex.1010,7:32-36.) Clement further discloses that the "location system 330 may include hardware and/or software for determining the location of the control device 230 within the passenger compartment 210." (Ex.1010,7:23-32.) Additionally, the "location system 330 includes receivers 610*a-d*…located in different parts of the passenger compartment 210" that "may take measurements of the strength of radio signal(s) transmitted by the control device 230 and forward those measurements to the vehicle control unit 320 where they are triangulated and used to determine the location of the control device 230." (Ex.1010,7:23-32;Ex.1003,¶¶338-345,378,390-393.)

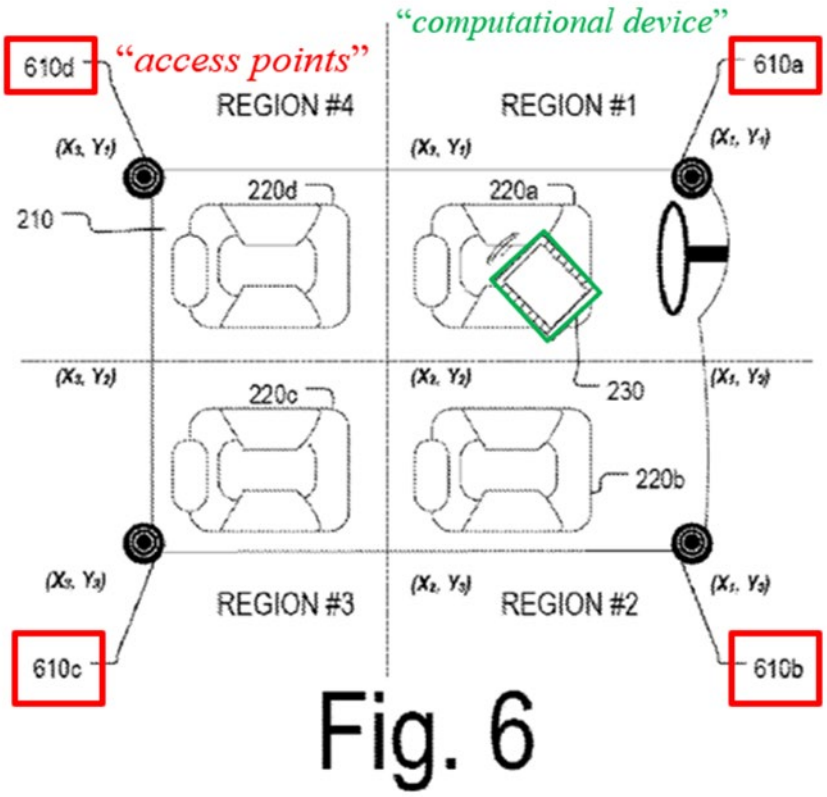


Fig. 6

Ex.1010,Fig.6 (Annotated)

The Moinzadeh/Clement combination includes Clement's vehicle control unit 320 with location system 330 and receivers 610*a-d*, providing the ability to determine "*whether the computational device* [control device 230] *is located within the predetermined area and/or zone of the vehicle* [e.g., Regions 1-4] *on* <u>*one or more*</u> *of…triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points* [radio receivers 610*a-d*] *of the vehicle*[.]…" (Ex.1003,¶¶346-347,390-393.)

[8a] The method of claim 7,

[19a] The vehicle of claim 15,

… ***<u>wherein the</u>***[11] ***wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is permitted to access or attempt to access the vehicle network***[12] ***and/or communication subsystem and***

Claims [8a]/[19a] are largely duplicative of claim [4c]. (Ex.1003,¶¶348-352,394-396.)

[8b]/[19b] wherein the device discovery daemon determines a set of tasks, functions, and/or operations that can be performed and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device.

Clement discloses that "[t]he vehicle control unit 320 may use the location system 330 to enforce location-based permissions on instructions received from the control device 230." (Ex.1010,7:40-42.) Clement also discloses that if the control device 230 is held by the driver in the driver's seat, the control device 230 "may be capable of steering or accelerating the vehicle 101" which is "*a set of tasks[]…that can be performed*." (Ex.1010,5:61-64;Ex.1003,¶¶348-349,353.) However, if the control device 230 is held by a passenger occupying a different seat in the vehicle,

[11] Petitioner interprets the second "*wherein the*" phrase as a typographical error and not limiting.

[12] Petitioner interprets the "*vehicle network*" as "*the network*" for antecedent basis.

the control device 230 "may be permitted to control the vehicle's entertainment system, but not steer or apply the brakes of the vehicle" which is "*a set of tasks[]…that cannot be performed*." (Ex.1010,5:64-67;Ex.1003,¶¶354,394-396.)

Clement also discloses varying the menu of buttons corresponding to available input components ("*a set of tasks[]…that can be performed*") displayed on the user interface of control device 230 based on its location. For example, Figure 9B below shows that "when the control device 230 is located in regions #2-3, the menu 900B may be displayed[,]" however, "the interface 900B [lacks] input components for controlling safety-critical aspects of the operation of the vehicle 101." (Ex.1010,10:18-26;Ex.1003,¶¶355-356,394-396.)

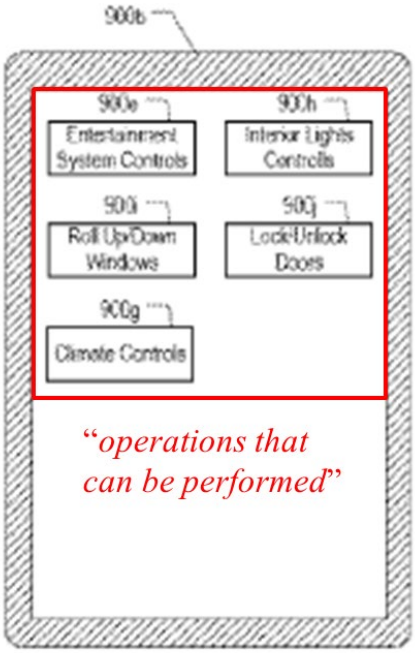


Fig. 9B

Ex.1010,Fig.9B (Annotated)

[9] The method of claim 7,

[20] The vehicle of claim 15,

… wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication

subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.

As explained above with reference to claim 7, Clement discloses determining the location of the control device 230 ("*computational device*") based on triangulation. (Ex.1003,¶¶358-360.) Clement also discloses determining the location of the control device 230 based on radio signal strength. (Ex.1010,3:13-15,8:42-43;Ex.1003,¶¶359-61,396-399.)

Clement discloses using a simple coordinate-based model to define a region (i.e., Regions 1-4), where "each region may be presented as a single coordinate and a radius." (Ex.1010,8:47-50.) A POSA would have understood that Clement's disclosure that each region may be represented as a "single coordinate and radius" indicates a range of signal strength values, thus teaches a single access point. (Ex.1003,¶¶362-363,396-399.)

Clement further discloses defining each region using "4-tupples of signal strength ranges (e.g., sets of signal strength ranges that are expected to be measured by each of the receivers 610*a-d* when the control device 230 is in a given region)." (Ex.1010,8:50-58.) A POSA would have also understood that each of Clement's

radio receivers 610*a-d* is an "*access point*" as each receiver 610*a-d* receives signals from the device for localization purposes. (Ex.1003,¶¶364-369,396-399.)

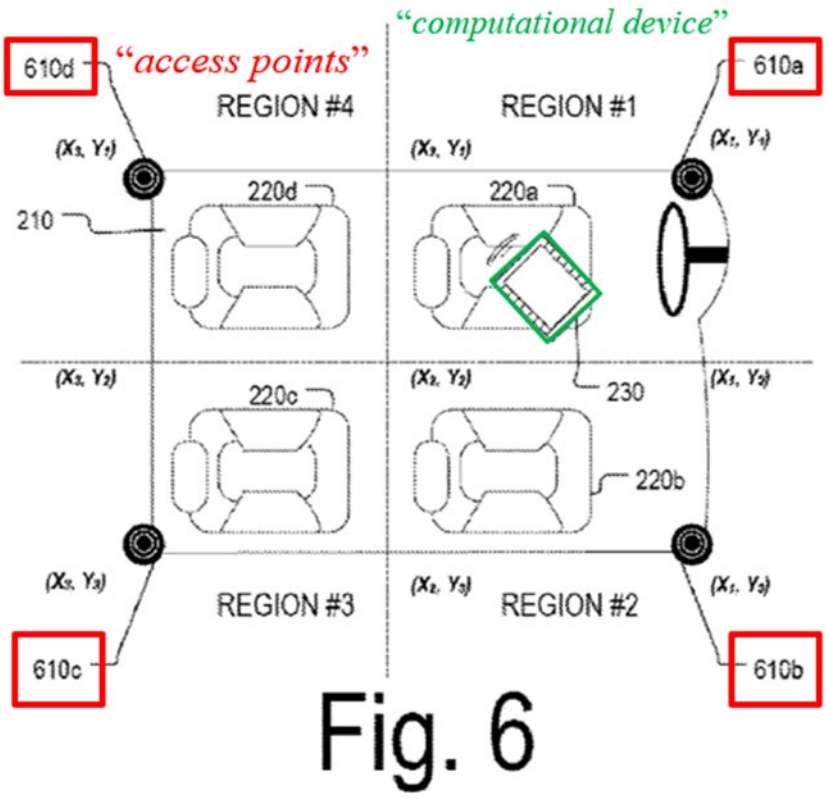


Fig. 6

Ex.1010,Fig.6 (Annotated)

[10] The method of claim 9,

[21] The vehicle of claim 20,

… ***wherein the device discovery daemon determines a level of confidence that the computational device is located within the predetermined area and/or zone and wherein the device discovery daemon determines that the computational device is located within the predetermined area and/or zone when the level of confidence has at least a threshold value.***

Clement discloses that "[t]he receivers 610*a-b* [*sic* 610*a-d*] may take measurements of the strength of radio signal(s) transmitted by the control device 230 and forward those measurements to the vehicle control unit 320 where they are triangulated and used to determine the location of the control device 230." (Ex.1010,7:28-32;Ex.1003,¶¶370-372,400-402.)

Clement further discloses that "regions #1-4 may be represented by 4-tupples of signal strength ranges (e.g., sets of signal strength ranges that are expected to be measured by each of the receivers 610*a-d* when the control device 230 is in a given region)." (Ex.1010,8:43-46,8:51-55;Ex.1003,¶¶373-374,400-402.)

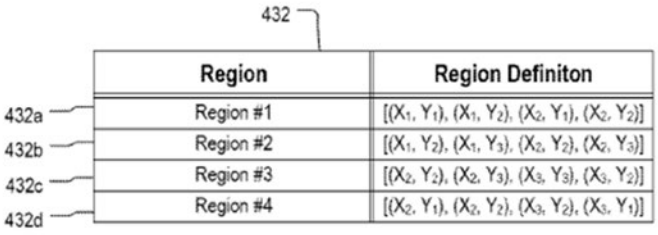


Fig. 5

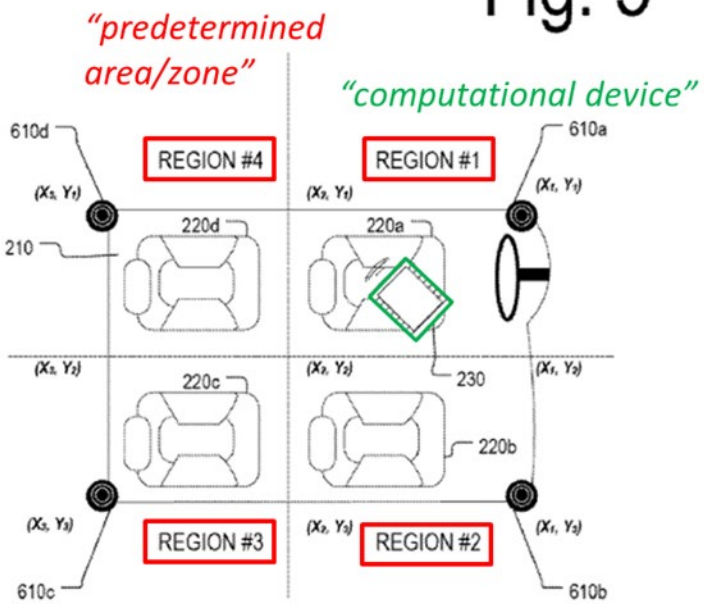


Fig. 6

Ex.1010,Figs.5,6 (Annotated)

A POSA would have understood that the 4-tupple structure disclosed in Clement reflects a "*level of confidence*" in determining the location of the portable control device 230. Each 4-tupple represents a set of expected signal strength ranges corresponding to the receivers positioned within the vehicle, with each set associated with a specific region, and the limits of each range representing a "*threshold.*" A POSA would have also understood that Clement's disclosure of each region having

its own signal strength range, teaches that the vehicle control unit 320 determines whether the signal strength is above or below a "*threshold*" to be within any specific region. (Ex.1003,¶¶375-377,400-402.)

C. Ground 3: Claims 1, 3, 11-12, and 14 are Unpatentable as Obvious Over Rasin and Bosch.

1. Rationale to Combine

It would have been obvious to a POSA at the time of the invention to combine the vehicle user interface system disclosed in Rasin with a known electronic control unit, including a microprocessor and memory, as disclosed in Bosch, e.g., to improve a similar device in the same way, e.g., to reduce cost for a high-volume component. (Ex.1003,¶403.) A POSA would have understood that Rasin and Bosch are complementary technologies that are combinable. For example, both disclose automotive electronic control units (ECUs). (Ex.1015,2:55-57;Ex.1050,1065.) Bosch explains that a microcontroller includes a microprocessor and memory. (Ex.1050,94,96.) Rasin explains that "the disclosed embodiments are merely exemplary of the invention that may be embodied in various and alternative forms" and a POSA "will recognize various alternative designs and embodiments for practicing the invention." (Ex.1015,2:16-26,5:24-28;Ex.1003,¶¶403-404.)

A POSA would have been motivated to use a microprocessor to execute software code implementing Rasin's relatively simple tasks, e.g., device discovery

and refreshing content on a display, to "avoid individualization in the face of large-scale integration," as described in Bosch, to provide a common microprocessor for high-volume automotive application, to reduce the piece-price of the microprocessor. (Ex.1050,94;Ex.1003,¶405.) A POSA would have known how to implement Rasin's control strategies on a microprocessor as this is just combining prior art elements (microprocessor) according to known methods to yield predictable results, e.g., reduced cost. (Ex.1003,¶406.)

2. Independent Claims 1 and 12

1[pre]/12[pre]

Rasin discloses "a vehicle…that is configured to communicate and enable access to electronic devices including services and/or applications…available via the electronic devices." (Ex.1015,2:27-30;Ex.1003,¶¶454-456.)

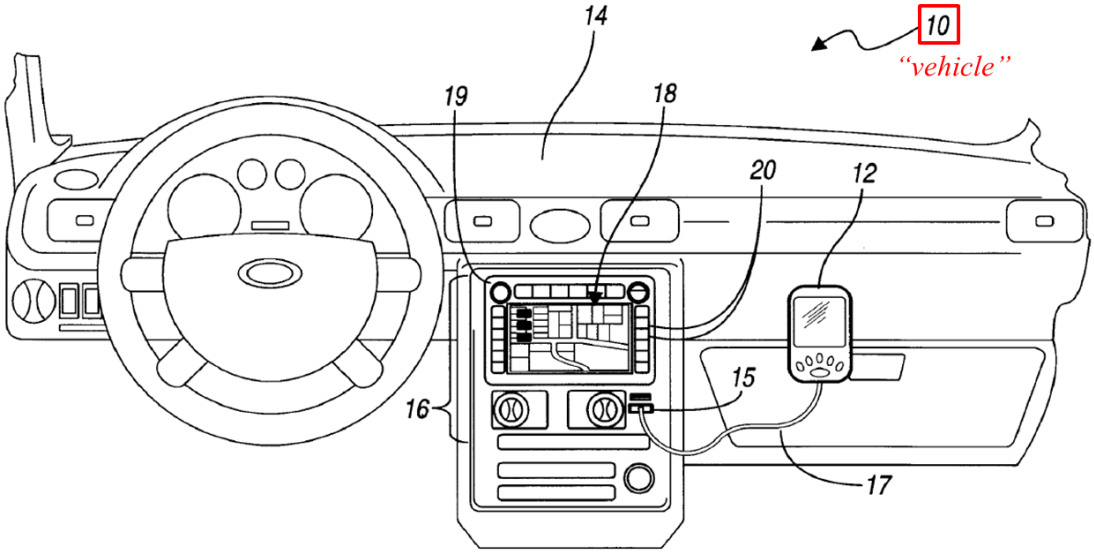


FIG. 1

Ex.1015,Fig.1 (Annotated)

Rasin further discloses, with reference to Figure 3, "a method for accessing services available through the electronic device." (Ex.1015,4:50-51,*see also*2:8-11;Ex.1003,¶¶408-411.)

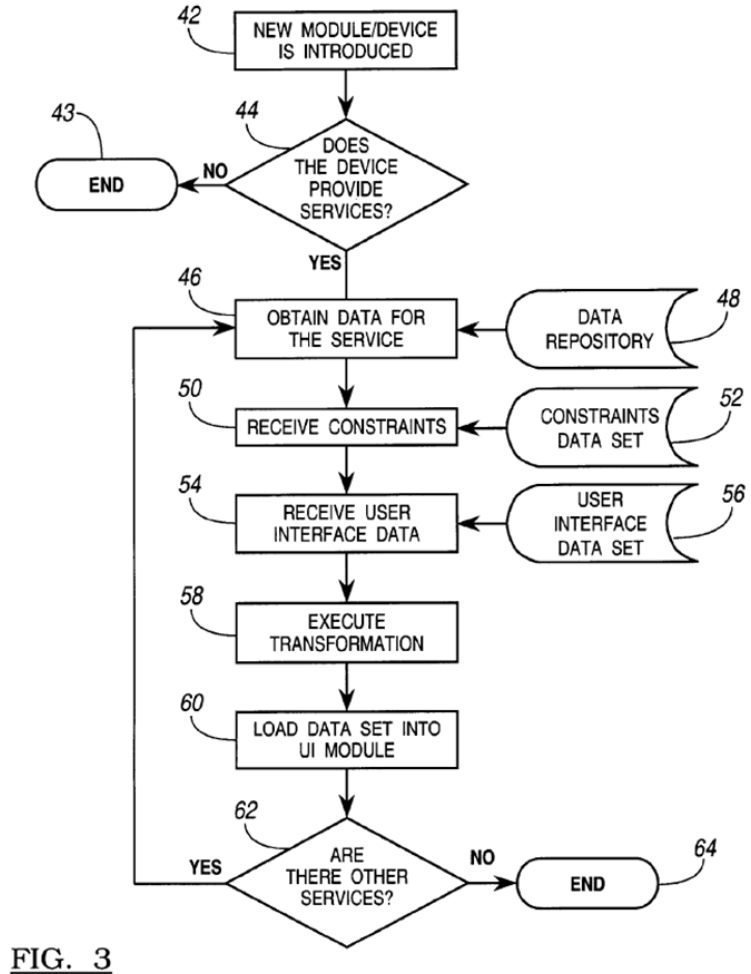


FIG. 3

Ex.1015,Fig.3

[1a]/[12a]-[12c]

Petitioner construes the term "*daemon*" as "computer program." Rasin discloses that the vehicle 10 includes a user interface system 16 ("*communication subsystem*") that "provides vehicle occupants information/data pertaining to vehicle 10, its systems, and devices, including services available through an electronic device 12 ["*communication device*"]." (Ex.1015,2:40-42;Ex.1003,¶¶412-415,425,457-461.)

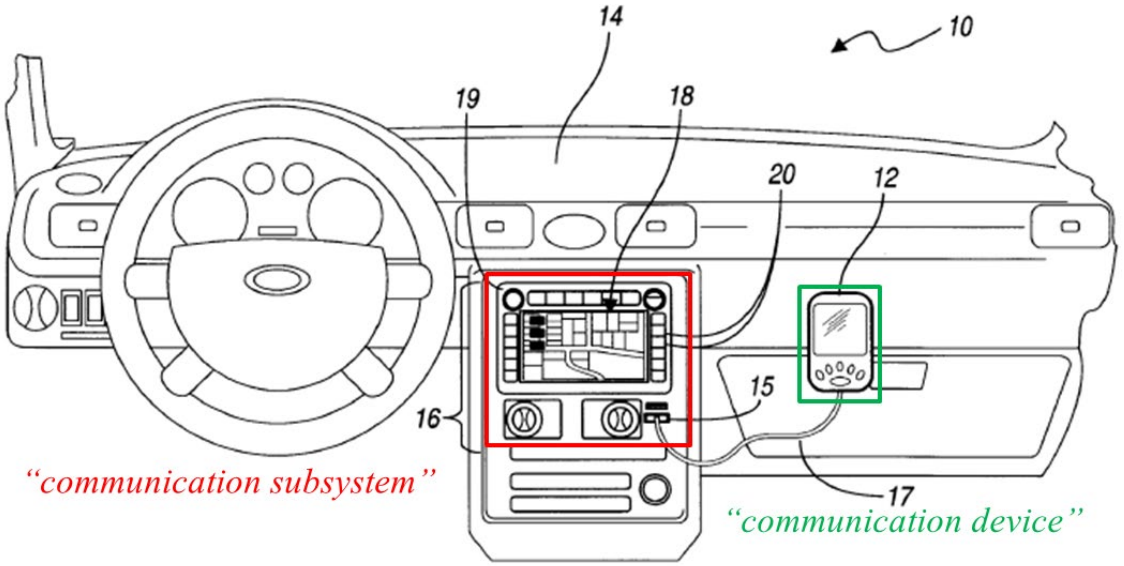
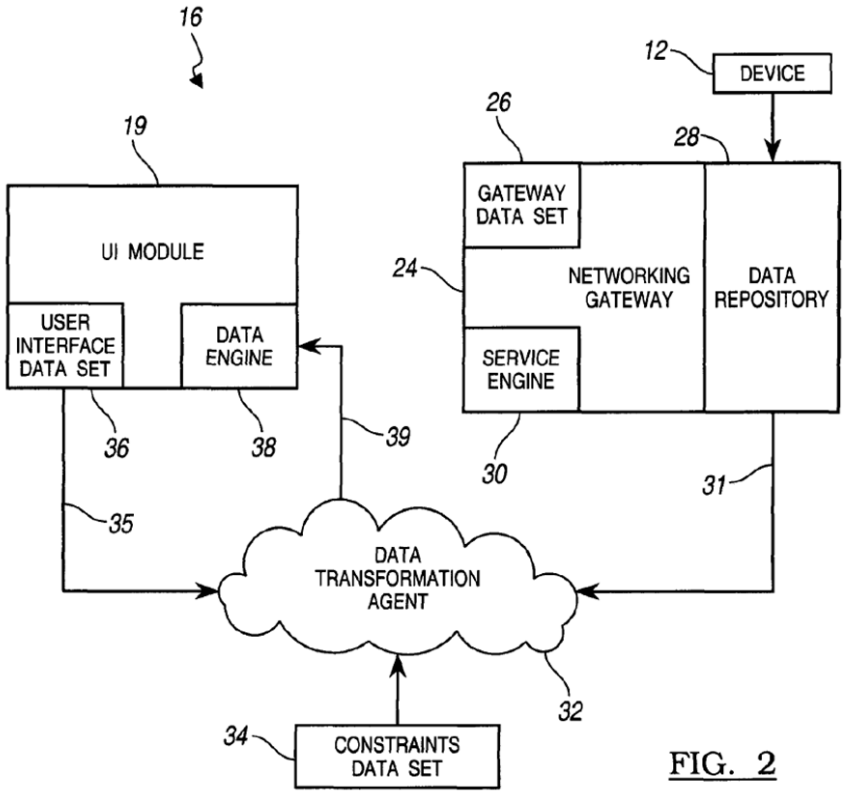


FIG. 1

Ex.1015,Fig.1 (Annotated)

Rasin discloses that the "user interface system 16 includes user interface module 19, a networking gateway 24, and a data transformation agent 32." (Ex.1015,3:24-27,Fig.2;Ex.1003,¶¶416,457-461.)



Ex.1015,Fig.2

Rasin discloses that "upon connection of device 12 to the vehicle…device 12 transmits a data set to user interface system 16[,]" "referred to as service discovery[.]" (Ex.1015,3:33-36.) Rasin further discloses that "[t]he networking gateway 24 initially receives the data set" and "determines whether the electronic device offers any services." (Ex.1015,3:39-41,4:50-64,Fig.3;Ex.1003,¶¶417,457-461.)

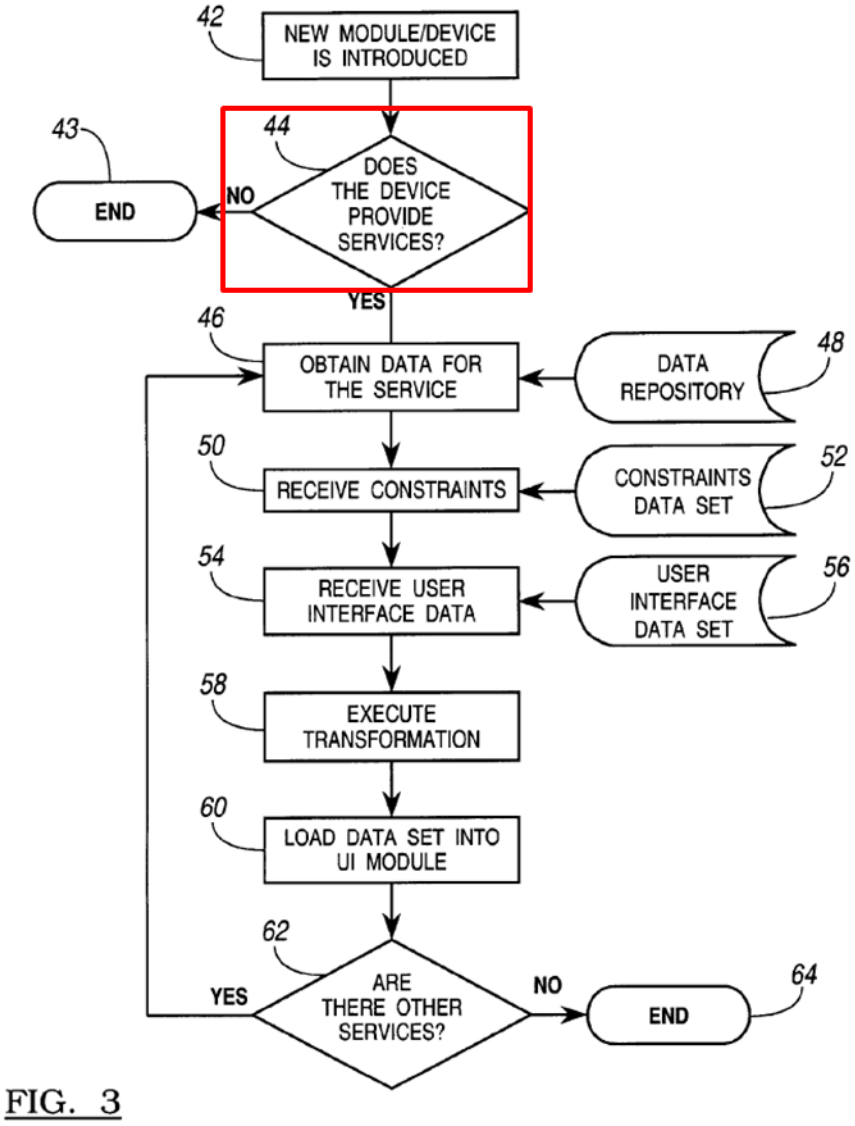
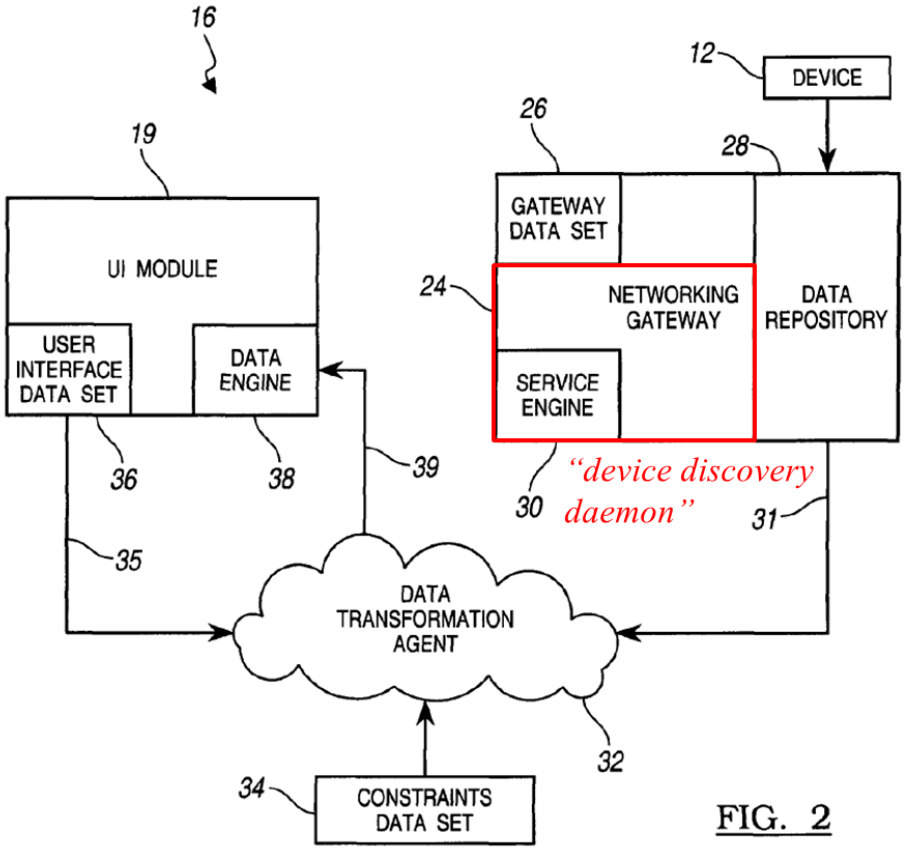


FIG. 3

Ex.1015,Fig.3 (Annotated)

Rasin further discloses that the "[n]etworking gateway 24 includes a data repository 28, a gateway data set 26, and a service engine 30. Service engine 30 is configured to establish communications with devices such as device 12 and to generate a corresponding data set in a desired format that describes the available services." (Ex.1015,3:39-51;Ex.1003,¶¶418,457-461.)

A POSA would have understood that Rasin's disclosure of the networking gateway 24 "initially receiv[ing] the data set" (Ex.1015,3:39) and the service engine 30 "establish[ing] communications with devices…and…generat[ing] a corresponding data set" (Ex.1015,3:41-43), teach that the combination of the networking gateway 24 and service engine 30 is a "*device discovery* [computer program]" that enables detection of devices and processing subsequent data received by the devices. (Ex.1003,¶¶419-420,457-461.)

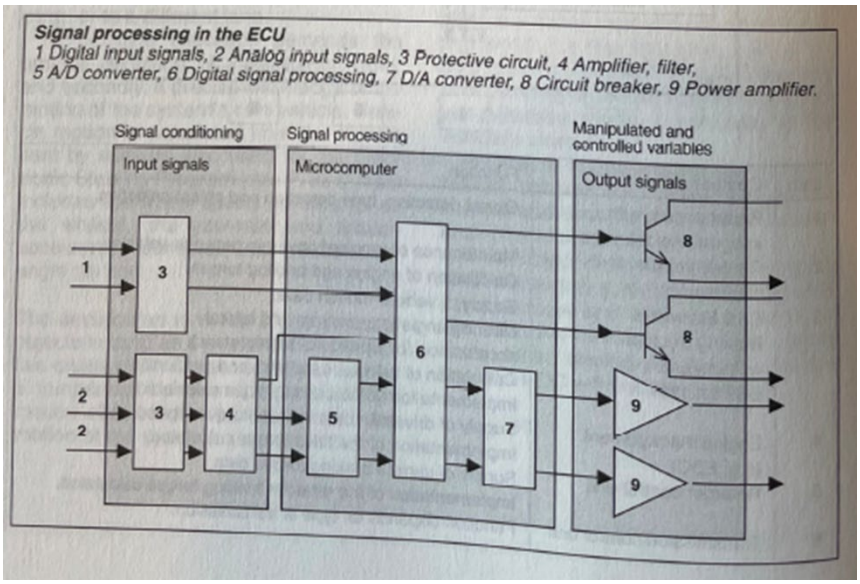


Ex.1015,Fig.2 (Annotated)

A POSA would have understood that hardware is required to receive and process data from the device 12. Although not expressly disclosed, Rasin at least

suggests that the user interface system 16 includes hardware, such as a microprocessor, to control the networking gateway 24 and service engine 30. (Ex.1003,¶¶421,457-461.)

Bosch discloses that vehicle systems include electronic control units (ECUs) for controlling vehicle functions. An ECU receives signals from vehicle sensors and "then converts to the signals required to adjust the final-control elements/actuators." (Ex.1050,1064.) As illustrated in the figure below, ECUs share a common structure with "conditioning of input signals, the logic processing of these signals in the microcomputer, and the output of logic and power levels as regulation or control signals." (Ex.1050,1065;Ex.1003,¶¶422,457-461.)

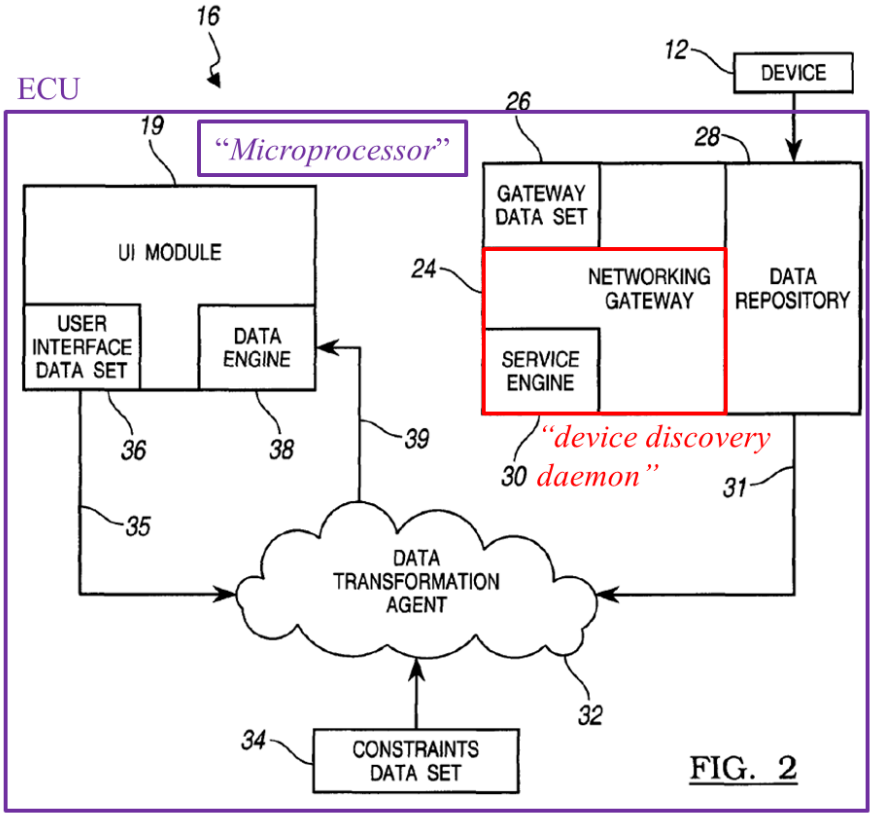


Ex.1050,1064

A microcomputer includes: a microprocessor, input and output units (I/O), and memory. (Ex.1050,94,96.) "The microprocessor represents the integration of a

computer's central processing unit on a single chip" and "can be programmed to meet the varied requirements associated with specific operating conditions." (Ex.1050,94;Ex.1003,¶¶423,457-461.)

Accordingly, in would have been obvious to a POSA to combine Rasin's user interface system 16 with Bosch's ECU, including a "*microprocessor*" to control or "*execute*[]" the networking gateway 24 and service engine 30 ("*device discovery* [computer program]") as illustrated in the figure below (Ex.1003,¶¶424,457-461):

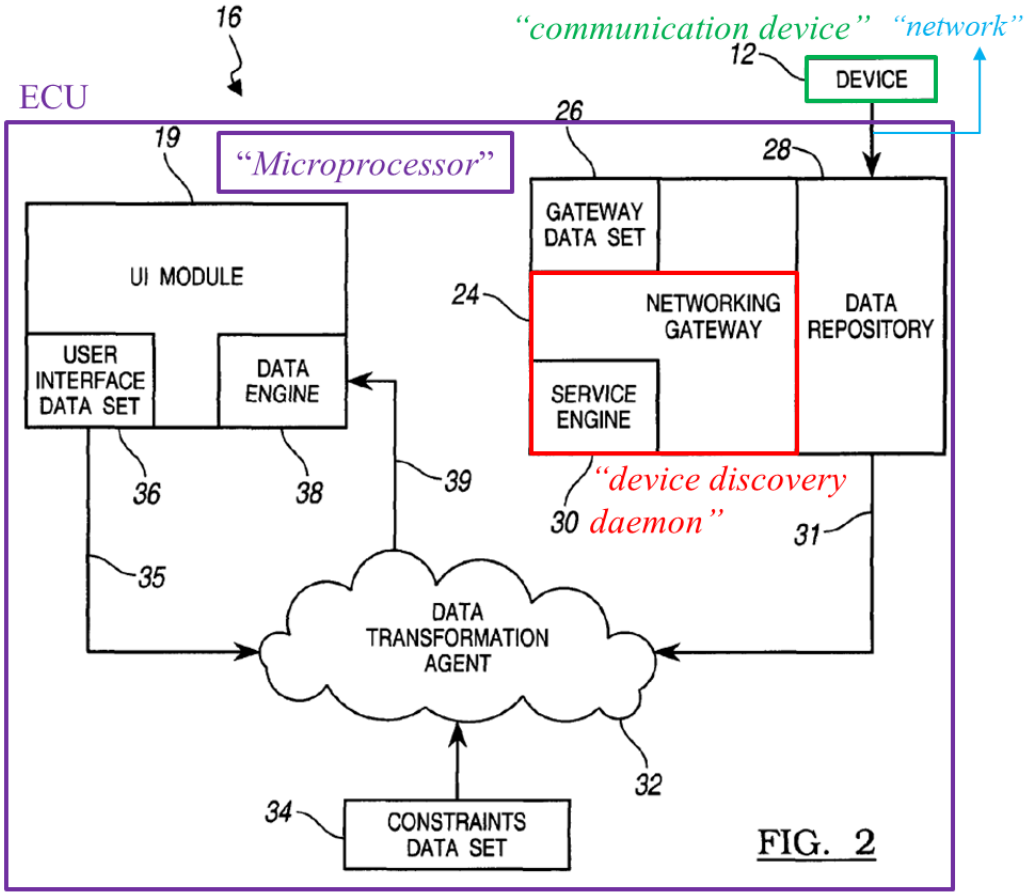


Ex.1015,Fig.2 (Annotated)

Rasin discloses that the electronic device 12 ("*communication device*") may be connected to the user interface system 16 ("*communication subsystem*") "through

the use of a port 15, which includes universal serial bus (USB) ports…[or] via a wireless protocol including, but not limited to bluetooth, wi-fi, and the like." (Ex.1015,3:4-17;Ex.1003,¶¶425-426,457-461.)

A POSA would have understood that Bluetooth was a very popular protocol used by most if not all vehicle systems for transmitting wireless signals to/from wireless devices. Bluetooth includes aspects of device discovery in which a computer program runs in the background to discover such wireless devices. (Ex.1003,¶427.) Accordingly, a POSA would have understood that Rasin's disclosure of the networking gateway 24 and service engine 30 software ("*device discovery* [computer program]") establishing a connection with the electronic device 12 through "wireless protocol including, but not limited to bluetooth," teaches that the networking gateway 24 and service engine 30 software ("*device discovery* [computer program]") is discovering and wirelessly connecting the electronic device 12 ("*communication device*") to the user interface system 16 ("*communication subsystem*") over a wireless "*network*." (Ex.1015,3:12-13;Ex.1003,¶¶427-428,457-461.)



Ex.1015,Fig.2 (Annotated)

[1b]/[12d]

Rasin discloses that the networking gateway 24 within the user interface system 16 "receives the data set" from the device 12; and "includes a data repository 28, a gateway data set 26, and a service engine 30." (Ex.1015,3:39-41.) The "[d]ata repository 28 provides a plurality of default software constructs that describes communication parameters, features of device 12, and services that may be available via device 12." (Ex.1015,3:52-55.) Rasin further discloses that the service engine 30 "generate[s] a corresponding data set in a desired format that describes the available

services" "[b]ased on the data available from gateway data set 26 and data repository 28[.]" (Ex.1015,3:39-44;3:60-63.) Accordingly, a POSA would have understood that the data set generated by the networking gateway is indicative of the "*device information and capabilities*" of the "*communication device*." (Ex.1003,¶¶429-432,457-461.)

With reference to Figure 3, Rasin discloses that "[a]t block 46, in response to data provided by the data repository (block 48), the user interface system obtains ["*populat[es]*"] data that indicates the services available through the electronic device." (Ex.1015,4:50-64.) Further, at "block 54, the user interface data is received via the data transformation agent. Block 56 depicts the user interface data set which includes data that describes the appearance and functions of the user interface module." (Ex.1015,5:6-23;Ex.1003,¶¶433-434,457-461.)

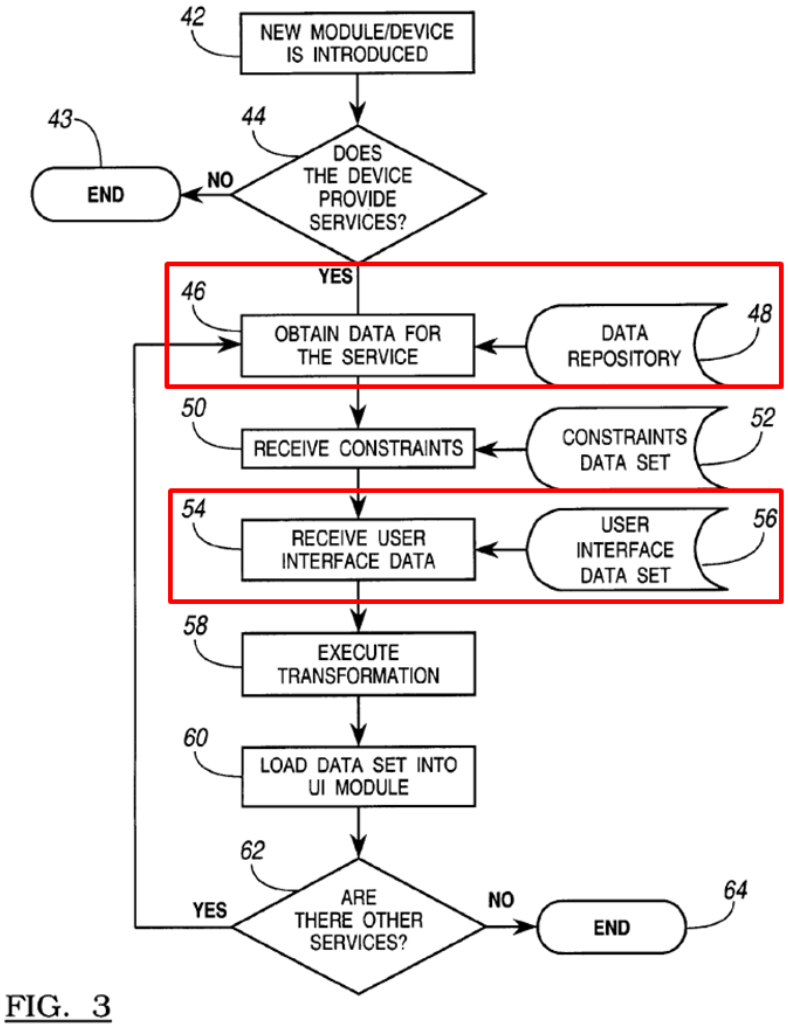


FIG. 3

Ex.1015,Fig.3 (Annotated)

[1c]/[12e]

Rasin discloses a display unit 18 ("*graphical display*") that "is adapted to display information ["*graphical elements*"] such as maps generated by a navigation system, audio system information, climate information, and services/applications that are accessible through the use of electronic device 12." (Ex.1015,2:45-48;Ex.1003,¶¶435,457-463.)

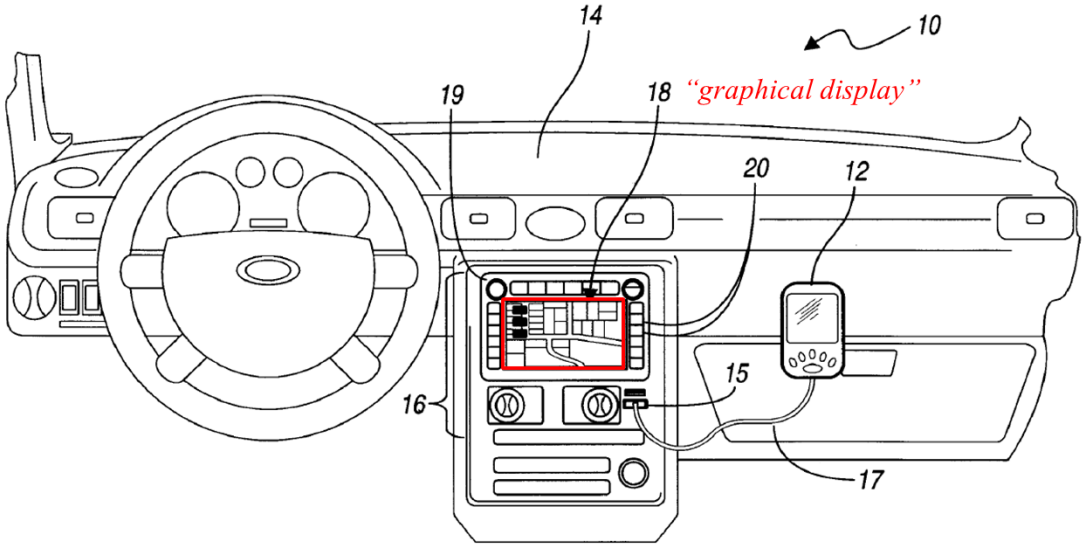
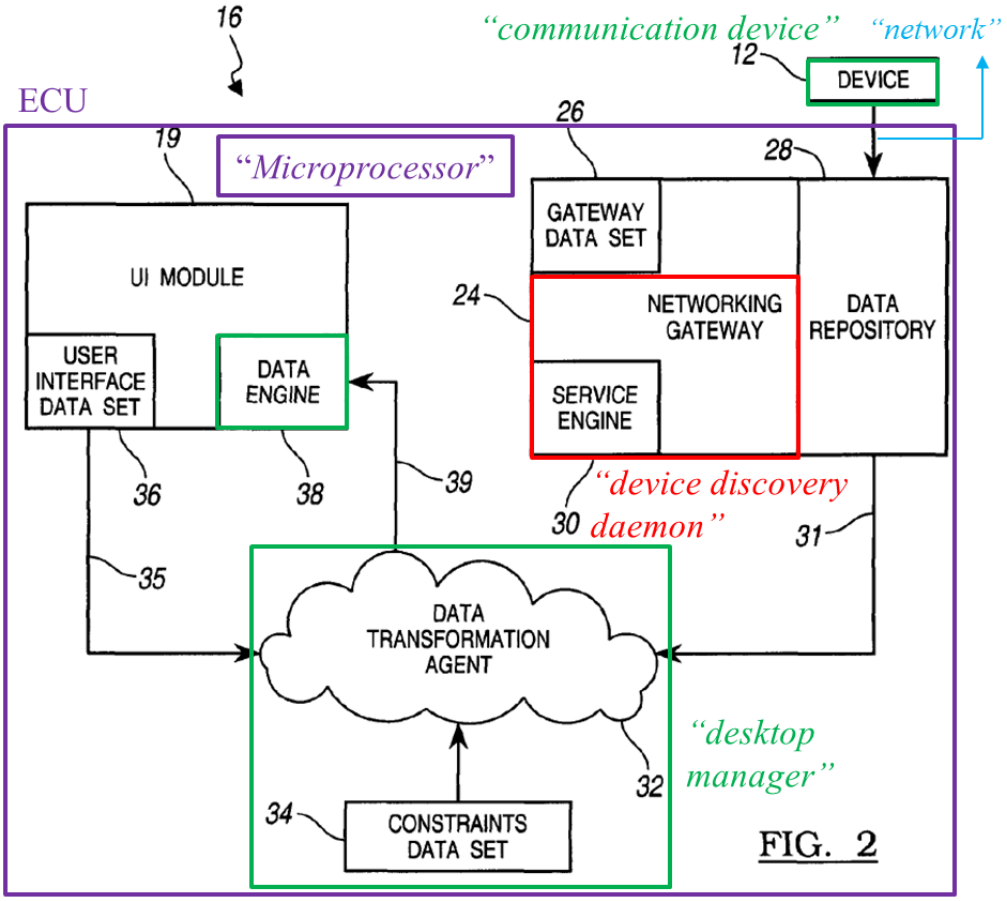


FIG. 1

Ex.1015,Fig.1 (Annotated)

Rasin discloses that the "[d]ata transformation agent 32 may be embodied as a software program or data set" that processes data based on "a set of predetermined rules" derived from "a constraints data set 34." Rasin further discloses that "[t]hese constraints may be used to control the appearance of information displayed by the user interface system display unit." (Ex.1015,3:65-4:17.) Additionally, Rasin discloses that the "[d]ata engine 38 is responsible for generic interaction with the user and may contain a specification in electronic form that also controls the appearance and/or function of the user interface module display." (Ex.1015,4:39-42.) It would have been obvious to a POSA to combine Rasin's "controller" with Bosch's ECU so that the "microprocessor" controls the data transformation agent 32 and the data engine 38. (Ex.1003,¶¶436-437,457-463.)



Ex.1015,Fig.2 (Annotated)

Rasin discloses that "[t]he data of constraints data set 34 may include static and dynamic data, which may be loaded into the vehicle at any time." (Ex.1015,4:12-14,*see also,*3:13-17.) A POSA would have understood that Rasin's disclosure of loading data into the vehicle at various times teaches that the data being displayed on display unit 18 may be "*refreshed*" or updated based on new data received from the electronic device 12. For example, Rasin discloses that "upon connection of device 12…device 12 transmits a data set to user interface system 16" initiating service discovery. (Ex.1015,3:33-38.) The data transformation agent 32 processes

this data along with constraint information to generate a data set 39. (Ex.1015,4:33-38.) The data engine 38 then uses this data to update or "*refresh*" graphical elements—such as buttons and keys—on the display. (Ex.1015,4:42-46;Ex.1003,¶¶438-442,457-463.)

3. Dependent Claims 3, 11, and 14

[3]/[14]

As explained for claims [1b]/12d], Rasin discloses that the networking gateway 24 and service engine 30 generate a data set "[b]ased on the data available from gateway data set 26 and data repository 28." (Ex.1015,3:39-44,3:60-63.) Accordingly, the data set generated by the networking gateway is indicative of the "*device information and capabilities*" of the "*communication device*." (Ex.1015,3:39-41,3:52-55,3:39-44,3:60-62;Ex.1003,¶¶430-431,443-445,466.)

Rasin further discloses that the electronic device 12 ("*communication device*") connects to the user interface 16 (and therefore to the networking gateway 24) "through the use of a port 15, which includes universal serial bus (USB) ports…[or] via a wireless protocol including, but not limited to bluetooth, wi-fi, and the like." (Ex.1015,3:4-17;Ex.1003,¶¶446,466.)

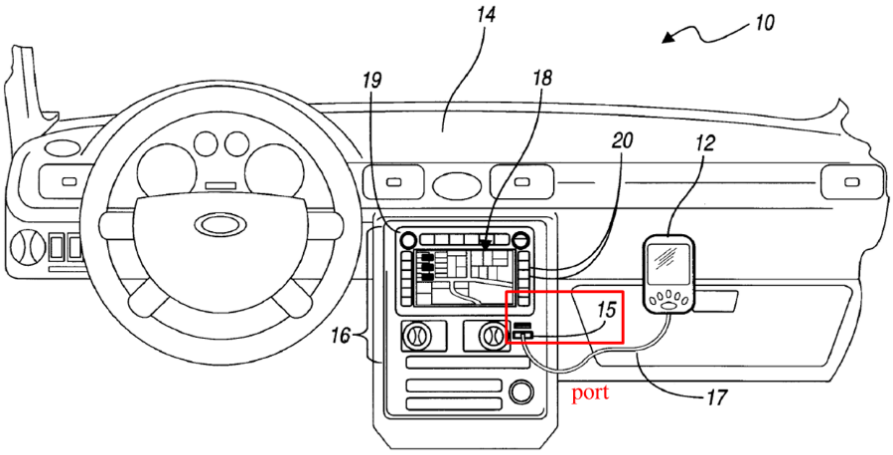


FIG. 1

Ex.1015,Fig.1 (Annotated)

A POSA would have understood that by connecting to the networking gateway 24 with a Bluetooth, WiFi or USB connection, the "*communication device*" is "*expos[ing]*" its open ports, and based on which open ports are exposed, the vehicle head unit software can determine the connectivity capabilities and services of the device. (Ex.1003,¶¶447-448,466.)

[11]

Rasin discloses that "[t]he networking gateway 24 initially receives the data set" and "includes a data repository 28, a gateway data set 26, and a service engine 30." (Ex.1015,3:39-44.) Rasin further discloses that the "[s]ervice engine 30 is configured to establish communications with…device 12 and…generate a corresponding data set in a desired format that describes the available services." (Ex.1015,3:39-44;Ex.1003,¶¶449-451.)

A POSA would have understood that a non-transitory medium is a physical object where data can be stored, like a hard drive, CD-ROM, or memory card. (Ex.1050,94-95;Ex.1051,152.) Rasin's disclosure that the networking gateway 24 includes a data repository 28 and gateway data set 26, which stores structured data and "default software constructs" (Ex.1015,3:51-55), indicates storage of executable instructions. Accordingly, a POSA would have understood that the networking gateway 24 and service engine 30 are implemented using a non-transitory, tangible computer-readable medium. (Ex.1003,¶¶452-453.)

D. Ground 4: Claims 4-5, 7-10, 15-16, and 18-21 are Unpatentable Over Rasin, Bosch, and Clement.

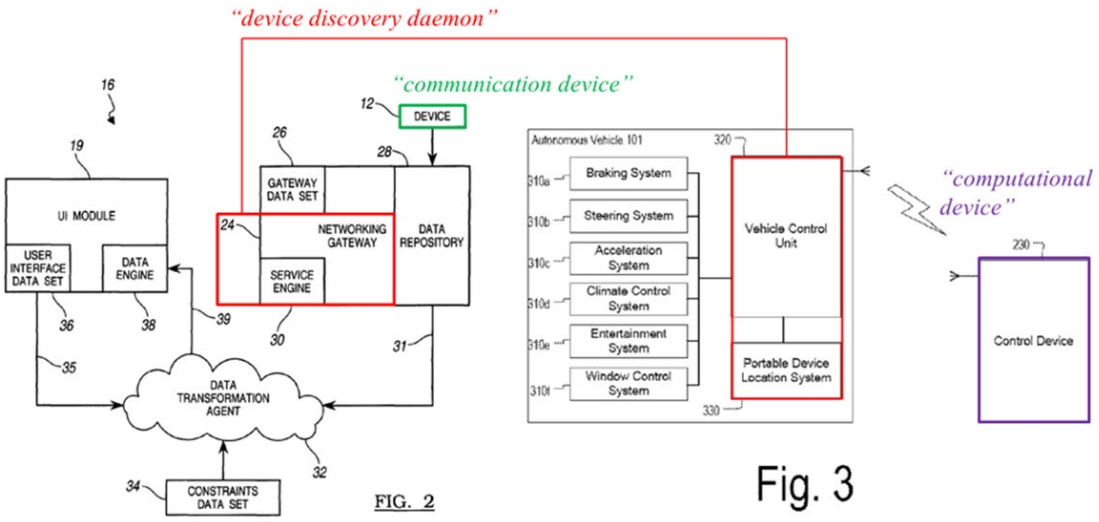
1. Rationale to Combine

It would have been obvious to a POSA at the time of the alleged invention to combine the vehicle user interface system disclosed in the Rasin/Bosch combination with the location-based permission management system and known technique of device discovery as disclosed in Clement to provide additional functionality and to improve security. A POSA would have understood that Rasin, Bosch, and Clement are complementary technologies, from the same field – communication between a vehicle system and one or more electronic devices (Ex.1015,1:5-7;Ex.1050,1118;Ex.1010,4:42-46,7:8-11), that are combinable, e.g., "the disclosed embodiments are merely exemplary of the invention that may be embodied in

various and alternative forms." (Ex.1015,2:16-26,5:24-28;Ex.1003,¶¶467-470.)

Clement discloses a vehicle control unit 320 that permits or restricts certain vehicle functions based on the "location of the portable control device" 230 within the vehicle, which "is important with respect to ensuring the safety of the vehicle." (Ex.1010,1:43-46,5:6-17,*see also*,7:40-50,Fig.8;Ex.1003,¶¶471-474.)

A POSA would have understood how to combine Rasin, Bosch, and Clement with a reasonable expectation of success. This modification would have been a simple combination of known elements in the prior art, e.g., receivers and corresponding software for detecting the location of a portable electronic device within a vehicle limiting access to vehicle system functionality based on the location of the portable electronic device. As illustrated in the figure below, a POSA would have understood that due to the complementary nature of the systems, Rasin's vehicle user interface system 16, with networking gateway 24 and service engine 30, and Clement's vehicle control unit 320 would have been combined to share hardware and software. (Ex.1003,¶¶475-476.)



Ex.1015,Fig.2 (Annotated);Ex.1010,Fig.3 (Annotated)

Regarding software, a POSA would have known how to modify the combined Rasin/Bosch vehicle user interface system to include the associated software needed to operate Clement's vehicle control unit 320 and the location system 330, to enable determining the position of a mobile device within the vehicle, e.g., using triangulation and signal strength strategies. (Ex.1003,¶¶477-482.)

2. Dependent Claims 4-5, 7-10, 15-17, and 18-21

[4a]/[15a]

As explained for claims [1a]/[12c], Rasin discloses that the networking gateway 24 and service engine 30 software ("*device discovery* [computer program]") establish a connection with the electronic device 12 ("*communication device*") through "wireless protocol" e.g., "bluetooth." (Ex.1015,3:12-13;Ex.1003,¶¶412-

428,457-461.) Clement discloses that its vehicle control unit 320 software performs a similar device discovery procedure, allowing the combined Rasin/Bosch/Clement system to also discover Clement's control device 230 ("*computational device*"). (Ex.1003,¶¶483-489,575-577.)

Clement discloses a vehicle 101 that includes "a vehicle control unit 320, and a portable device location system 330" that "may be (completely or partially) integrated together." (Ex.1010,6:27-30,7:32-36.) The "[v]ehicle control unit 320 may also be operatively connected to…the vehicle systems 310*a-f*…to change the state of any one of these systems." (Ex.1010,6:63-66.) A POSA would have understood that the wireless and wired connections collectively provide a "*network*" enabling the control device 230 to control vehicle functions through the vehicle control unit 320. (Ex.1003,¶¶490-496,575-577.)

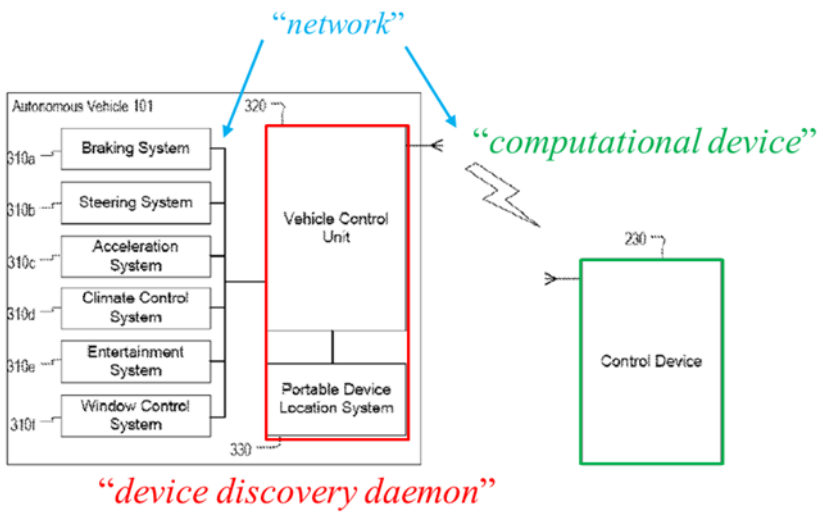


Fig. 3

Ex.1010,Fig.3 (Annotated)

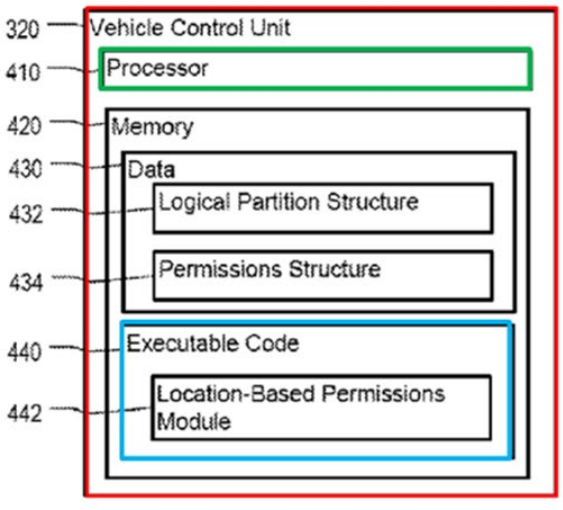


Fig. 4

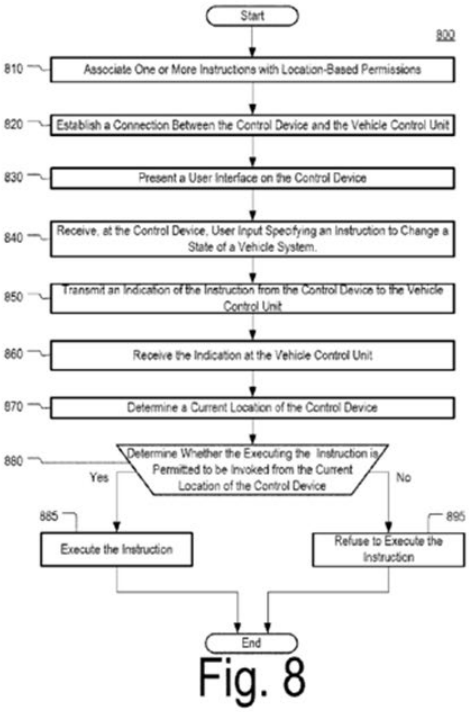


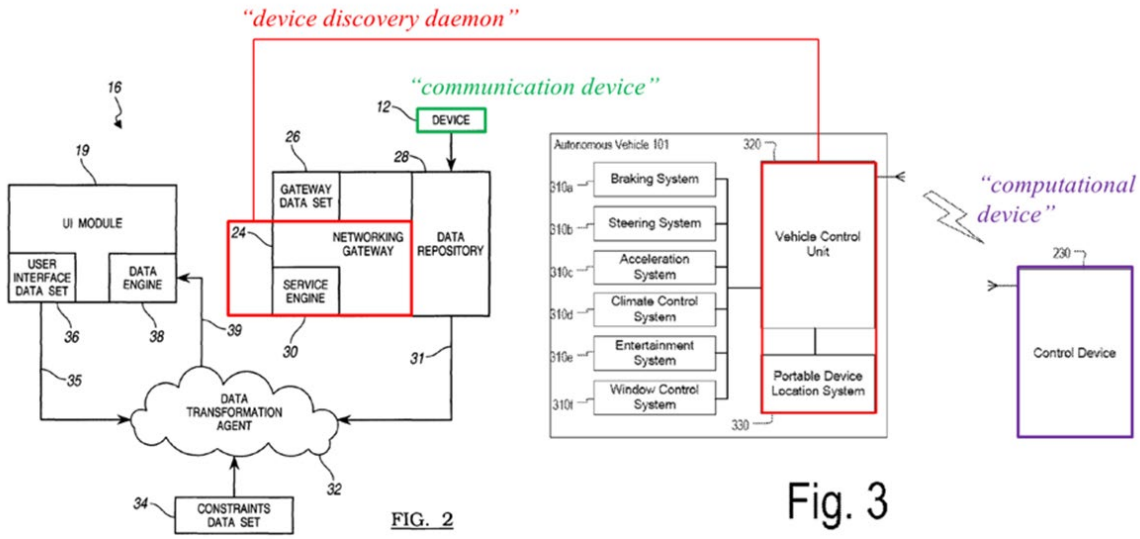
Fig. 8

Ex.1010,Figs.4,8 (Annotated)

Clement discloses that the vehicle control unit 320 establishes "a connection

between the control device 230 and the vehicle control unit 320" utilizing "any communications protocol" such as "Bluetooth." to change the state of one or more of the vehicle systems 310*a-f*." (Ex.1010,7:8-11,9:45-50,Figs.2,3,8;Ex.1003,¶497.) A POSA would have further understood that by connecting to and receiving instructions from the control device 230, the vehicle control unit 320 "*determines*" that the control device 230 is connected to the vehicle network. (Ex.1010,7:8-11;Ex.1003,¶¶498,575-577.)

Rasin's networking gateway 24 and service engine 30, combined with Clement's executable code 440, including the location-based permissions module 442 of the vehicle control unit 320 combined with the portable device location system 330, collectively provide a "*microprocessor executable device discovery* [computer program]." (Ex.1003,¶¶495,499,575-577.)



Ex.1015,Fig.2 (Annotated);Ex.1010,Fig.3 (Annotated)

[4b]/[15b]

Clement discloses that "the vehicle control unit 320 determines the current location of the control device 230" "[a]t task 870[.]" (Ex.1010,10:37-45;Ex.1003,¶¶500-501,575-577.)

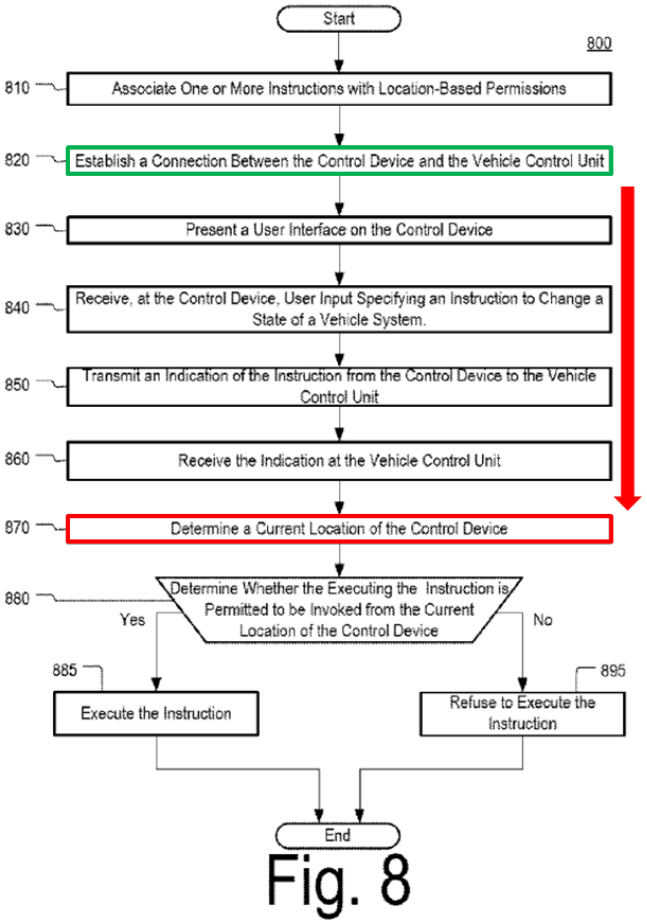


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement explains that the location of the control device 230 refers to a specific ("*predetermined*") region (e.g., Regions 1-4) of the vehicle, and that instructions are executed "only if the control device 230 is located in a **region** of the passenger compartment 210 where the instruction is permitted to be invoked from." (Ex.1010,8:14-24;Ex.1003,¶¶502-504,575-577.)

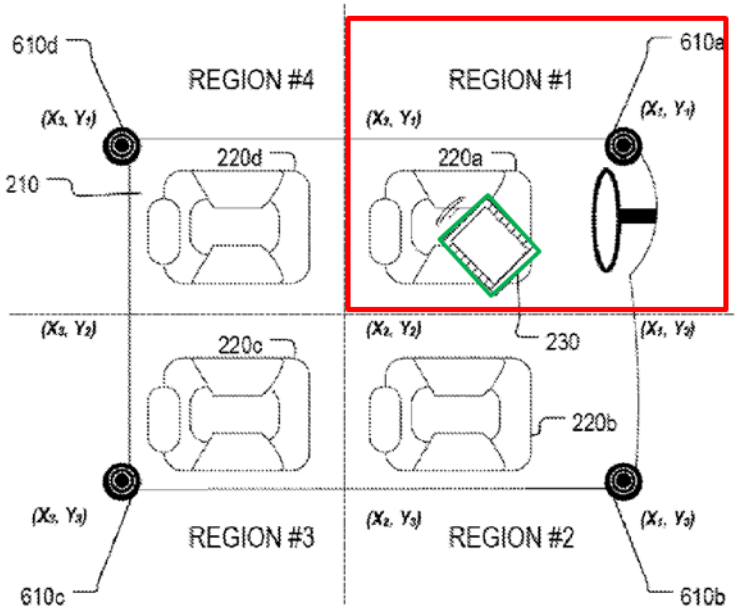


Fig. 6

Ex.1010,Fig.6 (Annotated)

[4c]/[15c]

Petitioner construes the term "*access or attempt to access the vehicle network and/or communication subsystem*" as "*access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem*."

Clement discloses that the "vehicle control unit 320 [uses] the location system 330 to enforce location-based permissions" and "[a]t task 880…determines whether the instruction is permitted to be invoked from the current location of the control device 230" and if so "Execute[s] the Instruction" at task 885. (Ex.1010,7:40-42,10:55-67,11:1-2;Ex.1003,¶¶505,508-509,575-577.)

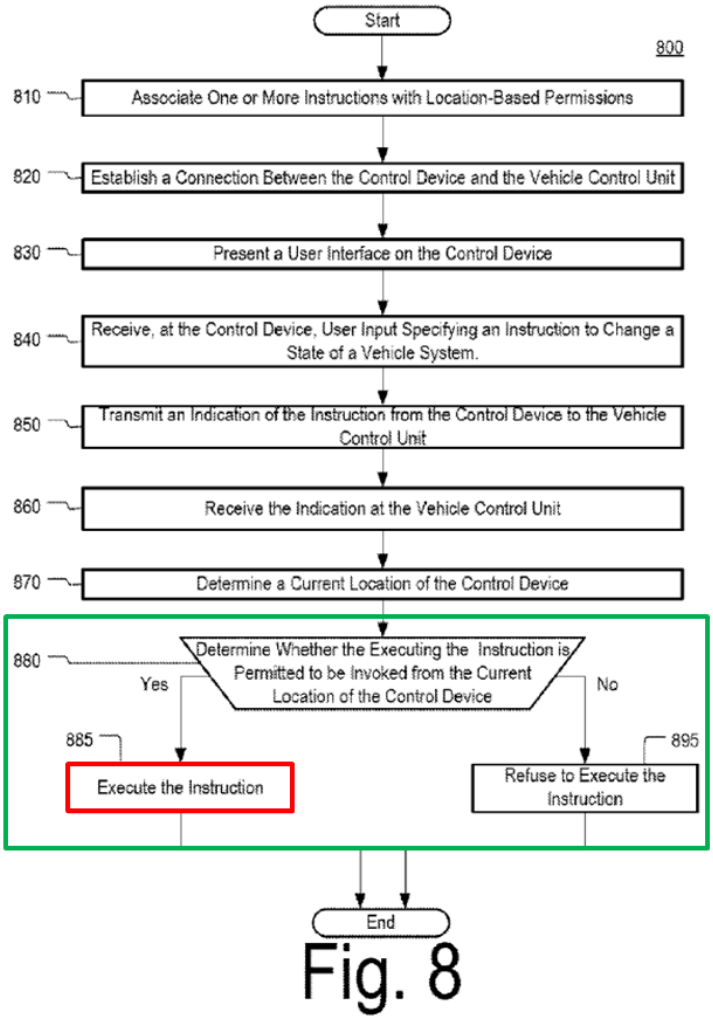


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement discloses that "some instructions, such as steering the vehicle 101, may be invoked only when the control device 230 is located in the area of the driver seat 220*a*." (Ex.1010,7:42-45.) A POSA would have understood that the control device 230 accesses the vehicle network, through the vehicle control unit 320, to control the steering system 310b. (Ex.1003,¶¶510,575-577.)

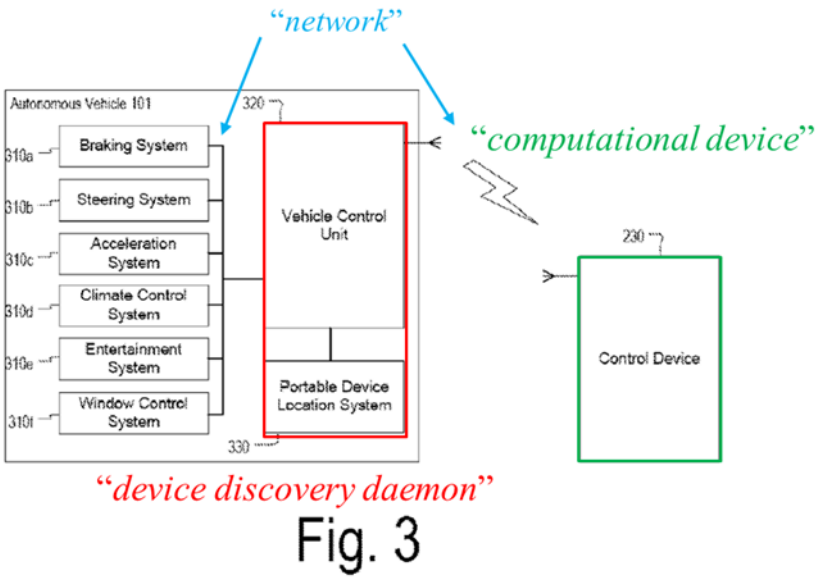


Fig. 3

Ex.1010,Fig.3 (Annotated)

Clement discloses that the control device 230 displays "buttons" 910*a–j* (mislabeled 900*a–j* in the figures) for controlling vehicle functions, e.g., button 910a provides a user access to a menu for "steering, stopping, or acceleration" and that the displayed menu varies by location. (Ex.1010,9:55-60,10:14-26;Ex.1003,¶¶511-513,575-577.)

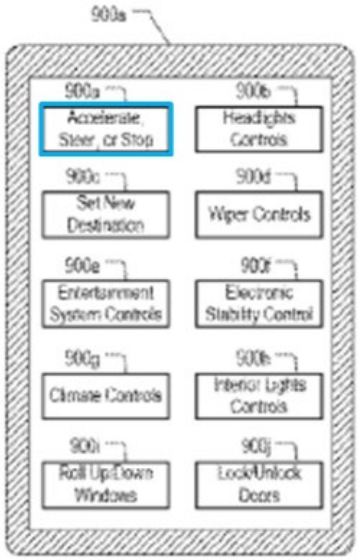


Fig. 9A

Ex.1010,Fig.9A (Annotated)

[4d]/[15d]

Clement discloses that "[a]t task 880" "if the control device 230 is outside" a permitted region, the vehicle control unit 320 "Refuse[s] to Execute the Instruction" at task 895. (Ex.1010,10:55-67,11:5-6;Ex.1003,¶¶514-516,575-577.)

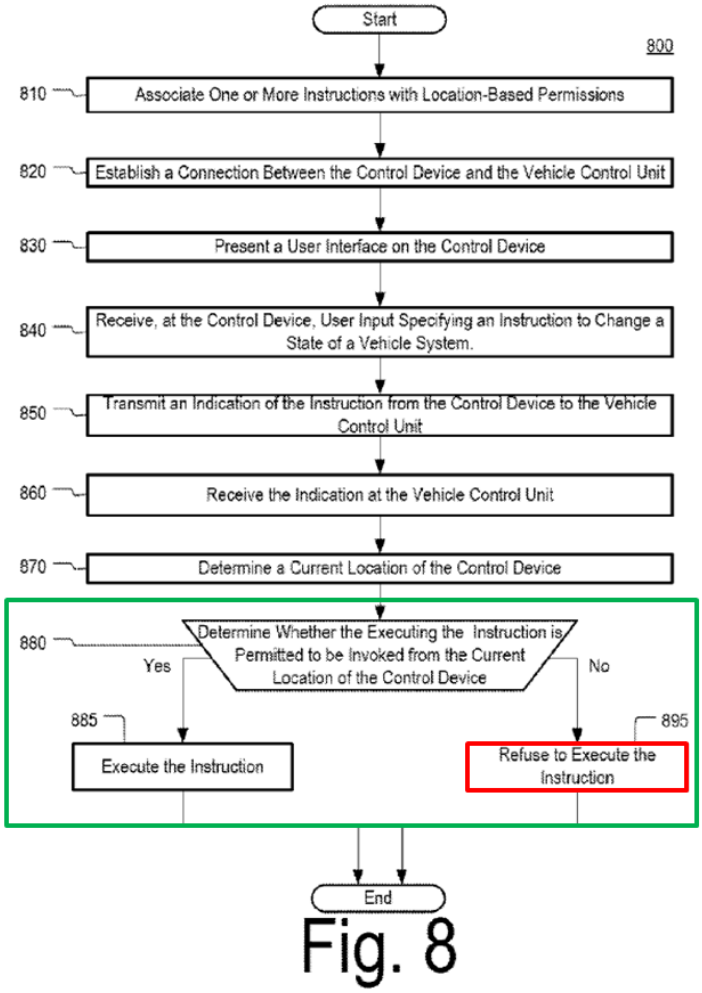


Fig. 8

Ex.1010,Fig.8 (Annotated)

Clement discloses that certain instructions, like steering, may be invoked "only when the control device 230 is located in the area of the driver seat 220*a*" and the steering button 900a is not present in the passenger seat interface (Fig. 9B) (Ex.1010,7:42-45;Ex.1003,¶¶517-518,575-577.)

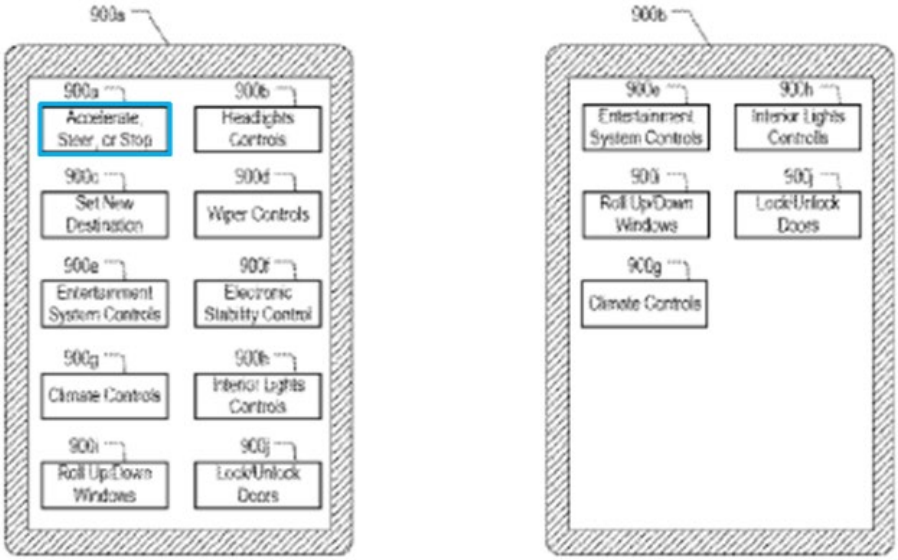


Fig. 9A Fig. 9B

Ex.1010,Figs.9A,9B (Annotated)

[5a]/[16a]

Clement discloses that "the control device 230 may determine its location and communicate it to the vehicle control unit 230 [*sic* 320]." (Ex.1010,10:48-49,*see also*12:14-25,10:50-54.) For example, Clement discloses determining if the specific location of the control device 230 is within one of the four specific "regions in the passenger compartment 210 where the instruction is permitted to be invoked from." (Ex.1010,10:55-67,*see also*1:42-51;Ex.1003,¶¶500-504,519-526,578-580.)

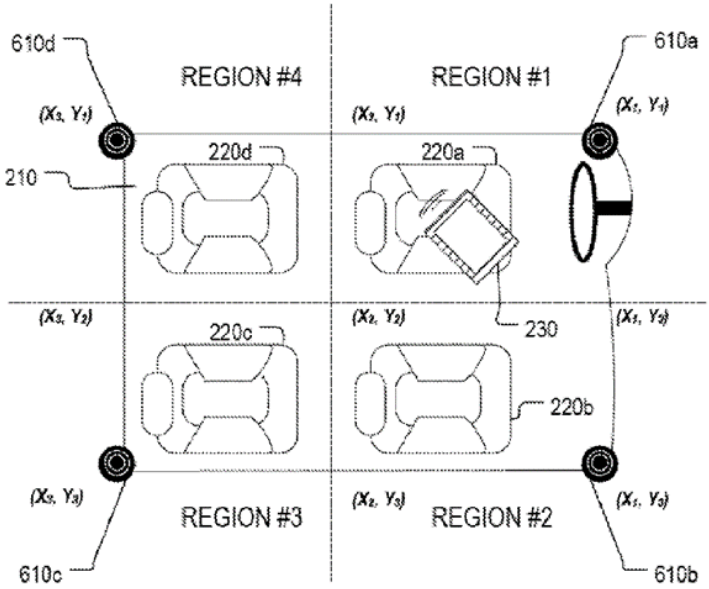


Fig. 6

Ex.1010,Fig.6

[5b]/[16b]

Clement discloses that the control device 230 ("*computational device*") "may be a tablet, a smart phone, a laptop, or another type of portable computing device." (Ex.1010,6:9-10;Ex.1003,¶¶527-528,578-580.)

[5c]/[16c]

Clement discloses that "the control device 230 may triangulate signal strength measurements from those transmitters to independently determine its location within the passenger compartment 210." (Ex.1010,10:50-54;Ex.1003,¶¶529-533,578-580.)

[7]/[18]

Clement discloses that the vehicle control unit 320 and the location system 330 "may be (completely or partially) integrated together" and that the "location

system 330 may include hardware and/or software for determining the location of the control device 230." (Ex.1010,7:23-36.) Clement discloses that the "location system 330 includes receivers 610*a-d*…located in different parts of…the passenger compartment 210" that measure the signal strength from the control device 230 and "forward those measurements to the vehicle control unit 320" for triangulation "to determine the location of the control device 230." (Ex.1010,7:23-32;Ex.1003,¶¶534-544,581-583.)

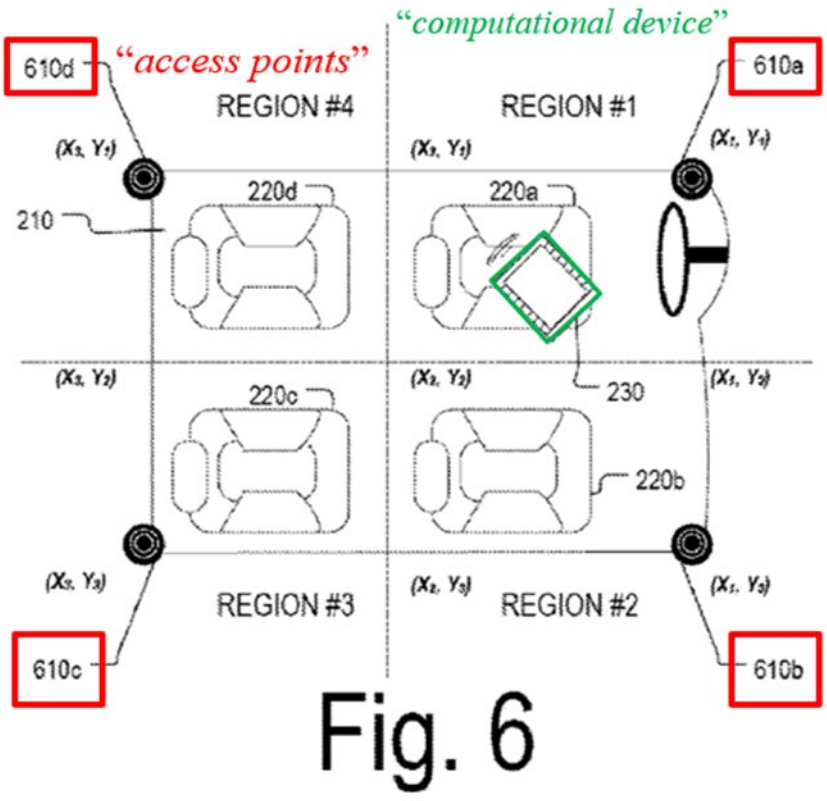


Fig. 6

Ex.1010,Fig.6 (Annotated)

[8a]/[19a]

Claims [8a]/[19a] are largely duplicative of claims [4c]/[8a]. (Ex.1003,¶¶545-549,584-586.)

[8b]/[19b]

Clement discloses that the "vehicle control unit 320 may use the location system 330 to enforce location-based permissions." (Ex.1010,7:40-42.) For example, if the control device 230 is in the driver's seat, it "may be capable of steering or accelerating the vehicle 101," which is "*a set of tasks…that can be performed*." (Ex.1010,5:61-64.) However, if the control device 230 is held by a passenger, it "may be permitted to control the vehicle's entertainment system, but not steer or apply the brakes of the vehicle[,]" which is "*a set of tasks…that cannot be performed*." (Ex.1010,5:64-67;Ex.1003,¶¶545-546,550-551,584-586.)

Clement discloses that the control device 230 displays a location-based menu of input components reflecting "*a set of tasks…that can be performed.*" For example, "when the control device 230 is located in regions #2-3, the menu 900B may be displayed[,]" however, it lacks "input components…for controlling safety-critical" functions of the vehicle 101. (Ex.1010,10:18-26;Ex.1003,¶¶552-553,584-586.)

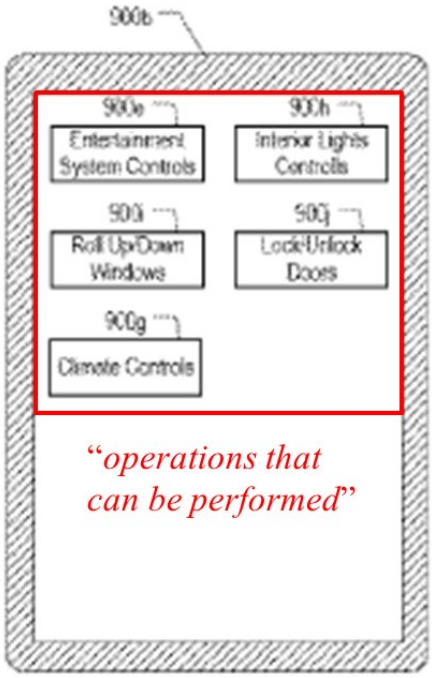


Fig. 9B

Ex.1010,Fig.9B (Annotated)

[9]/[20]

As explained above with reference to claim 7, Clement discloses determining the location of the control device 230 ("*computational device*") based on triangulation. (Ex.1003,¶¶554-558.) Clement also discloses determining the location of the control device 230 based on radio signal strength. (Ex.1010,3:13-15,8:42-58;Ex.1003,¶¶559-566,587-589.)

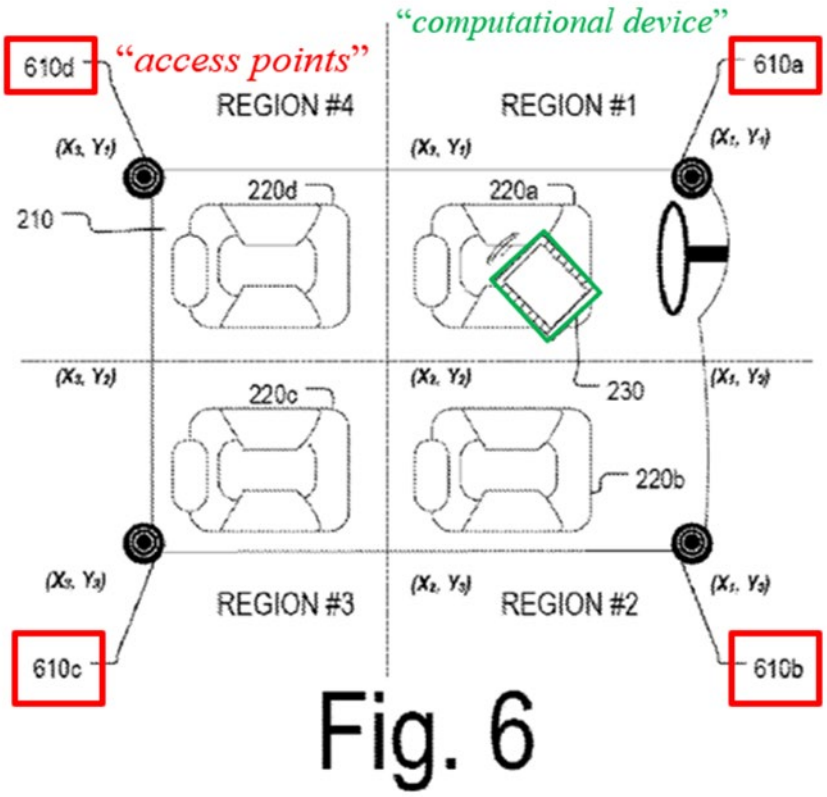


Fig. 6

Ex.1010,Fig.6 (Annotated)

[10]/[21]

Clement discloses that the receivers 610*a-d* measure "the signal strength of radio signal(s) transmitted by the control device 230" and sends the measurements "to the vehicle control unit 320" for triangulation "to determine the location of the control device 230." (Ex.1010,7:28-32;Ex.1003,¶¶567-570,590-592.)

Clement further discloses that "regions #1-4 may be represented by 4-tupples of signal strength ranges" that are "measured by each of the receivers 610*a-d* when the control device 230 is in a given region[]." (Ex.1010,8:43-46,8:50-55;Ex.1003,¶¶570-574,590-592.)

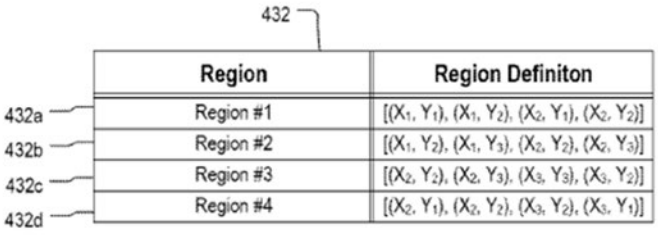


Fig. 5

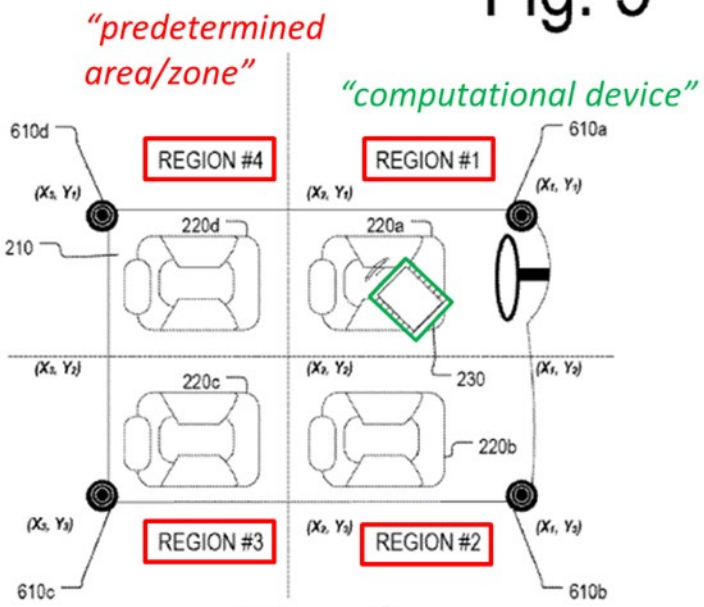


Fig. 6

Ex.1010,Figs.5,6 (Annotated)

A POSA would have understood that Clement's disclosed 4-tupple structure reflects a "*level of confidence*" in determining the location of the control device 230. A POSA would have also understood that by each region having its own signal strength range, Clement teaches that the vehicle control unit 320 determines whether the signal strength is above or below a "*threshold*" to be within any specific region. (Ex.1003,¶¶572-574,590-592.)

E. Ground 5: Claims 2 and 13 are Unpatentable as Obvious Over Rasin, Bosch, and Ghabra

1. Rationale to Combine

It would have been obvious to a POSA at the time of the invention to combine the vehicle user interface system disclosed in the Rasin/Bosch combination with the known technique of device discovery and positioning as disclosed in Ghabra to provide additional functionality and user convenience improvements, such as passive control, increased vehicle communication responsiveness, and conservation of battery life. A POSA would have understood that Rasin, Bosch, and Ghabra are complementary technologies that are combinable. (Ex.1015,2:16-26,5:24-28;Ex.1003,¶593.)

Rasin, Bosch, and Ghabra are from the same field – communication between a vehicle system and one or more electronic devices. (Ex.1015,1:5-7;Ex.1050,1118;Ex.1011,1:16-20.) Rasin discloses "a user interface system for a vehicle that enables access to an electronic device." (Ex.1015,1:5-7,3:18-27,3:39-44,3:65-4:8.) However, the Rasin/Bosch combination does not disclose an event-based system for initiating discovery or communication with external devices. (Ex.1003,¶¶594-596.)

Ghabra discloses a vehicle system "for localizing a fob in a passive entry sequence…to determine whether the fob is outside the vehicle in the vicinity of a

particular door…or inside the vehicle (i.e., a passive engine start sequence is triggered by a user pressing an engine start switch inside the vehicle)." (Ex.1011,4:57-63;Ex.1003,¶597.) Ghabra explained that a disadvantage of prior art remote-keyless entry (RKE) systems "is that the user must manually actuate the key fob to achieve the desired result." (Ex.1011,1:28-48,1:40-46;Ex.1003,¶¶598-600.)

Ghabra discloses a PEPS system that "operate[s] in a hands-free manner" that "has [the] advantages of added convenience, [and] faster response times" over existing systems. (Ex.1011,1:42-44,2:13-16,4:57-63;Ex.1003,¶¶601-602.)

A POSA at the time of the alleged invention would have been motivated to combine the vehicle user interface system disclosed in the Rasin/Bosch combination with the PEPS system disclosed in Ghabra to yield predictable results, e.g., expand the functionality of the device outside of the vehicle and to be able to interact with their vehicle in a "hands-free" manner to improve user convenience. As Ghabra explains, removing the need for manual actuation provides users with the "added convenience" of interacting with their vehicle. (Ex.1011,2:13-14;Ex.1003,¶¶603-604.)

Ghabra provides the added benefit of improved security, e.g., "resistance to relay attacks" with faster response times by authenticating or authorizing a fob before allowing it to access the vehicle network by using unique identifier numbers or security codes sent using ultra high frequency (UHF) signals. (Ex.1011,1:64-

67,3:57-67,4:8-29,4:30-40,6:55-58;Ex.1003,¶¶605-607.)

A POSA at the time of the invention would have recognized, based on the teachings of Ghabra, that the addition of a PEPS system to the Rasin/Bosch combination system also provides the added benefit of conservation of battery life. Ghabra discloses that by sending a wakeup signal in response to a trigger event, its PEPS system aids in "avoid[ing] excessive battery consumption by periodic radio transmission from the fob, [where] the approach of the user to the vehicle is usually sensed by the vehicle, which then wakes up the fob to perform a security check before actuating a passive entry function." (Ex.1011,1:44-48.) Further, "[p]assive entry communication operates over a much shorter range than RKE communication," therefore, "an LF signal…is used for passive entry while a much higher frequency RF signal…is used for RKE." (Ex.1011,1:54-58;Ex.1003,¶608.)

A POSA would have understood how to combine Rasin, Bosch, and Ghabra with a reasonable expectation of success. This modification would have been a simple combination of known elements in the prior art, e.g., additional transmitters and receivers to enable the two-way communication model utilized in Ghabra (Ex.1011,3:5-8,2:63-67,4:19-21,2:4-9), along with sensors that provide a trigger signal in response to a user lifting a door handle or pressing an engine start switch. (Ex.1011,3:10-15,4:57-63,5:22-24;Ex.1003,¶¶609-615.)

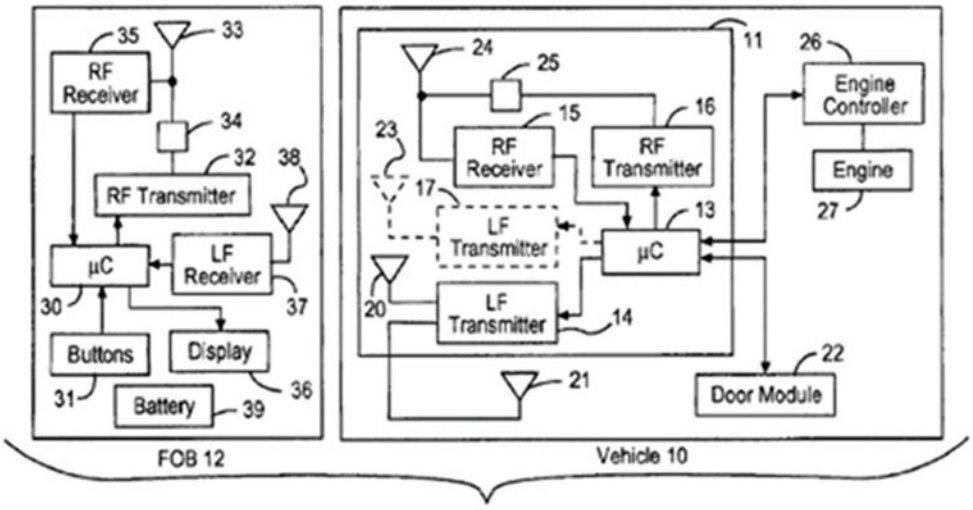
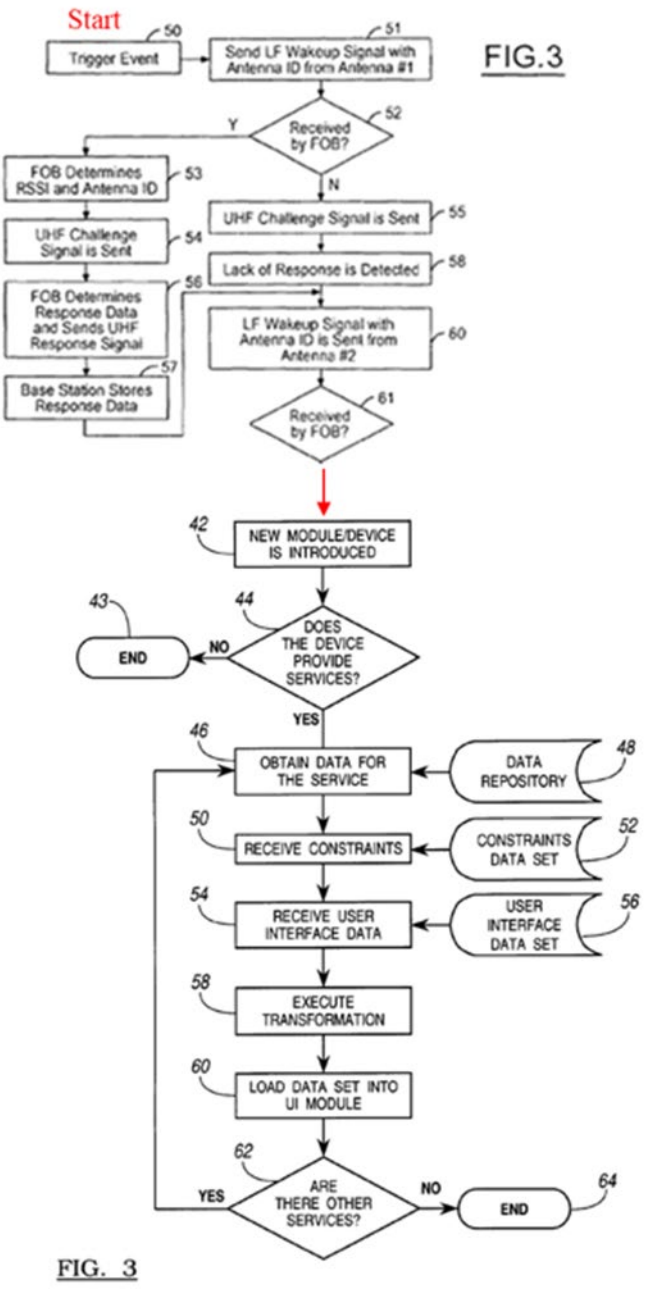


FIG.1

Ex.1011,Fig.1

Regarding software, a POSA would have been motivated to modify the combined Rasin/Bosch vehicle user interface system to include Ghabra's device discovery technique in response to a triggering event, e.g., as shown in the image below. (Ex.1003,¶¶616-618.)



Ex.1015,Fig.3 (Annotated);Ex.1011,Fig.3 (Annotated)

2. Dependent Claims 2 and 13

[2]/[13]

Petitioner construes the term "*daemon*" as "computer program."

(Ex.1003,¶¶83-85.) As explained for limitation [1a], Rasin discloses a user interface system 16 that includes a networking gateway 24 and a service engine 30 to enable detection of devices and process subsequent data received by the devices. (Ex.1015,3:39-43.) Rasin further discloses that the "electronic device 12 may be connected to user interface system 16 through the use of a port 15, which includes universal serial bus (USB) ports…[or] via a wireless protocol including, but not limited to Bluetooth[.]" (Ex.1015,3:4-17;Ex.1003,¶¶412-428,619-623,630-632.)

Ghabra discloses a PEPS system that "includes a base station or vehicle communication module 11 for communicating with a remote portable fob 12. Base station 11 includes a microcontroller 13 coupled to an LF transmitter 14, an RF receiver 15, and an RF transmitter 16." (Ex.1011,2:63-67;Ex.1003,¶¶624-625,630-632.)

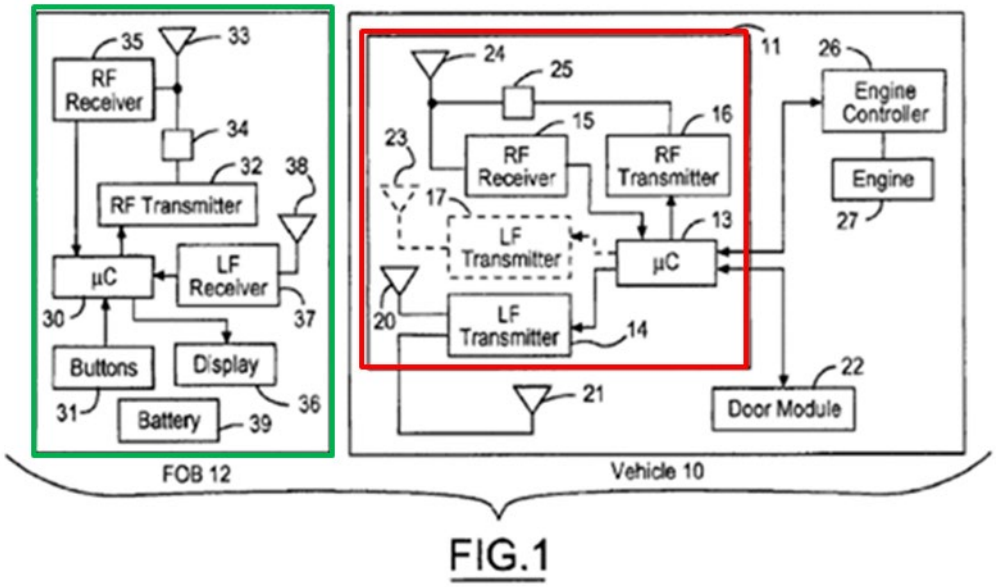
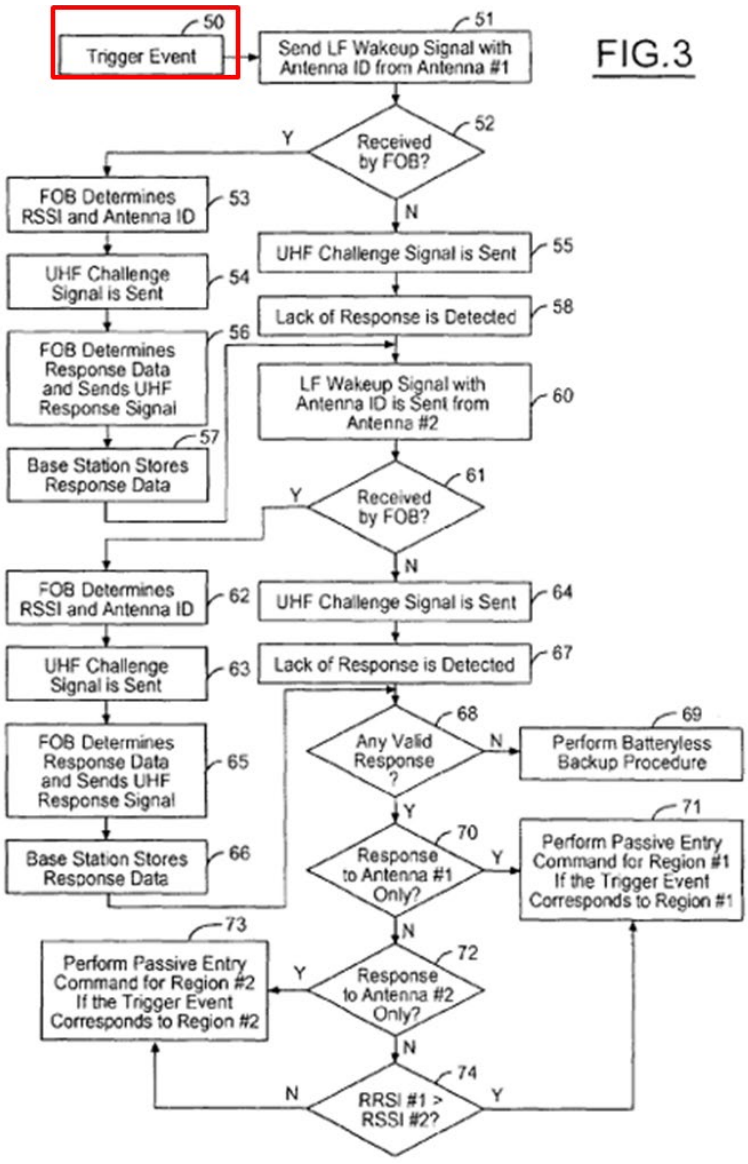


FIG.1

Ex.1011,Fig.1 (Annotated)

With reference to Figure 3, Ghabra discloses initiating wireless communication in response to a "trigger event" ("*predetermined event*"), e.g., "lifting a door handle or pressing a start button inside the vehicle[]." (Ex.1011,5:22-25;Ex.1003,¶¶626,630-632.)



Ex.1011,Fig.3 (Annotated)

Ghabra discloses an embodiment in which "[a] first LF wakeup signal 40 is

generated" in response to "a trigger signal" ("*ping*"), e.g., "when a door unlock request is initiated by a trigger signal from the lifting of a door handle" or "a passive engine start sequence is triggered by a user pressing an engine start switch inside the vehicle" ("*starting the vehicle*"). (Ex.1011,4:57-63;Ex.1003,¶¶627-632.)

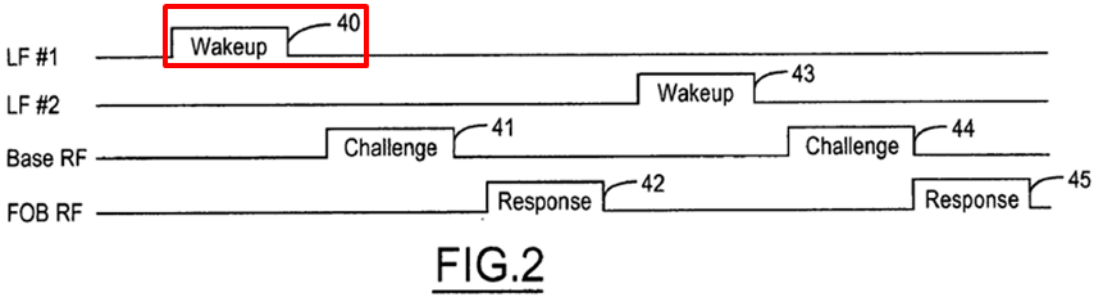


FIG.2

Ex.1011,Fig.2 (Annotated)

F. Ground 6: Claim 6 and 17 are Unpatentable as Obvious Over Rasin, Bosch, Clement, and Ghabra

1. Rationale to Combine

A POSA would have been motivated and understood how to combine Rasin, Bosch, and Clement as explained in Ground 4, and similarly to combine Rasin, Bosch, and Ghabra as explained in Ground 5. (Ex.1003,¶¶467-482,593-618.) The rationale to combine Rasin, Bosch, and Ghabra likewise supports combining Ghabra with the Rasin/Bosch/Clement combination. (Ex.1003,¶¶633-668.)

2. Dependent Claims 6 and 17

[6a] The method of claim 4, wherein step (a)[13] comprises the substeps: receiving, by the device discovery daemon,

[17a] The vehicle of claim 15, wherein operation (a) comprises the sub-operations: receive…

… information from an on board vehicle sensor that a new occupant has entered the vehicle;

As explained for limitation 1[pre], Rasin discloses "a method for enabling access to electronics devices through the use of a user interface system in accordance with an embodiment of the present invention." (Ex.1015,2:8-11;Ex.1003,¶¶669-671,693-695.)

As explained for limitation [4a], which is referenced by "step (a)," Rasin's disclosure of the user interface system 16 establishing a connection with the electronic device 12 through "wireless protocol including, but not limited to bluetooth" (Ex.1015,3:12-13) indicates that the user interface system 16 and its associated software (networking gateway 24 and service engine 30 – "*device discovery* [computer program]") is discovering and wirelessly connecting the electronic device 12 ("*communication device*") to the vehicle network.

[13] The term "*step[operation] (a)*" lacks antecedent basis and Petitioner interprets the phrase as referring to claims [4a]/[15a].

(Ex.1003,¶¶485-499.) Further, Clement discloses that its vehicle control unit 320 software performs similar device discovery procedure. Thus, Rasin/Bosch/Clement/Ghabra combination teaches the "*device discovery* [computer program]" limitations of Ground 6. (Ex.1003,¶¶672,693-695.)

Ghabra discloses a PEPS system that "includes a base station or vehicle communication module 11 for communicating with a remote portable fob 12. Base station 11 includes a microcontroller 13 coupled to an LF transmitter 14, an RF receiver 15, and an RF transmitter 16." (Ex.1011,2:63-67;Ex.1003,¶¶673,693-695.)

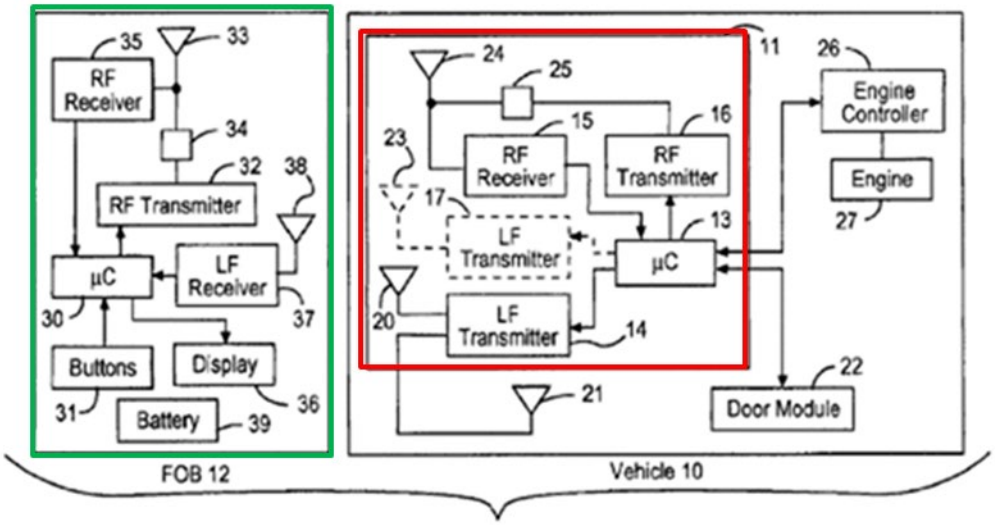
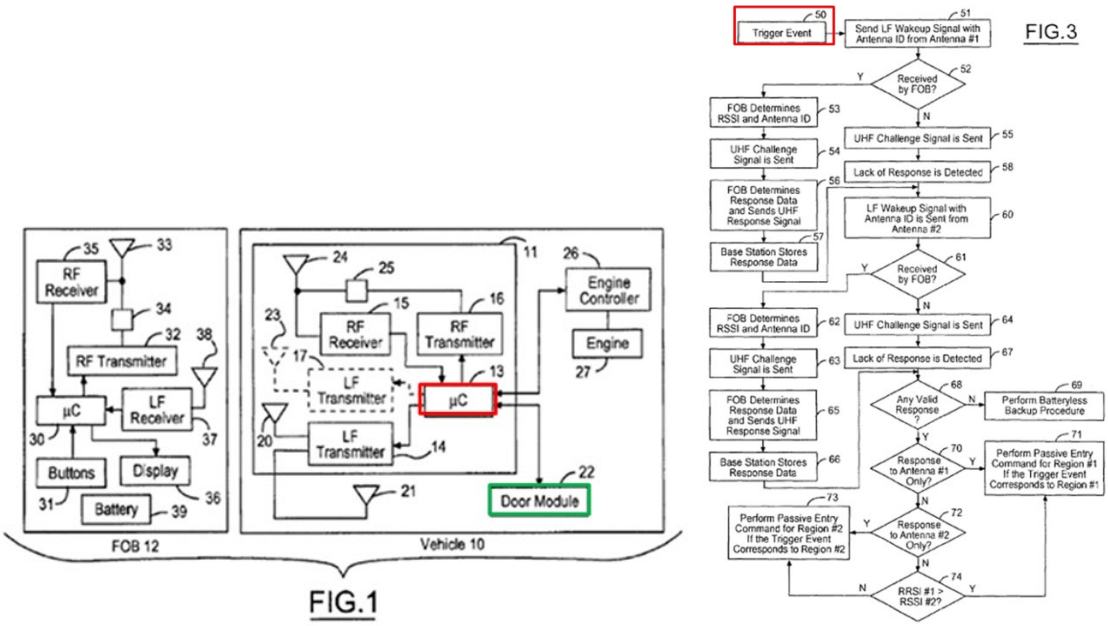


FIG.1

Ex.1011,Fig.1 (Annotated)

Ghabra discloses initiating wireless communication in response to a "trigger event", i.e., "a trigger event is generated indicating a request for a passive entry function (e.g., lifting a door handle or pressing a start button inside the vehicle)." (Ex.1011,5:22-25.) A "[d]oor module 22 is coupled to microcontroller 13 and may

preferably include a sensing switch for detecting the lifting of a door handle…." (Ex.1011,3:10-13.) Ghabra also discloses that a "trigger signal" w ould be "triggered by a user pressing an engine start switch inside the vehicle." (Ex.1011,4:57-63.) A POSA would have understood that a trigger signal generated by Ghabra's door module 22 sensing switch or engine start switch ("*on board vehicle sensor*") is an indication, or "*information that a new occupant has entered the vehicle*." (Ex.1003,¶¶674-680,693-695.)



Ex.1011,Figs.1,3 (Annotated)

Ghabra also discloses determining whether a fob is authorized by using unique identifier numbers or security codes. (Ex.1011,3:57-67,4:8-40.) A POSA would also have understood that the process of authorizing the fob is yet another indication that a new occupant is attempting to connect to the vehicle or has entered the vehicle.

(Ex.1003,¶¶681-682,693-695.)

[6b]/[17b] in response to the receipt of the information, emit[ting, by the device discovery daemon,]

… ***a ping to discover the computational device; and***

Ghabra discloses transmitting a wakeup signal 40 ("*ping*"), in response to receiving a trigger signal ("*information*") to interrogate an area ("*discover*") for the fob: "A first LF wakeup signal 40 is generated from a first antenna preferentially transmitting to a first area with respect to the vehicle" which "is initiated by a trigger signal from the lifting of a door handle) or inside the vehicle (i.e., a passive engine start sequence is triggered by a user pressing an engine start switch inside the vehicle)." (Ex.1011,4:57-5:3;Ex.1003,¶¶683,693-695.) "At point 52, either a fob is actually present or not in the area being interrogated by the first antenna." (Ex.1011,5:27-28;Ex.1003,¶¶684-686,693-695.)

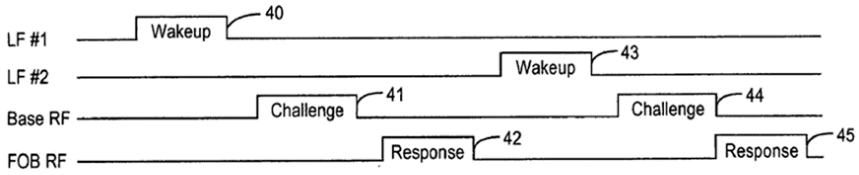
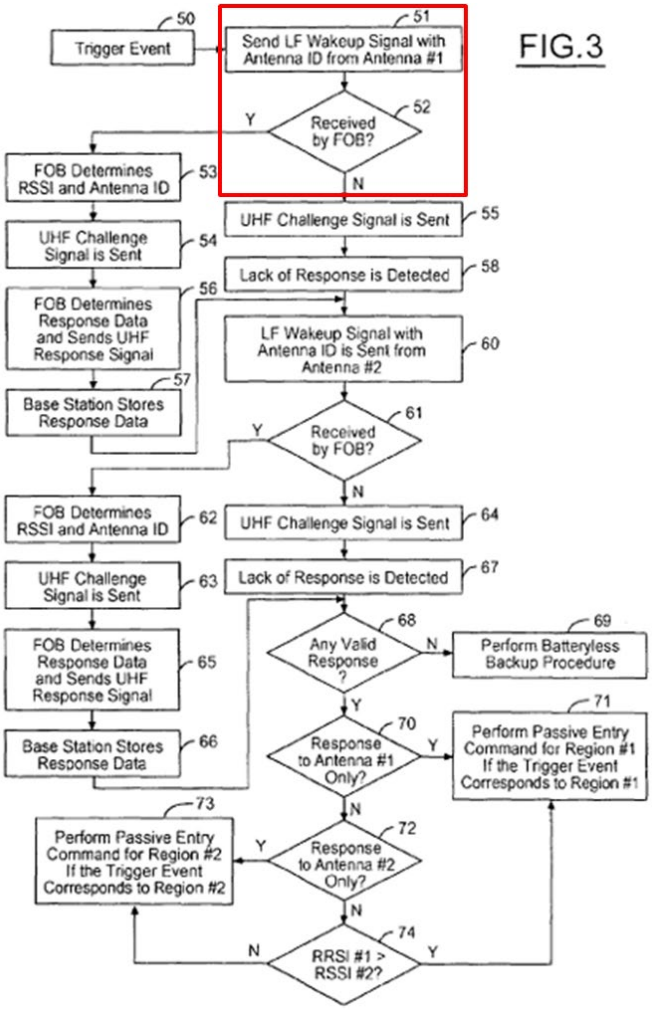


FIG.2

Ex.1011,Fig.2



Ex.1011,Fig.3 (Annotated)

[6c]/[17c] when a responsive signal is received from the computational device, determin[ing, by the device discovery daemon,]…

… that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle[14].

[14] Petitioner interprets "*a network…of a vehicle*" as "*the network…of the vehicle*" for antecedent basis.

Ghabra discloses that "[a]fter waiting [for] the fob to awaken, the base station sends a challenge signal 41 via the base station RF transmitter and antenna….When the fob is located in the area…the response includes RSSI data showing strong reception. [Otherwise], the RSSI data will reflect a weak signal." (Ex.1011,4:67-,5:9.) Ghabra further discloses that "[i]f a fob was awakened in the desired location being polled, a UHF response signal 45 is sent from the fob RF transmitter to the base station RF receiver." (Ex.1011,5:16-19;Ex.1003,¶¶687-689,693-695.)

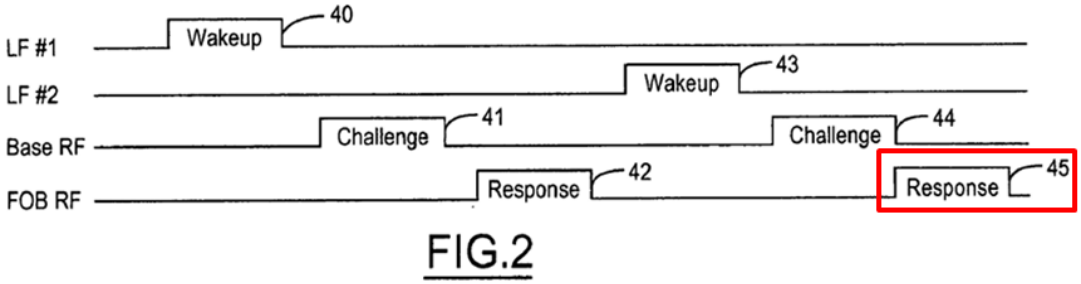


FIG.2

Ex.1011,Fig.2 (Annotated)

A POSA would have understood that Ghabra's disclosure of receiving the response signal 45 after transmitting the UHF challenge signal 44 indicates that the fob was awakened in the proper zone and is attempting to access vehicle functionality. (Ex.1003,¶¶690-695.)

VIII. Objective Indicia of Nonobviousness

Petitioner is not aware of any evidence of alleged secondary considerations of non-obviousness having nexus to the challenged claims. (Ex.1003,¶696.)

IX. Conclusion

For the foregoing reasons, the Board should grant institution.

Respectfully submitted,

Dated: August 14, 2025

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Certificate of Service

The undersigned hereby certifies that the foregoing **PETITION FOR *INTER PARTES* REVIEW UNDER 35 U.S.C. § 311 *ET SEQ.* AND 37 C.F.R. § 42.100 *ET SEQ.* (U.S. PATENT NO. 9,290,153)**, including all exhibits and supporting evidence, was served by overnight courier in its entirety on **August 14, 2025**, upon the following correspondence address as shown for the '153 Patent:

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UNITED STATES

Respectfully submitted,

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Certificate of Compliance Pursuant to 37 C.F.R. § 42.24

This paper complies with the type-volume limitation of 37 C.F.R. § 42.24. The paper contains 13,942 words, excluding the parts of the paper exempted by §42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii)&(iv).

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Appendix A

A. Listing of All Challenged Claims

1[pre]	A method, comprising:
[1a]	discovering, by a microprocessor executing a microprocessor executable device discovery daemon, one or more communication devices connected wirelessly to a network and/or communication subsystem of a vehicle;
[1b]	for each of the discovered one or more communication devices, populating, by the microprocessor executing the device discovery daemon, system data with device information and capabilities; and
[1c]	refreshing, by the microprocessor executing a microprocessor executable desktop manager, graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.
[2]	The method of claim 1, wherein the device discovery daemon pings the network and/or communication subsystem when a predetermined event occurs, the predetermined event being one or more starting the vehicle and a vehicle door opens or closes.
[3]	The method of claim 1, wherein the device discovery daemon determines capabilities of the one or more communication devices based on which open port the one or more communication devices exposes to the device discovery daemon.
[4a]	The method of claim 1, further comprising: determining, by the microprocessor executable device discovery daemon, that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;

[4b]	in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[4c]	applying, by the device discovery daemon, at least the following rules: (C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem; and
[4d]	(C2) when the computational device is not located within the predetermined area and/or zone of the vehicle, not permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem.
[5a]	The method of claim 4, wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality of predetermined areas and/or zones, to be used in applying the rules,
[5b]	wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and
[5c]	wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.
[6a]	The method of claim 4, wherein step (a) comprises the substeps: receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;
[6b]	in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and

[6c]	when a responsive signal is received from the computational device, determining, by the device discovery daemon, that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.
[7]	The method of claim 4, wherein the determining step (b) bases the determination on whether the computational device is located within the predetermined area and/or zone of the vehicle on one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.
[8a]	The method of claim 7, wherein the wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is permitted to access or attempt to access the vehicle network and/or communication subsystem and

[8b]	wherein the device discovery daemon determines a set of tasks, functions, and/or operations that can be performed and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device.
[9]	The method of claim 7, wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.
[10]	The method of claim 9, wherein the device discovery daemon determines a level of confidence that the computational device is located within the predetermined area and/or zone and wherein the device discovery daemon determines that the computational device is located within the predetermined area and/or zone when the level of confidence has at least a threshold value.

[11]	A non-transitory and tangible computer readable medium comprising processor executable instructions that, when executed, perform the steps of claim 1.
12[pre]	A vehicle, comprising:
[12a]	a microprocessor;
[12b]	a network and/or communication subsystem of a vehicle;
[12c]	a microprocessor executable device discovery daemon stored in a computer readable medium and configured to discover one or more communication devices connected wirelessly to the network and/or communication subsystem of a vehicle and,
[12d]	for each of the discovered one or more communication device, populate system data with device information and capabilities; and
[12e]	a microprocessor executable desktop manager stored in the computer readable medium and configured to refresh graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.
[13]	The vehicle of claim 12, wherein the device discovery daemon pings the network and/or communication subsystem when a predetermined event occurs, the predetermined event being one or more starting the vehicle and a vehicle door opens or closes.
[14]	The vehicle of claim 12, wherein the device discovery daemon determines capabilities of the one or more communication devices based on which open port the one or more communication devices

	exposes to the device discovery daemon.
[15a]	The vehicle of claim 12, wherein the device discovery daemon is further configured to: determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[15b]	in response, determine whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[15c]	apply at least the following rules: (C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permit the computational device to access or attempt to access the vehicle network and/or communication subsystem; and
[15d]	(C2) when the computational device is not located within the predetermined area and/or zone of the vehicle, not permit the computational device to access or attempt to access the vehicle network and/or communication subsystem.
[16a]	The vehicle of claim 15, wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality of predetermined areas and/or zones, to be used in applying the rules,
[16b]	wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and
[16c]	wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.
[17a]	The vehicle of claim 15, wherein operation (a) comprises the sub-operations: receive information from an on board vehicle sensor that

	a new occupant has entered the vehicle;
[17b]	in response to the receipt of the information, emit a ping to discover the computational device; and
[17c]	when a responsive signal is received from the computational device, determine that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.
[18]	The vehicle of claim 15, wherein the determining operation (b) bases the determination on whether the computational device is located within the predetermined area and/or zone of the vehicle on one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.

[19a]	The vehicle of claim 15, wherein the wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is permitted to access or attempt to access the vehicle network and/or communication subsystem and
[19b]	wherein the device discovery daemon determines a set of tasks, functions, and/or operations that can be performed and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device.
[20]	The vehicle of claim 15, wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.
[21]	The vehicle of claim 20, wherein the device discovery daemon determines a level of confidence that the computational device is

	located within the predetermined area and/or zone and wherein the device discovery daemon determines that the computational device is located within the predetermined area and/or zone when the level of confidence has at least a threshold value.

Appendix B

A. Comparison of Independent Claims

Ind. Claim	Ind. Claim
1[pre] A method, comprising:	12[pre] A vehicle, comprising:
[1a] discovering, by a microprocessor executing a microprocessor executable device discovery daemon, one or more communication devices connected wirelessly to a network and/or communication subsystem of a vehicle;	[12a] a microprocessor; [12b] a network and/or communication subsystem of a vehicle; [12c] a microprocessor executable device discovery daemon stored in a computer readable medium and configured to discover one or more communication devices connected wirelessly to the network and/or communication subsystem of a vehicle and,
[1b] for each of the discovered one or more communication devices, populating, by the microprocessor executing the device discovery daemon, system data with device information and capabilities; and	[12d] for each of the discovered one or more communication device, populate system data with device information and capabilities; and
[1c] refreshing, by the microprocessor executing a microprocessor executable desktop manager, graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.	[12e] a microprocessor executable desktop manager stored in the computer readable medium and configured to refresh graphical elements of a graphical display of the vehicle to reflect the discovered one or more communication devices.

B. Comparison of Dependent Claims

Depends from Ind. Claim 1	Depends from Ind. Claim 12
[2] The method of claim 1,	[13] The vehicle of claim 12,

wherein the device discovery daemon pings the network and/or communication subsystem when a predetermined event occurs, the predetermined event being one or more starting the vehicle and a vehicle door opens or closes.	wherein the device discovery daemon pings the network and/or communication subsystem when a predetermined event occurs, the predetermined event being one or more starting the vehicle and a vehicle door opens or closes.
[3] The method of claim 1, wherein the device discovery daemon determines capabilities of the one or more communication devices based on which open port the one or more communication devices exposes to the device discovery daemon.	[14] The vehicle of claim 12, wherein the device discovery daemon determines capabilities of the one or more communication devices based on which open port the one or more communication devices exposes to the device discovery daemon.
[4a] The method of claim 1, further comprising: determining, by the microprocessor executable device discovery daemon, that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;	[15a] The vehicle of claim 12, wherein the device discovery daemon is further configured to: determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[4b] in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle; and	[15b] in response, determine whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[4c] applying, by the device discovery daemon, at least the following rules: (C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permitting the computational device to access or	[15c] apply at least the following rules: (C1) when the computational device is located within the predetermined area and/or zone of the vehicle, permit the computational device to access or

attempt to access the vehicle network and/or communication subsystem; and	attempt to access the vehicle network and/or communication subsystem; and
[4d] (C2) when the computational device is not located within the predetermined area and/or zone of the vehicle, not permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem.	[15d] (C2) when the computational device is not located within the predetermined area and/or zone of the vehicle, not permit the computational device to access or attempt to access the vehicle network and/or communication subsystem.
[5a] The method of claim 4, wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality of predetermined areas and/or zones, to be used in applying the rules,	[16a] The vehicle of claim 15, wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality of predetermined areas and/or zones, to be used in applying the rules,
[5b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and	[16b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and
[5c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.	[16c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.
[6a] The method of claim 4, wherein step (a) comprises the substeps: receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;	[17a] The vehicle of claim 15, wherein operation (a) comprises the sub-operations: receive information from an on board vehicle sensor that a new occupant has entered the vehicle;
[6b] in response to the receipt of the information, emitting, by the device discovery daemon,	[17b] in response to the receipt of the information, emit

a ping to discover the computational device; and	a ping to discover the computational device; and
[6c] when a responsive signal is received from the computational device, determining, by the device discovery daemon, that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.	[17c] when a responsive signal is received from the computational device, determine that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.
[7] The method of claim 4, wherein the determining step (b) bases the determination on whether the computational device is located within the predetermined area and/or zone of the vehicle on one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether	[18] The vehicle of claim 15, wherein the determining operation (b) bases the determination on whether the computational device is located within the predetermined area and/or zone of the vehicle on one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether

the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.	the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.
[8a] The method of claim 7, wherein the wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is permitted to access or attempt to access the vehicle network and/or communication subsystem and	[19a] The vehicle of claim 15, wherein the wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is permitted to access or attempt to access the vehicle network and/or communication subsystem and
[8b] wherein the device discovery daemon determines a set of tasks, functions, and/or operations that can be performed and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device.	[19b] wherein the device discovery daemon determines a set of tasks, functions, and/or operations that can be performed and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device.
[9] The method of claim 7, wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location	[20] The vehicle of claim 15, wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as received by an access point of the vehicle, a received satellite-based position of the computational device, triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle, image processing of images of the predetermined area and/or zone, occupant presence and/or location

information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.	information received by an on board vehicle sensor, whether the computational device is attempting to connect to the network and/or communication subsystem wirelessly or by hard wire connection, whether the computational device has moved relative to a selected access point during a defined time interval, whether the received signal strength of signaling from the computational device at a selected access point varies temporally, a type or service of the computational device, and input received from a user of the computational device.
[10] The method of claim 9, wherein the device discovery daemon determines a level of confidence that the computational device is located within the predetermined area and/or zone and wherein the device discovery daemon determines that the computational device is located within the predetermined area and/or zone when the level of confidence has at least a threshold value.	[21] The vehicle of claim 20, wherein the device discovery daemon determines a level of confidence that the computational device is located within the predetermined area and/or zone and wherein the device discovery daemon determines that the computational device is located within the predetermined area and/or zone when the level of confidence has at least a threshold value.
[11] A non-transitory and tangible computer readable medium comprising processor executable instructions that, when executed, perform the steps of claim 1.	