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. 9,020,697

Case No.: IPR2025-01342

DECLARATION OF TODOR COOKLEV

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List of Exhibits

Exhibit No.	Description
1001	U.S. Patent No. 9,020,697 ("the '697 Patent")
1002	U.S. Patent No. 9,020,697 Certified File History ("the '697 Patent File History")
1003	Expert Declaration of Todor Cooklev
1004	Todor Cooklev Curriculum Vitae
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 to Moinzadeh ("Moinzadeh")
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") (Excerpts)
1052	"Specification of The Bluetooth System" (June 30, 2010). Version 4.0 (Volumes XX) Available at https://www.bluetooth.com/specifications/specs/core-specification-4-0/ (Accessed June 27, 2025) ("Bluetooth Specification")
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 ("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 ("McCartt") Available at https://pmc.ncbi.nlm.nih.gov/articles/PMC4001674/ (Accessed July 1, 2025.)

Exhibit No.	Description
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")
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")

I, Todor Cooklev, hereby declare as follows:

1. I am making this declaration at the request of Ford Motor Company in the matter of *inter partes* review of U.S. Patent No. 9,020,697 ("the '697 Patent") to Christopher Ricci. (Ex. 1001.)

2. I am being compensated at an hourly consulting rate of $700 for time spent reviewing materials and performing my analysis of the technical issues relevant to this matter. My compensation is not contingent on the outcome of this proceeding or the content of my opinions.

3. This declaration is based on the information currently available to me. If additional information becomes available, I may continue my investigation and study, which may include a review of documents and information that may be produced, as well as testimony from depositions that have not yet been taken.

4. In preparation of this declaration, I have studied the exhibits as listed in the Exhibit List shown above in my report.

5. In forming the opinions expressed below, I have considered:

   a. The documents listed above as well as additional patents and documents referenced herein;

   b. The relevant legal standards, including the standard for obviousness provided in *KSR International Co. v. Teleflex, Inc*.,

550 U.S. 398 (2007), and any additional documents cited in the body of this declaration; and

c. My knowledge and experience based upon my work and study in this area as described below.

I. Qualifications and Professional Experience

6. I have provided my full background in the curriculum vitae that is attached as Ex. 1004.

7. I am currently Professor of Electrical and Computer Engineering at Purdue University in Fort Wayne, Indiana, where I have had several administrative positions.

8. In addition to communications systems and radios, my current research interests include hardware and software architectures of electronic devices. A significant part of my research is specifically focused on standards-related issues. I have received a number of research grants in these areas. My research has been funded by DARPA, the Air Force Research Laboratory, the Office of Naval Research, and other organizations. My teaching responsibilities have included courses in communication systems and networks, signals and systems, software-defined radio, and digital signal processing.

9. I am a named inventor on more than thirty U.S. patents, most of which relate to the hardware or software aspects of communication systems. In 2019, I was

inducted into the Purdue Inventors Hall of Fame. I have also authored and coauthored more than one hundred peer-reviewed articles. I also authored "Wireless Communication Standards: A Study of IEEE 802.11, 802.15, and 802.16," published by IEEE Press. Recently I authored the textbook "Modern Communications Systems: A First Course" published by the University of Michigan. According to the publisher, the textbook has been used at close to 200 universities in the United States and at a similar number of universities abroad.

10. I graduated from the Technical University of Sofia, Bulgaria in 1988 with a Diploma of Engineering in the field of Electrical Engineering. I graduated from Tokyo Institute of Technology in Tokyo, Japan in 1995 with a Doctor of Philosophy (Ph.D.) degree in Electrical Engineering.

11. Prior to my career in academia, I worked in the high-technology industry. I worked in research and development but also contributed to product firmware and software development. I have worked on the design of an Application Specific Integrated Circuit (ASIC).

12. I have contributed to the development of several major standards for communication systems and numerous amendments, including Bluetooth, Wi-Fi, cellular, and other standards. I have participated in many meetings of standards committees; I have chaired some committee meetings and served in other leadership roles. Since about 1999 I have been reviewing and contributing to many standards

relevant to wireless protocols, and to the hardware and software for their implementation. At present, I continue to be involved.

13. Around 1998 - 1999 I participated in the Bluetooth Special Interest Group (SIG). I was among the authors of the Bluetooth 1.0 specification, contributing to the Host Controller Interface (HCI) and the Message Sequence Charts that illustrate the interaction between the host and the Bluetooth radio. At the time it was recognized that laptop computers and personal digital assistants (PDAs, predecessors of modern smartphones) would be the main but not the only examples of Bluetooth hosts. Even then it was expected that Bluetooth would become part of many embedded systems. This proved correct; in subsequent years Bluetooth enabled many novel applications, exceeding the expectations for success that we had as authors of the 1.0 specification. In 1999 I participated in the group that established the license agreement between the Bluetooth SIG and the IEEE 802. Subsequently I joined IEEE 802.

14. Within IEEE 802, I mostly participated in 802.15 and 802.11. For example, I contributed to the early work within 802.15.1 and 802.15.2. In November 1999 I was part of the group that established 802.15.3. I was also a voting member of 802.11 during 2000-2002 and 2005-2008. Between 2005 and 2008 the 802.11 Working Group worked on, *inter alia*, 802.11p, an amendment supporting Intelligent Transportation Systems (ITS). Further, I chaired a Study Group within IEEE 802.11

and for part of this work I received an award from IEEE Standards Association in 2012.

15. Around 2006-2008 I was the Principal Investigator of one National Science Foundation grant awarded to the IEEE. This grant supported many students and their faculty mentors from a number of institutions who worked on the development of innovative hardware and software that incorporated standards such as Bluetooth and Wi-Fi. The grant was considered successful by the NSF and the IEEE. Around the same time, I served as Chairman of the IEEE Standards in Education Committee.

16. My additional involvement with IEEE includes being elected to serve on the Board of Governors of the IEEE Standards Association (SA) in 2020. The Board of Governors provides overall leadership of the IEEE Standards Association. The Board also interacts with other standards organizations and government entities in the U.S. and the world. As a Member-at-Large, together with other members of the Board, I oversaw the budget of the IEEE SA and the revision of the Intellectual Property policy, among other activities.

17. I am the Series Editor for Wireless and Radio Communications for the IEEE Communications Standards Magazine (which is the premier journal in the field of communication standards) and have held that position since 2017. As member of the Editorial Board, I coordinate the review of scholarly manuscripts. I have handled

several manuscripts that relate to, *inter alia*, vehicle-to-everything (V2X) communication and positioning methods.

18. I have previously prepared expert reports and testified in a number of cases concerning systems for wireless communication, communication protocols, and hardware and software of electronic devices.

19. I am familiar with the subject matter of this case, and consider myself an expert in, among other things, intelligent transportation systems, vehicle information and communications systems, and navigation systems.

20. Intentionally left blank.

II. Relevant Legal Standards

A. General

21. I have been asked to provide opinions on the claims of the '697 Patent in light of the prior art.

22. It is my understanding that a claimed invention is unpatentable under 35 USC § 102 if a prior art reference teaches every element of the claim. Further, it is my understanding that a claimed invention is unpatentable under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the alleged invention was made to a person having ordinary skill in the art to which the subject matter pertains. I also understand that an obviousness analysis takes into factual inquiries including

the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

23. It is my understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of the claimed subject matter. Some of these rationales include the following: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

B. Priority Dates for Claimed Subject Matter

24. I understand that in order to be considered "prior art," patents or printed publications must predate the pertinent priority dates for the subject matter claimed in the '697 Patent.

25. I have been informed that a patent is only entitled to a priority date based on an earlier filed application if the earlier filed application meets the requirements of 35 U.S.C. §112. Specifically, I have been informed that 35 U.S.C.

§ 112 (a) requires that the specification of a patent or patent application must "contain a written description of the invention, and the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the [invention] . . . ." I understand that the requirements of this provision are commonly called the written description requirement and the enablement requirement.

26. I have been informed that compliance with both the written description requirement and enablement requirement must be determined as of the effective filing date of the application for which priority is sought.

27. I have been informed that to satisfy the written description requirement a patent's specification should reasonably convey to a person of skill in the art that the inventor had possession of the claimed invention as of the effective filing date of the application.

C. Claim Construction Standard

28. In order to properly evaluate these claims, I understand that the terms of the claims must first be construed.

29. I understand that in this proceeding, the claims are construed consistent with the specification and using the same construction as that used in litigation. I have been informed that the claims, after being construed in this manner, are then to

be compared to the information in the prior art, which for this proceeding is limited to patents and printed publications. I also understand that, at the same time, absent some reason to the contrary, claim terms are typically given their ordinary and accustomed meaning as would be understood by one of ordinary skill in the art.

30. I understand that an apparatus claim limitation that includes functional language without reciting the structure limitations for performing the claimed function may be construed as a "means for" or "means plus" claim, even if the claim limitation does not expressly use the term "means." Such a claim limitation is interpreted to cover the structure disclosed in the specification for performing the claimed function and equivalents thereof.

D. Anticipation

31. I understand that the following standards govern the determination of whether a patent claim is "anticipated" by the prior art.

32. I understand that, for a patent to be "anticipated" by the prior art, each and every limitation of the claim must be found, expressly, implicitly or inherently, in a single prior art reference. I further understand that the requirement of strict identity between the claim and the reference is not met if a single element or limitation required by the claim is missing from the applied reference.

33. I understand that claim limitations that are not expressly described in a prior art reference may still be there if they are implicit or inherent to the thing or

process being described in the prior art. I have been informed that to establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. I have been informed that inherency cannot be established just because a certain thing may result from a given set of circumstances.

34. I understand that it is acceptable to consider evidence other than the information in a particular prior art document to determine if a feature is necessarily present in or inherently described by that reference.

E. Obviousness

35. I understand that for a single reference or a combination of references to render obvious a claimed invention, a person of ordinary skill in the art must have been able to arrive at the claimed invention by altering or combining the applied references.

36. I have been informed that a patent claim can be found unpatentable as obvious where the differences between the subject matter taught to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the relevant field. Specifically, I understand that the obviousness question involves a consideration of:

a) the scope and content of the prior art;

b) the differences between the prior art and the claims at issue;

c) the knowledge of a person of ordinary skill in the pertinent art; and

d) whatever objective factors indicating obviousness or non-obviousness may be present in any particular case – referred to as "secondary considerations."

37. I have been informed that such secondary considerations include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unmet need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) the taking of licenses under the patent by others and (h) the patentee proceeded contrary to the accepted wisdom of the prior art. I understand that secondary considerations are relevant where there is a connection, or nexus, between the evidence and the claimed invention.

38. In addition, I understand that the obviousness inquiry should not be done in hindsight, but must be done using the perspective of a person of ordinary skill in the relevant art as of the effective filing date of the patent claim.

39. I understand that in order for a claimed invention to be considered obvious, there must be some rationale in the prior art, or the knowledge of a person

of ordinary skill in the relevant art at the time of the invention, for combining cited references as proposed.

40. I understand that obviousness may also be shown by demonstrating that it would have been obvious to modify what is taught in a single piece of prior art to create the patented invention. I understand that obviousness may be shown by establishing that it would have been obvious at the time of the purported invention to combine the teachings of more than one item of prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of one of ordinary skill in the art, I have been informed the following are examples of approaches and rationales that may be considered:

a) Combining prior art elements according to known methods to yield predictable results;

b) Simple substitution of one known element for another to obtain predictable results;

c) Use of a known technique to improve similar devices (methods, or products) in the same way;

d) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

e) Applying a technique or approach that would have been "obvious to try" (i.e., choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);

f) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; or

g) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. I also understand that this suggestion or motivation may come from such sources as explicit statements in the prior art, or from the knowledge or common sense of one of ordinary skill in the art.

41. I understand that an invention that might be considered an obvious variation or modification of the prior art may be considered non-obvious if one or more prior art references discourages or lead away from the line of inquiry disclosed in the reference(s). I understand a reference does not "teach away" from an invention simply because the reference suggests that another embodiment of the invention is better or preferred. My understanding of the doctrine of teaching away requires a

clear indication that the combination should not be attempted (e.g., because it would not work or explicit statement saying the combination should not be made).

42. Intentionally left blank.

III. Qualifications of One of Ordinary Skill in the Art

43. Based on my review of these materials, I believe that the relevant field for purposes of the ’697 Patent includes vehicle communication systems and limiting access to vehicle system functionality based on the location of a mobile device. (*See* the ’697 Patent, Ex. 1001, Abstract, 34:3-5.)

44. I have been asked to provide my opinion as to the level of skill of a person having ordinary skill in the art (“POSA” or “ordinary artisan”) of the ’697 Patent at the time of the claimed invention, which I have been instructed to assume is April 15, 2013. In determining the characteristics of a hypothetical person of ordinary skill in the art of the ’697 Patent at the time of the claimed invention, I was told to consider several factors, including the type of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made in the field, the sophistication of the technology, and the education level of active workers in the field. I also placed myself back in the time frame of the claimed invention and considered the colleagues with whom I had worked at that time.

45. In my opinion, a person having ordinary skill in the art (“POSA”) of the ’697 Patent at the time of its filing would have been a person having, 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. Such a person of ordinary skill in the art would have been capable of understanding the '697 Patent and the prior art references discussed herein.

46. Based on my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art at least as of April 15, 2013. Further, although my qualifications may exceed those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '697 Patent have been rendered from the perspective of a person having ordinary skill in the art at the time of the invention.

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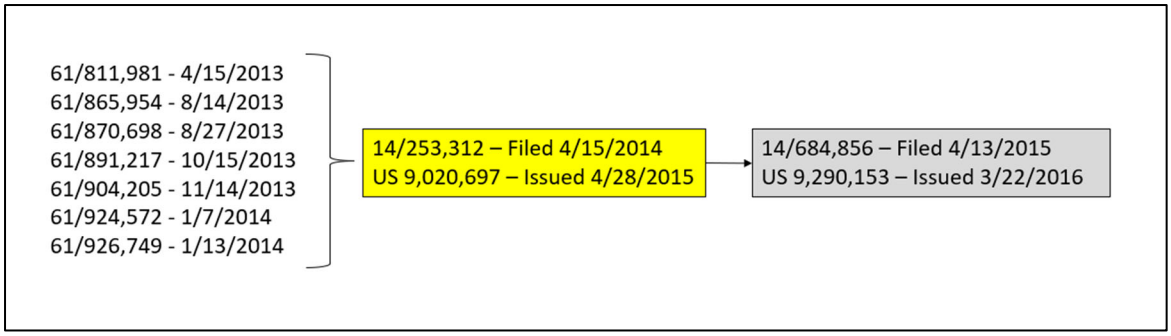
IV. U.S. Patent No. 9,020,697 to Ricci

A. Priority Claim

48. U.S. Patent No. 9,020,697 claims priority to a series of provisional patent applications: Application No. 61/811,981 filed on April 15, 2013, Application No. 61/865,954 filed on August 14, 2013, Application No. 61/870,698 filed on

August 27, 2013, Application No. 61/891,217 filed on October 15, 2013, Application No. 61/904,205 filed on November 14, 2013, Application No. 61/924,572 filed on January 7, 2014, and Application No. 61/926,749 filed on January 13, 2014. (Ex. 1001, '697 Patent, Cover.)

49. U.S. Application No. 14/684,856 was filed on April 13, 2015 as a continuation of the '697 Patent, and issued on March 22, 2016 as U.S. Patent No. 9,290,153. The '153 Patent is also asserted in the Related Litigation. A graphic of the '697 Patent Family is provided below, with the '697 Patent highlighted in yellow and the related '153 Patent is shaded in gray:



The '697 Patent Family

B. Overview of the '697 Patent

50. The '697 Patent titled "Vehicle-based multimode discovery" was filed on April 15, 2014 and issued on April 28, 2015. ('697 Patent, Ex. 1001, Cover.)

51. The '697 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." ('697 Patent, Ex. 1001, Abstract.) The '697

Patent explains that such access refers to "vehicle functionality and/or features to be provided and/or restricted to a user" based on "the location of the device 212, 248 relative to the vehicle 104" and that such "communications systems and/or devices . . . provide for an enhanced user experience making the automobile more useful and more efficient." ('697 Patent, Ex. 1001, 34:3-5, 23:19-30.)

52. The '697 Patent seeks to improve vehicle comfort: "Several manufacturers have added comfort features in vehicles . . . [h]owever, because these manufacturers have added features to a conveyance, they have built comfort around a vehicle and failed to build a vehicle around comfort." ('697 Patent, Ex. 1001, 2:54-61.)

53. The '697 Patent also seeks to reduce driver distractions while enhancing passenger enjoyment:

> The present disclosure can provide a number of advantages depending on the particular aspect, embodiment, and/or configuration. . . . The application of accessibility technologies to the driver's screen can successfully reduce driver distractions while enabling the driver to perform permissible computational tasks. The availability of accessibility technologies in the vehicle can not only comply with prevailing legal requirements but also enhance passenger enjoyment. . . . The use of media filters and restrictions based on one or more of the identity of the vehicle occupant requesting media content, the identity of a portable computational device associated with the vehicle

> occupant, and the spatial location of the vehicle occupant and/or remote computational device can enable compliance with prevailing laws regarding driver distractions while providing the vehicle owner with the ability to control media access by one or more selected vehicle occupants. The use of user accounts to control passenger access to vehicle tasks, functions, and operations can prevent a non-driving passenger, for instance, from controlling a critical vehicle task, function or operation and confusing or frustrating the driver. The inactive control surface can enable a vehicle occupant to perform tasks, functions and operations without viewing his or her screen. This provides yet another convenient method for driver control of vehicle and non-vehicle tasks, functions, and operations without distraction while driving the vehicle.

('697 Patent, Ex. 1001, 14:60-15:38.)[1]

54. With reference to Figure 1, the '697 Patent discloses a vehicle environment 100 with internal and external areas associated with a vehicle 104, including a first "interior zone 108"; a second zone 112 that "is exemplary of the range of those [vehicle] sensors and what can be detected by those sensors associated with the vehicle 104"; and a third "area 116 that includes all areas beyond the sensor range 112." ('697 Patent, Ex. 1001, 3:34-59.)

[1] Unless I indicate otherwise, all underlining and emphasis used in my declaration has been added.

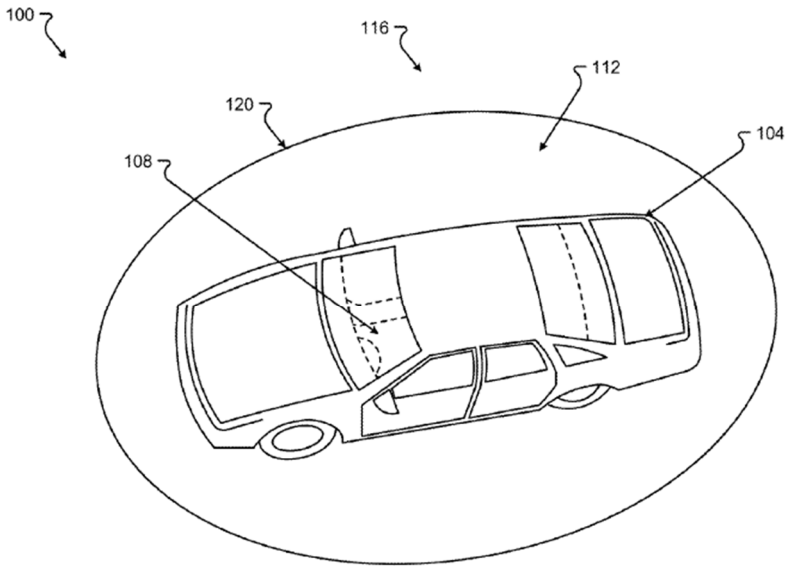


Fig. 1

'697 Patent, Ex. 1001, Fig. 1

55. Referring to Figure 2, the '697 Patent discloses a "vehicle control system 204 [that] may communicate with a device or user interface 212, 248" that "may be operable to receive user input either through touch input, on one or more user interface buttons, via voice command, via one or more image sensors, or through a graphical user interface." ('697 Patent, Ex. 1001, 24:13-20.)

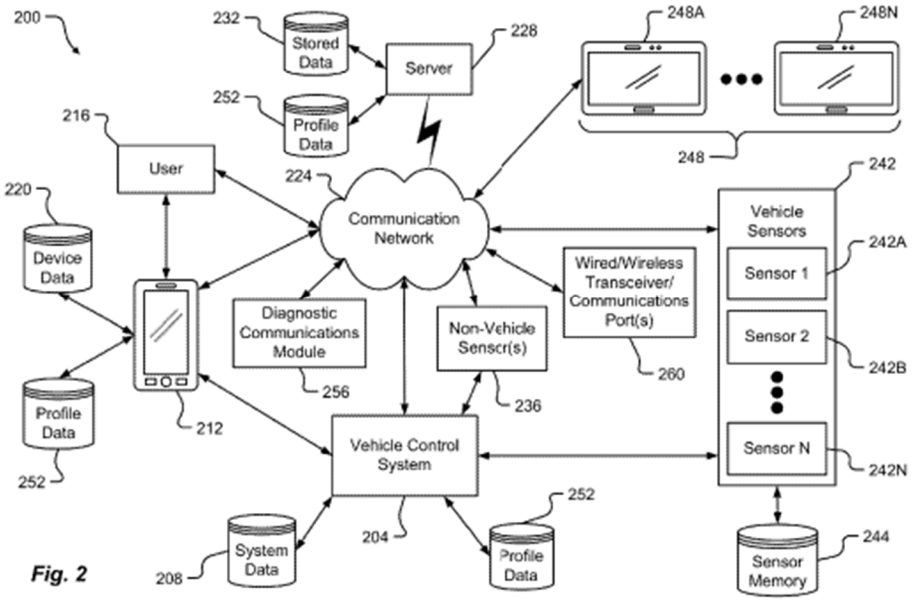


Fig. 2

'697 Patent, Ex. 1001, Fig. 2

56. "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." ('697 Patent, Ex. 1001, 24:21-29.) The '697 Patent refers to the device 212 using a plurality of interchangeable terms, such as "mobile," "portable," a "communication device," and a "computational device." ('697 Patent, Ex. 1001, 86:48-50, 16:64-17:8.) The '697 Patent also uses the terms computational device and communication device interchangeably, e.g., "The VNC software 2116 effectively provides the remote computational device 2120 (e.g., portable communication device) with remote access to the board 2104 . . . ." ('697 Patent, Ex. 1001, 100:55-58.)

57. "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." ('697 Patent, Ex. 1001, 25:47-52.) The communication network 224 within the vehicle may include "a Bluetooth® wireless system, an 802.11x (e.g., 802.11G/802.11N/802.11AC, or the like, wireless system), a CAN bus, an Ethernet network within the vehicle 104, or other types of communication networks." ('697 Patent, Ex. 1001, 25:54-60.)

58. The '697 Patent discloses accessing and controlling a vehicle system from a device located external to the vehicle with reference to Figure 5A. The '697 Patent 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." ('697 Patent, 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 from the

vehicle 104." ('697 Patent, Ex. 1001, 34:5-13.)

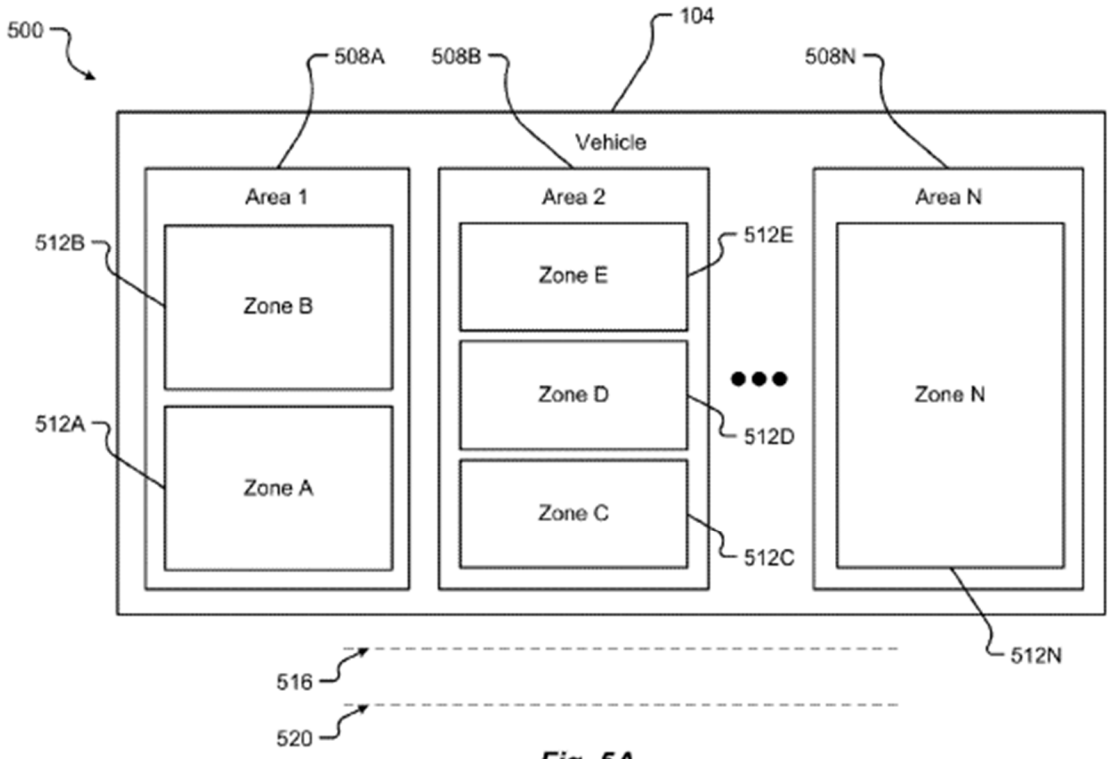


Fig. 5A

'697 Patent, Ex. 1001, Fig. 5A

59. Since the portable device 218, 248 is located far away from the vehicle "at or beyond the second outside area 520) the vehicle 104 may lock one or more features (e.g., ignition access, vehicle access, communications ability, etc.) associated with the vehicle 104." ('697 Patent, Ex. 1001, 34:8-13.) By "lock[ing]" "vehicle access" and "ignition access", the '697 Patent is describing not permitting passive entry and passive start functionality based on the location of the device 212, 248 relative to the vehicle 104. (*Id.*)

60. Referring to Figure 5B, the ’697 Patent also discloses accessing and controlling a vehicle system from a device located within the vehicle. The ’697 Patent discloses zones 512A-N associated with different locations of the vehicle and that “the zone 512 the user device is located in may have an impact on the type of communications, available bandwidth, the types of other devices or vehicle systems or subsystems the device could communicate with.” (’697 Patent, Ex. 1001, 34:49-53.) 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.” (’697 Patent, Ex. 1001, 35:25-28.) However, devices located in the rear passenger compartment, e.g., “area 2 508B devices can be provided with full access to multimedia and infotainment available within the vehicle 104” but “may be restricted from any access to vehicle functions.” (’697 Patent, Ex. 1001, 35:22-25.)

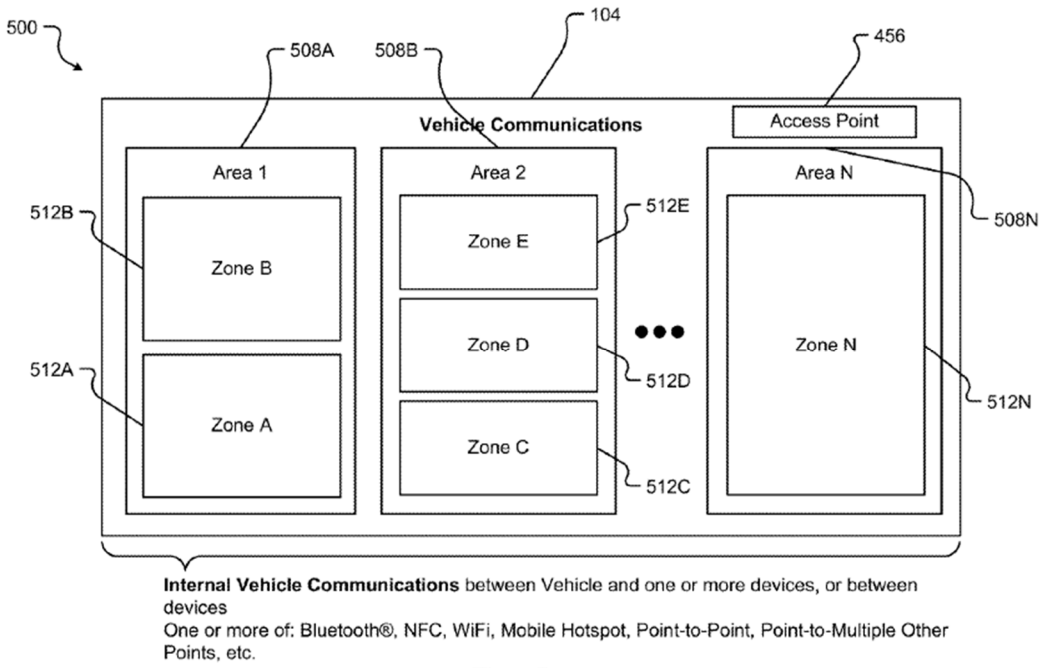


Fig. 5B

'697 Patent, Ex. 1001, Fig. 5B

61. With reference to Figure 10, the '697 Patent discloses that "[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." ('697 Patent, Ex. 1001, 57:45-49.) "The 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." ('697 Patent, Ex. 1001, 57:49-52.)

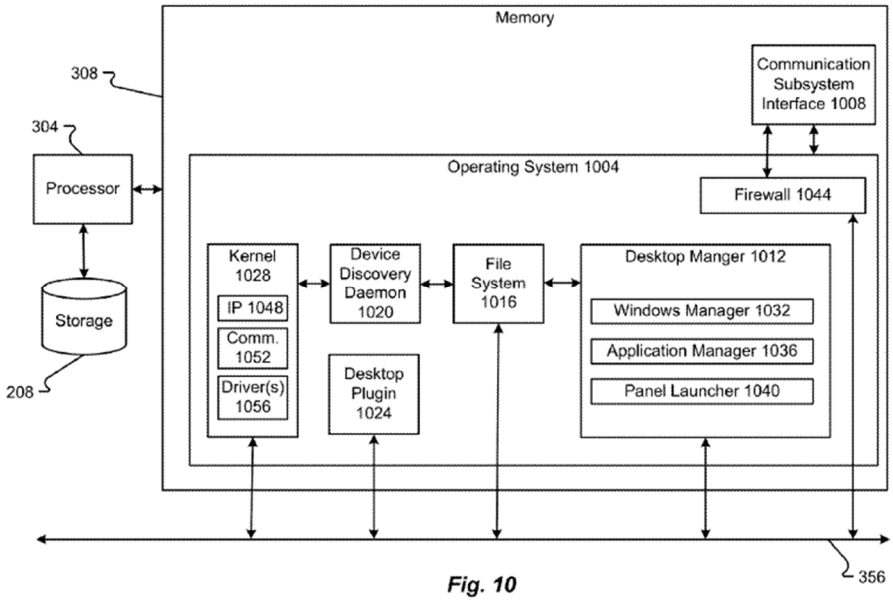


Fig. 10

'697 Patent, Ex. 1001, Fig. 10

62. The '697 Patent describes "an operation of the device discovery daemon 1020" with reference to Figure 20. ('697 Patent, Ex. 1001, 91:60-61.) "[T]he device discovery daemon 1020 detects a computational device attempting to connect to or otherwise connectable with the vehicle network 356 or communication subsystem 1008 and, applying rules, determines when it is appropriate to connect with the computational device." ('697 Patent, Ex. 1001, 91:62-67.) "In step 2000, the device discovery daemon 1020 detects a computational device connectable with the vehicle network 356 or communication subsystem 1008." ('697 Patent, Ex. 1001, 92:36-38.)

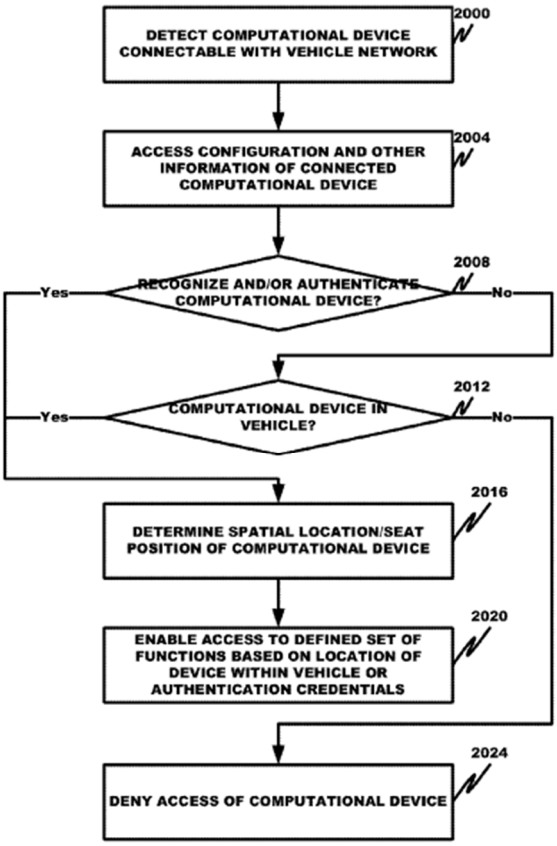


Fig. 20

'697 Patent, Ex. 1001, Fig. 20

63. As illustrated in Figure 20 above, in step 2020, the device discovery daemon "ENABLES ACCESS TO [a] DEFINED SET OF FUNCTIONS BASED ON [the] LOCATION OF [the] DEVICE." The '697 Patent clarifies that enabling access means permitting the computational device to connect with the vehicle network 356 or communication subsystem 1008 to perform a "set of tasks, functions, and/or operations" based on the location of the computational device.

> In step 2020, the device discovery daemon 1020 permits or enables connection of the computational device with the vehicle network 356

> or communication subsystem 1008 and optionally stipulates or defines what set of tasks, functions, and/or operations the user of the computational device can perform using the computational device, such as based on the location of the computational device within the vehicle and/or based on the authentication credentials (e.g., the identity of the computational device user).

('697 Patent, Ex. 1001, 96:26-34.)

64. 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:

> When the computational device is determined to be outside of a defined area and/or zone of the vehicle (e.g., outside the passenger compartment or cabin) and the device discovery daemon 1020 does not recognize and/or authenticate the computational device successfully, the device discovery daemon 1020, in step 2024, denies access of the computational device to connect to or access the vehicle network 356 or communication subsystem 1008.

('697 Patent, Ex. 1001, 96:35-42.)

65. The '697 Patent uses the terms "step" "operation" and "function" interchangeably for describing the steps of the method, for example:

> The present disclosure can include a method, vehicle, and/or tangible and non-transient computer readable medium comprising the steps, operations, and/or functions of:

> (a) determining, by a 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…

('697 Patent, Ex. 1001, 4:47-53.)

66. The '697 Patent explains that "'Connectable' can refer to the computational device being physically within the vehicle, the computational device having a threshold signal strength or connection quality with the vehicle network, the computational device being configured properly to connect with the vehicle network, and the like." ('697 Patent, Ex. 1001, 92:38-43.) The '697 Patent does not quantify the threshold signal strength or connection quality, beyond referencing ranges defined by certain standards or protocols, e.g., "some wireless protocols, particularly WiFi™, use an access point (or hotspot) having a defined range, which can be commensurate with the area of the vehicle passenger cabin." ('697 Patent, Ex. 1001, 93:30-33.)

67. Further, the '697 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." ('697 Patent, Ex. 1001, 93:56-59.) The '697 Patent does not quantify the level of confidence, instead it states that "[t]his 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." ('697 Patent, Ex. 1001, 93:59-63.)

68. The '697 Patent also discloses that "device detection can be receipt of information from one or more on board sensors that a new occupant has entered the vehicle." ('697 Patent, Ex. 1001, 92:62-64.) The '697 Patent further explains that the information includes "a door opening or closing, a successful authentication of an occupant or computational device, a sensed load in a seat, detection of movement within the vehicle, and detection of initiation of a vehicle task, function or operation, such as a key inserted in an ignition, engine start up, and the like." ('697 Patent, Ex. 1001, 92:64-93:2.)

69. Independent claims 1, 8, and 15 are directed to a vehicle system and method for limiting access to certain vehicle system functionality based on the location of a "*computational device*" within the vehicle. Independent claim 1 is representative of claims 8 and 15 and reproduced below:

1[pre]. A method, comprising:

> [1a] (a) determining, by a 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;
>
> [1b] (b) 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
>
> [1c] (c) applying, by the device discovery daemon, at least the following rules:
>
> [1d] (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
>
> [1e] (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.

70. In my opinion, the technology of the challenged independent claims of the ’697 Patent was old and well-known in the art by April 15, 2013. (*See* ¶¶ 86-121.)

71. The dependent claims of the ’697 Patent add common features, e.g., the computational device determining its own location (claims 2, 9, 16), device discovery (claims 3, 10, 17), and localization, or device positioning, strategies

(claims 4, 6-7, 11, 13-14, 18, 20-21) and limiting access to a set of tasks/operations based on the location of the "*computational device*" (claims 5, 12, 19).

72. Intentionally left blank.

C. The '697 Patent File History

73. U.S. Patent Application No. 14/253,312 was filed on April 15, 2014 with twenty one claims, including independent claims 1, 8, and 15. ('697 Patent File History, Ex. 1002 at 183-188.)

74. The patentee filed an information disclosure statement (IDS) on November 26, 2014, listing over 200 references. ('697 Patent File History, Ex. 1002 at 269-276.) A few weeks later, on December 19, 2014, the Examiner issued the first Office Action, a notice of allowance, in which all 21 claims were allowed, without rejection or objection. (*Id*. at 585-592.)

75. The Examiner provided the following reasons for allowance:

> The prior art of record fails to teach - applying, by the device discovery daemon, at least the following rules: (C1) when the computational device is <u>located within</u> the predetermined area and/or zone of the vehicle, <u>permitting</u> the computational device to access or attempt to access the vehicle network and/or communication subsystem; and (C2) when the computational device is <u>not located within</u> the predetermined area and/or zone of the vehicle, <u>not permitting</u> the computational device to access or attempt to access the vehicle network and/or communication subsystem.

(*Id*. at 590.)

76. On March 12, 2015, and March 18, 2015, the Patentee filed additional IDSs, collectively submitting over 130 references. (*Id*. at 615-619, 793.) On March 19, 2025, the Patentee filed another IDS, submitting over 30 references. (*Id*. at 818-819.) The application issued as the ’697 Patent on April 28, 2015 and I understand that the ’697 Patent lapsed for failure to pay the maintenance fees; however Patent Owner revived the ’697 Patent. (’697 Patent, Ex. 1001, Cover; Ex. 1002, 898-904.)

77. Clement (Ex. 1010), Ghabra (Ex. 1011), and Lickfelt (Ex. 1012) were not considered during examination and are not cited on the ’697 Patent (’697 Patent, Ex. 1001, 2-5.)

D. Claim Construction

78. In order to properly evaluate these claims, I understand that the terms of the claims must first be construed. I also understand that, at the same time, absent some reason to the contrary, claim terms are typically given their ordinary and accustomed meaning as would be understood by one of ordinary skill in the art.

1. “*daemon*”

79. For the purpose of this declaration, I have been asked to apply the following claim construction for my analysis regarding unpatentability:

- **“*daemon*” as a “computer program”**

80. The independent claims require that the *device discovery "daemon*" is executed by a microprocessor. For example, independent claims 1 and 8 require "*a microprocessor executable device discovery daemon*" and independent claim 15 requires, "*A tangible and non-transient computer readable medium including microprocessor executable instructions that, when executed, perform at least the following functions: . . . (c) applying, by the device discovery daemon, at least the following rules: . . .*" A POSA would have understood that a microprocessor executes a computer program, i.e., software.

81. This interpretation is consistent with the '697 Patent specification, which discloses that "[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." ('697 Patent, Ex. 1001, 57:45-49.)

2. "*access or attempt to access the vehicle network and/or communication subsystem*"

82. For the purpose of this declaration, I have been asked to apply the following claim construction for my analysis regarding unpatentability:

- "***access or attempt to access the vehicle network and/or communication subsystem***" **as** "***access or attempt to access***

[functionality of] ***the network and/or communication subsystem***"

83. Independent claims 1, 8, and 15 also require "*(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*." Each independent claim includes three steps: (a), (b), and (c). Step (c) includes sub-steps (C1) and (C2). The "permitting" sub-step C1 follows the "determin[ation]" in step (a) "that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle." Accordingly, a POSA would have understood that 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.

84. For example, the '697 Patent describes passive entry and passive start functionality with reference to Figure 5A 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." ('697 Patent, 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 from the vehicle 104." ('697 Patent, Ex. 1001, 34:5-7.) Since the portable device 218, 248 is located far away from the vehicle "at or beyond the second outside area 520) the vehicle 104 may lock one or more

features (e.g., ignition access, vehicle access, communications ability, etc.) associated with the vehicle 104." ('697 Patent, Ex. 1001, 34:8-13.) By "lock[ing]" "vehicle access" and "ignition access", the '697 Patent is describing not permitting passive entry and passive start functionality based on the location of the device 212, 248 relative to the vehicle 104.

85. Accordingly, Ford is pursuing a construction of "*access or attempt to access*" as "access or attempt to access functionality of" such that the phrase "*access or attempt to access the vehicle network and/or communication subsystem*" be construed 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 remote device is already connected as required by step (a).

V. State of the Art

86. As mentioned above, the '697 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." ('697 Patent, Ex. 1001, Abstract.) The '697 Patent explains that such "communications systems and/or devices . . . provide for an enhanced user experience making the automobile more useful and more efficient." ('697 Patent, Ex. 1001, 23:19-30.) As such the '697 Patent relates to

vehicle communication systems, including infotainment systems, and their communication with other devices and systems.

A. Vehicle Communication Systems

87. Vehicle systems communicate with portable devices located within the vehicle, and external to the vehicle, through wired and wireless communication. A remote keyless entry system is able to communicate with a portable device (e.g., key fob) that may be located outside of the vehicle, and a vehicle infotainment system may communicate with a portable device (e.g., a smart phone or tablet) located inside of the vehicle.

1. Infotainment Systems

88. Infotainment refers to the combination of information and entertainment. Early vehicle infotainment systems included audio systems that provided access to music, news, and entertainment and communicated over wired audio connections or radio waves. Vehicle infotainment systems at the time of the alleged invention were integrated multimedia interfaces that provide drivers and passengers with access to navigation, music, communication, and vehicle controls through touchscreen displays, voice commands, and/or manual buttons. These systems were becoming increasingly connected to smartphones and/or portable media players via technologies like USB and Bluetooth, Apple CarPlay, and Android Auto, enabling users to access apps, make calls, send texts, and stream

media directly through the vehicle's interface. Such infotainment systems include microprocessors that execute software or computer programs to facilitate such communication.

89. By the mid-2000s, as mobile phones became more advanced, vehicle infotainment systems that interacted with mobile devices became widely available. Multiple automotive manufacturers, including Ford and Fiat had commercialized infotainment systems that interacted with mobile devices by that time. For example, Ford released its Sync Infotainment system in 2007 and Fiat released its Blue&Me in-vehicle infotainment system in 2006. (Ghangurde, Ex. 1058, pp. 100, 102-103.)

a. Ford SYNC Technology

90. Partnering with Microsoft in 2006, Ford sought to develop a vehicle infotainment system that focused on affordability and accessibility, while "promoting hands-free use of cell phones and media devices." (Ghangurde[2], Ex. 1058, p. 101.) Ford's SYNC Gen1 system was first released in 2007, which enabled drivers to use voice activated commands for phone conversations and music control, automatically connected devices with the in-vehicle microphone and sound system, Bluetooth media streaming, voice-activated navigation, advanced voice recognition

[2] Ghangurde, Ex. 1058. Ghangurde is a true and accurate copy of a paper that I understand was published by *SAE International* on October 19, 2010.

software, contact data transferring, and text-to-voice online messaging control. (Ghangurde, Ex. 1058, pp. 102-103.)

91. The SYNC Gen1 system enabled drivers to connect both a digital media player and a mobile phone to the vehicle—media players via a USB cable, and phones via Bluetooth. The USB connection not only played media through the car's system but also charged the device. To connect a mobile phone, users first completed a one-time pairing process by entering a 6-digit PIN provided by the SYNC system. After that, the phone could automatically connect by selecting the "connect" option on the vehicle interface. (SYNC Supplemental Guide 2007, Ex. 1061[3], pp. 2–5, 38–39, 43–44.) Additionally, SYNC Gen1 introduced a voice-activated navigation system that included a feature called "Traffic, Directions and Information Services." This feature used GPS to give drivers voice-guided traffic updates, turn-by-turn directions, and local business information, along with real-time updates like sports

[3] SYNC Guide 2007, Ex. 1061. The SYNC Guide 2007 is a true and accurate copy of a guide that I understand was published by Ford Motor Company in November 2007.

scores. Drivers could use voice commands to customize or adjust the navigation system. (SYNC Supplemental Guide 2010, Ex. 1062[4], pp. 2, 30-32.)

92. In 2010, Ford released an updated version of its original SYNC Gen1 system, SYNC 2, also known as MyFord Touch. The addition of MyFord Touch created several improvements to the SYNC system, including: an inventive touch screen infotainment display, a four-section main display that allowed for control/display of phone, navigational, entertainment and climate information simultaneously, traffic monitoring, emergency contact information, and voice-activated climate control. (Ex. 1064[5], pp. 2-9; *see also* Ex. 1059[6], pp. 1-2.) These

[4] SYNC Guide 2010, Ex. 1062. The SYNC Guide 2010 is a true and accurate copy of a guide that I understand was published by Ford Motor Company in January 2010.

[5] MyFord Touch Guide, Ex. 1064. The MyFord Touch Guide is a true and accurate copy of a guide that I understand was published by Ford Motor Company in February 2012.

[6] Car and Driver, Ex. 1059. The Car and Driver is a true and accurate copy of an article that I understand was published by Car and Driver in January 2010. Car and Driver is available at https://www.caranddriver.com/news/a15128939/ford-introduces-next-gen-connectivity-suite-called-myford-should-be-awesome-car-news/, accessed on June 25, 2025.

enhancements were implemented to improve the user experience and enhance overall customer satisfaction.

2. Passive Entry and Passive Start (PEPS) Systems

93. A remote keyless entry system includes a door module that communicates wirelessly, typically using radio frequency (RF) communication, with a remote key fob to control a door lock to lock and unlock. Key fobs include buttons that a user manually actuates to send a lock/unlock signal to a door module.

94. Passive systems were developed in which a key fob and vehicle system communicated with each other without manual activation by the user to provide passive entry to a vehicle and also passive starting of the vehicle. (*See* Ghabra, Ex. 1011, 4:57-63.)

95. PEPS systems initiate communication with the key fob by being either "triggered" (where the user initiates the process by touching something on the car, e.g., a door handle or engine start button) or through "polling" (where the system continuously or periodically scans for the key fob within range). (Ghabra, Ex. 1011, 4:57-63.)

B. User Convenience

96. Mobile phones may be connected to infotainment systems by wired (e.g., USB) communications or wireless connections. Bluetooth is a wireless technology that enables short-range communication between devices. Bluetooth was

released in 1999 (*see* Bluetooth Specification, Ex. 1052, Vol. 0, p. 62) and became a ubiquitously available protocol that vehicle infotainment systems have been using to connect and exchange data with other devices (i.e. mobile phones) due to its low power consumption, cost, and ease of use.

1. Device Discovery

97. Bluetooth is a short-range wireless protocol operating in the unlicensed 2.4 GHz band, located within the ultra-High-Frequency (UHF) band between 300 MHz and 3 GHz. A Bluetooth device can be in one of three main states (Standby, Connection, Park); and within those states there are various substates. The Standby State "is the default state in the device. In this state, the device may be in a low-power mode." (Bluetooth Specification, Ex. 1052, Vol. 2, p. 151.) For the specific purpose of device discovery, the two critical substates are the Inquiry Substate and the Inquiry Scan Substate. (Bluetooth Specification, Ex. 1052[7], Vol. 2, pp. 160-163.)

[7] Bluetooth Specification, Ex. 1052 is a true and accurate copy of the Bluetooth 4.0 specification, that was published by the Bluetooth Special Interest Group in 2010. Bluetooth Specification, Ex. 1052 is available at https://www.bluetooth.com/specifications/specs/core-specification-4-0/, accessed on June 27, 2025.

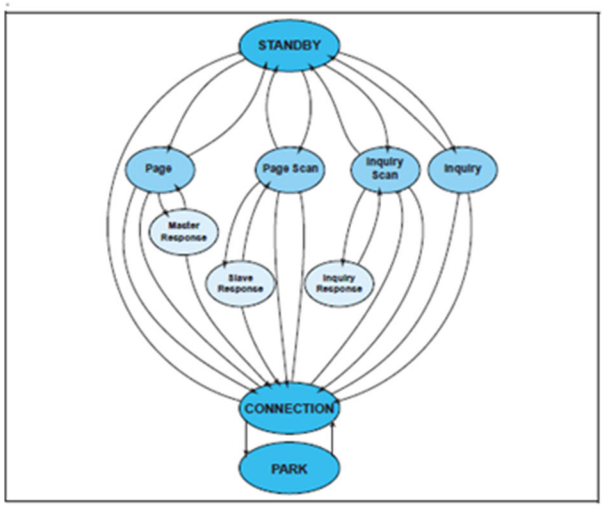


Figure 8.1: State diagram of link controller.

Bluetooth Specification, Ex. 1052, Vol. 2, p. 150, Figure 8.1

98. Bluetooth is far more than a radio. At the time of the invention, it was known that certain protocols that are part of Bluetooth can run in the background. Generally, an application that "runs in the background" has the following characteristics:

- operates continuously even when the vehicle is parked;
- not started and terminated by user commands but may be configured for background operation.

99. At the time of the invention, background operation was well known. Further, it was known that certain protocols that are part of the Bluetooth specification can run in the background. Bluetooth depends on "[a]t least two background daemons . . . hcid (*host controller interface*), which serves as an interface for the Bluetooth device and controls it, and sdpd (*service discovery*

protocol)[.]" (Linux, Ex. 1065[8], p. 207.) Common protocols like SDP enabled this functionality by allowing "for automatic recognition and configuration between two devices of different types and from different manufacturers." (MDDI, Ex. 1063[9], p. 7.) I note that a POSA would have known that Bluetooth includes both device discovery and service discovery protocols. Device discovery involves scanning for nearby Bluetooth devices, while service discovery involves identifying specific capabilities or functionalities offered by these devices.

100. Such background apps in vehicles play a crucial role in providing seamless connectivity between the vehicle and a user device, without requiring manual setup each time a user enters the vehicle. For example, Bluetooth devices can remember previously connected devices and automatically re-establish the connection when the devices are in range, eliminating the need for repeated pairing. In essence, a vehicle's "device discovery" must run in the background to facilitate

[8] Linux, Ex. 1065 is a true and accurate copy of an administration guide that I understand was published by Suse Linux AG in 2004.

[9] MDDI, Ex. 1063 is a true and accurate copy of an article that I understand was published by Medical Device and Diagnostic Industry on February 1, 2002. MDDI, Ex. 1063 is available at https://www.mddionline.com/new-technologies/bluetooth-the-future-of-wireless-medical-technology-, accessed on June 30, 2025.

seamless integration and functionality between the car's infotainment system and various other devices, enhancing the overall driving and connectivity experience.

101. An infotainment system may include a program that runs in the background. For example, Clement discloses an infotainment system with receivers 610 that take signal strength measurements continuously to detect the location of a portable device within a vehicle, enabling the location system 330 to run in the background, without being turned on by a user. (Clement, Ex. 1010, 7:23-32.)

102. Passive entry systems may also include programs that run in the background to detect a user approaching a vehicle. Such systems include transmitters and receivers that communicate with each other to detect and authenticate an approaching user. (*See e.g.*, Lickfelt, Ex. 1012, [0005]; Ghabra, Ex. 1011, 2:21-41.)

103. However, even with Bluetooth's automatic connectivity, the ability for a device to enter the standby state allows for a reduction in power consumption. A device/controller may leave the standby state and enter into a substate in response to a trigger event:

> To move from one state or substate to another, either commands from the link manager are used, or internal signals in the link controller are used (such as the trigger signal from the correlator and the timeout signals).

(Bluetooth Specification, Ex. 1052, Vol. 2, p. 150.)

104. To discover other devices, the device enters the Inquiry Substate:

> In [the inquiry] substate, it shall repeatedly transmit the inquiry message (ID packet ...) at different hop frequencies. The inquiry hop sequence is derived from the LAP [Lower Address Part] of the GIAC [General Inquiry Access Code]. . . . A device that allows itself to be discovered, shall regularly enter the inquiry scan substate to respond to inquiry messages.

(Bluetooth Specification, Ex. 1052, Vol. 2, p. 160.)

105. During the Inquiry Substate, "the discovering device collects the Bluetooth device addresses and clocks of all devices that respond to the inquiry message…. It can then, if desired, make a connection to any one of the discovered devices…." (Bluetooth Specification, Ex. 1052, Vol. 2, p. 160.)

106. Bluetooth devices assume the roles of master and slave depending on their behavior in the inquiry procedure. The master transmits inquiry messages, and the slave responds with an inquiry response packet:

> Although master and slave roles are not defined prior to a connection, the term master is used for the inquiring device and slave is used for the inquiry scanning device. . . . During the inquiry procedure, the master shall transmit inquiry messages with the general or dedicated inquiry access code. ... An inquiry response packet is transmitted from the slave to the master after the slave has received an inquiry message (see Table 8.5 on page 165).

(Bluetooth Specification, Ex. 1052, Vol. 2, p. 81.)

107. Once the proper inquiry access code is received, the device will enter the Connection State, where a "connection has been established, and packets can be sent back and forth." (Bluetooth Specification, Ex. 1052, Vol. 2, p. 165.) "The first information packets [in this state] contain control messages that characterize the link and give more details regarding the devices." (Bluetooth Specification, Ex. 1052, Vol. 2, p. 165.) Once the proper response packets are retrieved, the device enters an active mode where the Bluetooth pairing is finalized, at which point the controller and devices can enter and/or complete differing functions based upon a given device need or request.

2. Customization

108. Infotainment system customization allows drivers to personalize their in-car experience by adjusting various settings, apps, and visual elements. This can include rearranging home screen icons, setting up user profiles, adjusting navigation preferences, and customizing visual appearance like color schemes. (Ex.1057[10], 1-

[10] Auto News, Ex. 1057 is a true and accurate copy of an article that I understand was published by Automotive News on October 7, 2008 and is available at https://www.autonews.com/article/20081007/ZZZ_SPECIAL/310079921/ford-launches-parental-control-technologies/ accessed on June 24, 2025.

6.) Many systems also allow for smartphone integration, application downloads, and personalized shortcuts.

109. Intentionally left blank.

110. Intentionally left blank.

111. Intentionally left blank.

C. Safety Concerns

112. While advancements in vehicle technology and infotainment have brought many valuable benefits to drivers, they have also introduced new considerations and potential challenges that warranted thoughtful attention.

1. Driver Distraction

113. A key concern that came with the advancements in mobile phones and use in vehicles was the increase in distracted driving. In 2001, New York was the first state to enact a law banning handheld cell phone use while driving. (McCartt, Ex. 1054, 1[11].) Many states followed with bans on texting while driving, with Washington being the first to enact such a law in 2008. (McCarrtt, Ex. 1054, 1.)

[11] McCartt, Ex. 1054. The McCartt is a true and accurate copy of a paper that I understand was published by Annals of Advances in Automotive Medicine for the Engaged Driving Symposium on March 31, 2014. McCartt, Ex. 1054 is available at https://pmc.ncbi.nlm.nih.gov/articles/PMC4001674/, accessed on July 1, 2025.

Between 2006 and 2010, the National Highway Traffic Security Administration ("NHTSA") reported a four percent (14,000 people) increase in vehicle crashes related to distracted driving. (NHTSA, Ex. 1055[12], p. 4.) As access to music, navigation, and phone features through vehicle systems became more seamless and user-friendly, it also highlighted the importance of developing solutions to help minimize potential driver distraction.

114. One of the primary approaches to address driver distraction was to limit access to certain features within the vehicle interface. Ford took a proactive approach to reducing driver distraction by introducing a "Do Not Disturb" feature within its SYNC connectivity system, that limits access to certain functions when a vehicle is in motion. (Motor Trend, Ex. 1056[13], p. 1.) When activated, this feature

[12] NHTSA, Ex. 1055 is a true and accurate copy of a research note that I understand was published by the National Highway Traffic Safety Administration in September, 2012. NHTSA, Ex. 1055 is available at https://www.nrd.nhtsa.dot.gov/CATS/index.aspx, accessed on June 24, 2025.

[13] Motor Trend, Ex. 1056 is a true and accurate copy of an article that I understand was published by Motor Trend in July 2010. Motor Trend, Ex. 1056 is available at https://www.motortrend.com/news/163-news100712-ford-sync-do-not-disturb, accessed on June 24, 2025.

automatically blocks incoming text messages and phone calls from a connected Bluetooth device, while still allowing voice-activated outgoing calls and access to emergency services through the enhanced 911 Assist feature. (Motor Trend, Ex. 1056, p. 3.)

115. Ford also implemented automatic restrictions on certain SYNC features when a vehicle is in motion. These restrictions include disabling access to screens that display non-driving related information, as well as preventing actions that involve typing on a keyboard, manually adding contacts, pairing a Bluetooth phone, or playing video on the navigation display. However, many of these features remain accessible through SYNC's voice-command system, which allows drivers to stay connected while maintaining focus on the road. (Motor Trend, Ex. 1056, p. 4.)

2. Security

116. Another area of concern that evolved from the advancements in vehicle technology and infotainment was the risk of improper access. This concern led to the development of several security enhancement strategies such as user authentication technology and vehicle disablement upon theft.

117. One of the ways this device discovery process has helped with security concerns is using it to authenticate and authorize a device. Authentication is a "procedure [] based on a challenge-response mechanism . . . ." (Bluetooth Specification, Ex. 1052, Vol. 3, p. 393.) "The verifier sends . . . a random number

(the challenge) to the claimant. The claimant calculates a response, that is a function of this challenge, the claimant's BD_ADDR and a secret key. The response is sent back to the verifier, that checks if the response was correct or not." (Bluetooth Specification, Ex. 1052, Vol. 2, p. 247.) Authorization is "[a] procedure where a user of a Bluetooth device grants a specific (remote) Bluetooth device access to a specific service. Authorization implies that the identity of the remote device can be verified through authentication." (Bluetooth Specification, Ex. 1052, Vol. 3, p. 393.)

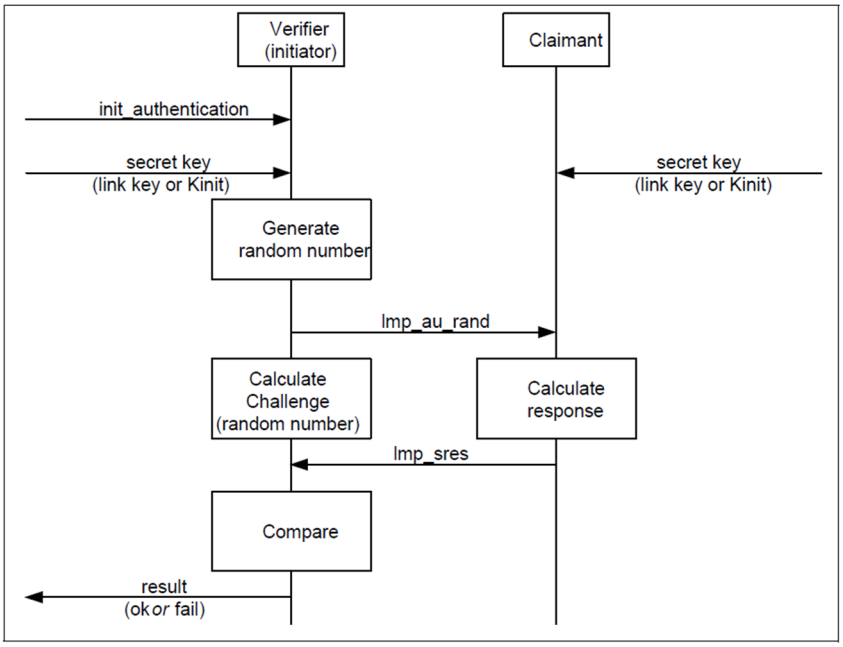


Figure 17.1: LMP-authentication as defined by [2].

Bluetooth Specification, Ex. 1052, Vol. 3, p. 398, Figure 17.1

118. Similarly, passive entry systems may authenticate a fob before allowing it to access the vehicle network by using unique identifier numbers or security codes. (Ghabra, Ex. 1011, 3:57-67, 4:8-29, 4:30-40.)

D. Positioning Methods

119. At the time of the invention, wireless positioning techniques, both outdoor and indoor, had become very popular. For example, just Bluetooth provides multiple signal parameters that may be used for determining the location of a mobile device, including: Link Quality, Received Signal Strength (RSSI), Transmit Power Level (TPL), and Inquiry Result with RSSI. (Hossain, Ex. 1053[14] at 1-2.) RSSI was a well-known technique at the time. Because generally signal strength decreases as distance increases, signal strength is an indication of distance. However, just a single signal strength value does not lead to a very accurate position determination. (Hossain, Ex. 1053 at 5.) More accurate methods such as based on multiple signal strength values or triangulation were also known.

120. Vehicle systems utilized wireless position techniques to limit driver distraction and to restrict access to certain functions to the driver. Systems were developed to limit access to certain vehicle systems from a mobile device based on the location of the mobile device within the vehicle. For example, U.S. Patent No. 8,768,539 (Clement, Ex. 1010) describes restricting manual control of safety-critical systems to the driver's seat. (Clement, Ex. 1010, 10:14-26.) U.S. Publication No.

[14] Hossain, Ex. 1053 is a true and accurate copy of an article that I understand was published by IEEE in 2007.

2011/0093153 (Moinzadeh, Ex. 1013) discloses disabling certain non-essential functions like video game playback on the driver display. (Moinzadeh, Ex. 1013, ¶ 26.)

121. Vehicle systems also utilized wireless position techniques to enhance security. One such innovation is the Passive Entry Passive Start (PEPS) system, which allows users to access and control vehicle functions without physically interacting with the vehicle. For example, U.S. Patent No. 7,388,466 (Ghabra, Ex. 1011) describes a passive entry and passive start (PEPS) system that allows a vehicle to communicate wirelessly with a key fob for hands-free access and ignition. (Ghabra, Ex. 1011, 2:13-14, 2:63-65.)

122. Intentionally left blank.

123. Intentionally left blank.

124. Intentionally left blank.

VI. Overview of the Key Prior Art References Relied Upon

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

125. Clement is a U.S. Patent that was filed September 28, 2012, and issued July 1, 2014. (Clement, Ex. 1010, Cover.) I understand that Clement is prior art to all claims of the '697 Patent under 35 U.S.C. § 102(a)(1) because it was filed before the earliest claimed priority date of the '697 Patent.

126. Clement is directed to a vehicle permission management system "that is configured to receive user input for controlling the vehicle…[by] a portable communication device." (Clement, Ex. 1010, 4:42-45.) Clement seeks to improve the control and operation of a smart vehicle, explaining that "[u]sing [a] portable computing device to provide user input to the vehicle may increase the ease at which users interact with their vehicles." (Clement, Ex. 1010, 1:31-33.)

127. Clement discloses vehicle 101 that includes passenger compartment 210. "Inside the passenger compartment 210 may be a control device 230 used by the vehicle's driver and/or passengers to control the vehicle." (Clement, Ex. 1010, 5:47-51.) "The control device 230 may be a tablet, a smart phone, a laptop, or another type of portable computing device." (Clement, Ex. 1010, 6:9-10.) Clement discloses that "[t]he operational capabilities of the control device 230 may vary with the control's device location...." (Clement, Ex. 1010, 5:59-61.)

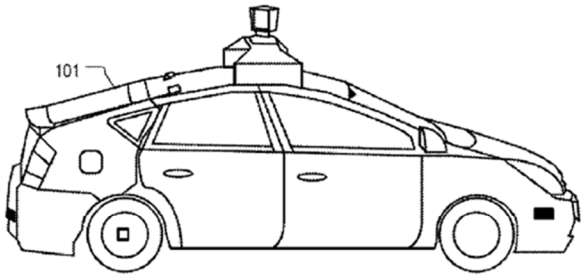


Fig. 1

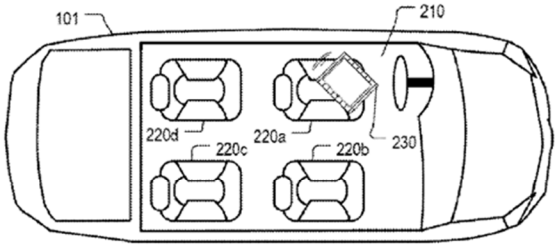


Fig. 2

Clement, Ex. 1010, Fig. 1 and Fig. 2

128. Clement discloses that vehicle 101 includes a vehicle control unit 320 and a portable device location system 330. (Clement, Ex. 1010, 6:28-30.) 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." (Clement, Ex. 1010, 7:51-57.) The executable code 440 "may include a location-based permission module 442 that is configured to enforce location-based restriction policies." (Clement, Ex. 1010, 8:13-17, Figure 4.)

129. Clement discloses that the "vehicle control unit 320 may…be operatively connected to one or more of the vehicle systems 310a-f and it may be operable to change the state of any one of these systems." (Clement, Ex. 1010, 6:63-66.) Clement further discloses that "[t]he vehicle control unit 320 may be coupled to the control device 230 . . . to receive instructions from the control device 230 to change the state of one or more of the vehicle systems 310a-f." (Clement, Ex. 1010, 7:8-11.)

130. Clement discloses that the location system 330 can be either its own component or combined with the vehicle control unit 320. (Clement, Ex. 1010, 7:32-36.) Clement discloses that the location system 330 may include receivers 610a-d "located in different parts of the [] passenger compartment 210." (Clement, Ex. 1010, 7:25-28.) The receivers 610a-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." (Clement, Ex. 1010, 7:25-32.) Additionally, 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." (Clement, Ex. 1010, 7:40-50.)

131. Alternatively, Clement discloses that the passenger compartment 210 may be separated into regions that can "be presented as a single coordinate and a radius…[or] may be represented by 4-tupples of signal strength ranges...." (Clement, Ex. 1010, 8:49-55.) Clement explains that "the indications of regions…may include any type of information capable of being used to distinguish from one another different portions of the passenger compartment 210." (Clement, Ex. 1010, 8:55-58.)

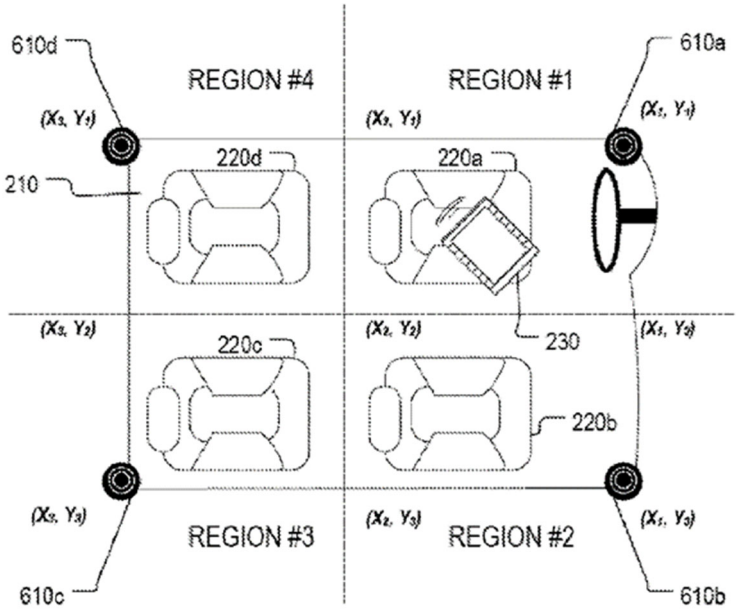


Fig. 6

Clement, Ex. 1010, Fig. 6

132. Clement discloses, with reference to Figure 8, "a process 800 associated with the operation of the vehicle 101." (Clement, Ex. 1010, 9:26-28.) Clement discloses that "[a]t task 820, a connection between the control device 230 and the vehicle control unit 320 is established." (Clement, Ex. 1010, 9:45-46.) Clement discloses that "[a]t task 870, the vehicle control unit 320 determines the current location of the control device 230." (Clement, Ex. 1010, 10:37-38.) Clement also discloses that "[i]n other examples, the control device 230 may determine its location and communicate it to the vehicle control unit 230 [*sic* 320]." (Clement, Ex. 1010, 10:48-49.)

133. Clement further discloses that "the vehicle control unit 320 determines whether [an] instruction is permitted to be invoked [based on] the current location of the control device 230." (Clement, Ex. 1010, 10:55-57.)

134. Clement explains that if the vehicle control unit 320 determines that the control device 230 is within a proper location/region of the vehicle, "task 885 is executed" and the instruction is executed. (Clement, Ex. 1010, 10:62-65.) "Otherwise, if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed" and the vehicle control unit refuses to execute the instruction. (Clement, Ex. 1010, 10:65-67, Fig. 8.)

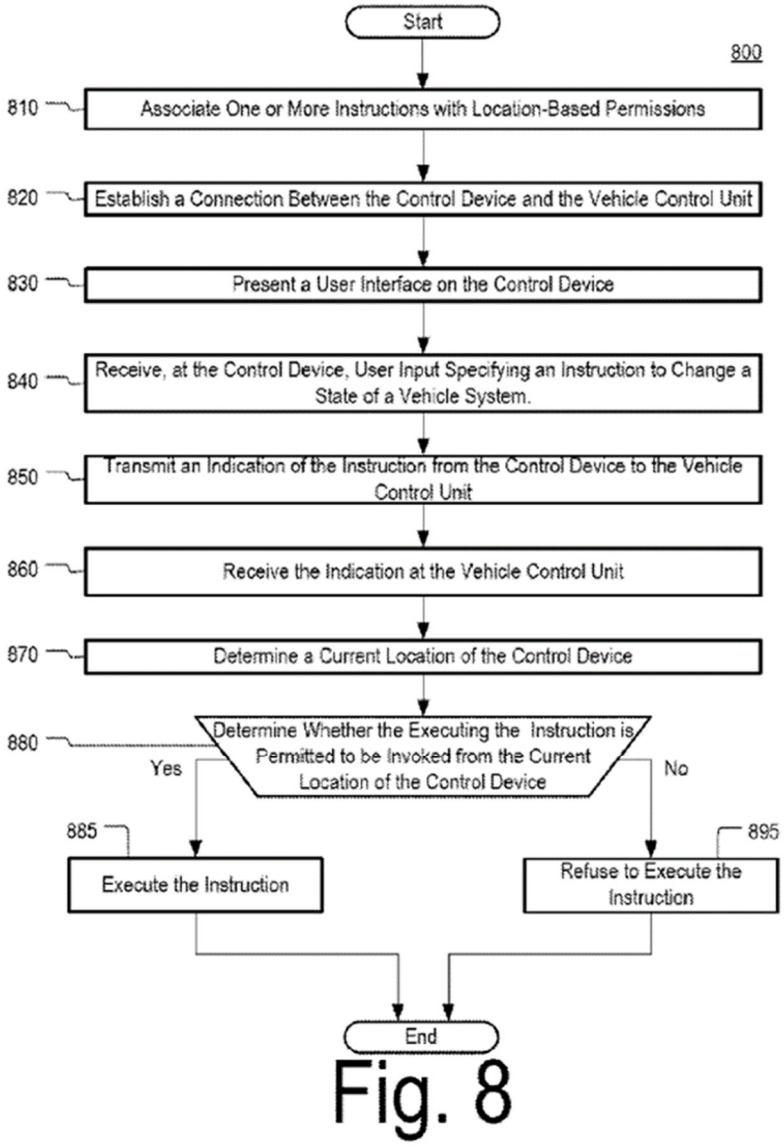


Fig. 8

Clement, Ex. 1010, Fig. 8

135. Clement clarifies that its disclosure may be modified and combined with other features, e.g., other prior art, "these and other variations and combinations of the features discussed above can be utilized without departing from the subject matter as defined by the claims" and that "the foregoing description of exemplary

aspects should be taken by way of illustration rather than by way of limitation of the subject matter as defined by the claims." (Clement, Ex. 1010, 13:19-24.)

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

136. Ghabra is a U.S. Patent that was filed November 20, 2004, and issued June 17, 2008. (Ghabra, Ex. 1011, Cover.) I understand that Ghabra is prior art to all claims of the '697 Patent under 35 U.S.C. § 102(a)(2) because it issued before the earliest claimed priority date of the '697 Patent.

137. Ghabra is directed to passive entry and passive start systems that involve a two-way wireless communication model. (Ghabra, Ex. 1011, 1:16-20.) Ghabra seeks to improve the operation of passive communication between a vehicle and a fob, explaining that a "hands-free" system "has [the] advantages of added convenience [and] faster response times." (Ghabra, Ex. 1011, 2:13-16.)

138. Ghabra discloses a vehicle 10 that includes "a base station or vehicle communication module 11 for communicating with a remote portable fob 12." (Ghabra, Ex. 1011, 2:63-65.) Ghabra discloses that "[b]ase station 11 includes a microcontroller 13 coupled to an LF transmitter 14, an RF receiver 15, and an RF transmitter 16." (Ghabra, Ex. 1011, 2:65-67.) Ghabra further discloses that the vehicle 10 may include a "[d]oor module 22 [] coupled to microcontroller 13 and may preferably include a sensing switch for detecting the lifting of a door handle." (Ghabra, Ex. 1011, 3:10-13.)

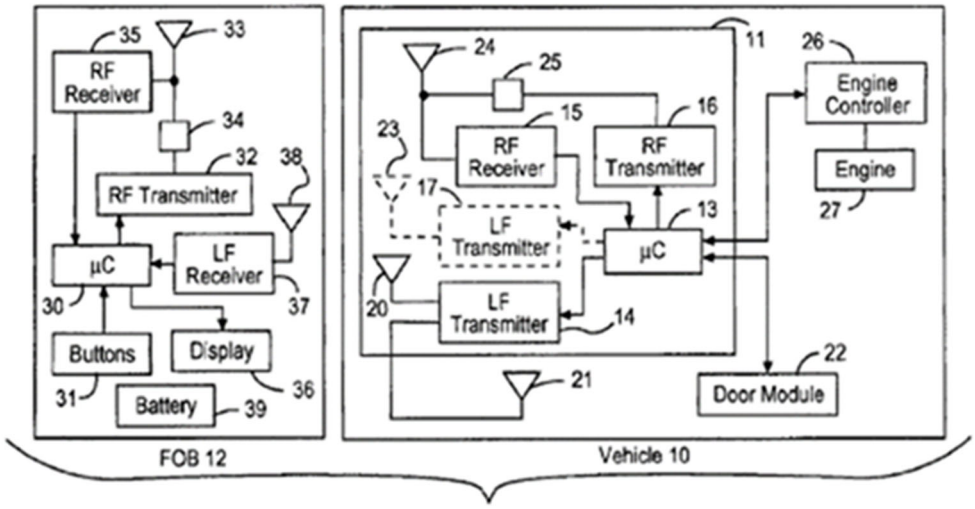
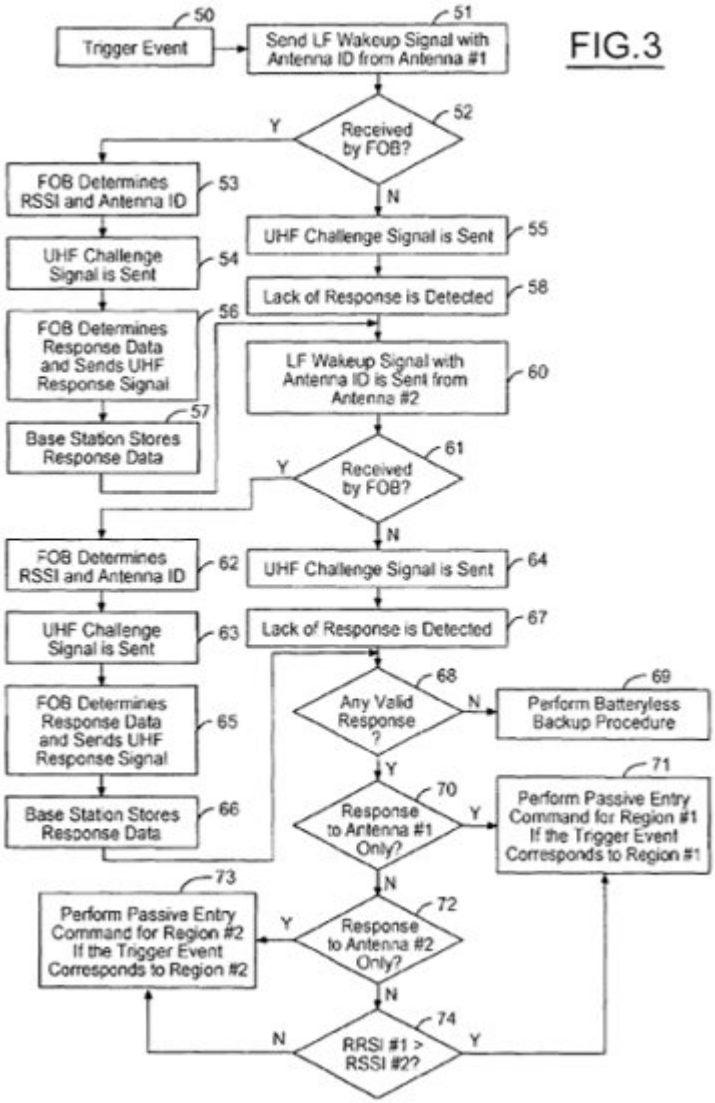


FIG.1

Ghabra, Ex. 1011, Fig. 1

139. Ghabra explains that "[i]n operation, a typical passive entry sequence begins when a door handle switch in door module 22 generates a trigger pulse provided to microcontroller 13 resulting in executing a trigger generation function within microcontroller 13." (Ghabra, Ex. 1011, 3:48-51.) With reference to Figure 3, Ghabra discloses that the trigger generation function or trigger event could occur when the fob is inside or outside of vehicle 10. Ghabra explains that "[i]n step 50, 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)." (Ghabra, Ex. 1011, 5:22-25.) Ghabra further explains that "[i]n response to the trigger generation, LF transmitter 14 is activated in order to generate an LF wakeup signal to activate LF receiver 37 in fob 12 . . . ." (Ghabra, Ex. 1011, 3:51-54.)



Ghabra, Ex. 1011, Fig. 3

140. Ghabra further discloses that "[l]ocalization of the fob is necessary to ensure that a person carrying an authorized fob is properly located in the area where the passive function is being requested . . . ." (Ghabra, Ex. 1011, 3:61-67.) Ghabra discloses that the location could be "outside the door with the triggering door handle for a passive entry function and located in the passenger compartment for a passive engine start function." (Ghabra, Ex. 1011, 3:64-67.)

141. Ghabra discloses that determining whether a fob is authorized or not is based on unique identifier numbers or security codes. Ghabra explains that after the LF wakeup signal is sent "RF transmitter 16 in base station 11 is used to broadcast a UHF challenge signal including [a] random number [to fob 12]." (Ghabra, Ex. 1011, 4:8-29.) Ghabra further explains that the fob 12 "passe[d] the random number through [a] known mathematical transformation. The resulting transformed number is included in [the] response data" sent back to the vehicle. (Ghabra, Ex. 1011, 4:13-16.) Then, the "microcontroller 13 checks the transformed number as received from the fob 12 with its own results of the transformation and determines the UHF response signal to be valid if the transformed numbers match." (Ghabra, Ex. 1011, 4:25-29.)

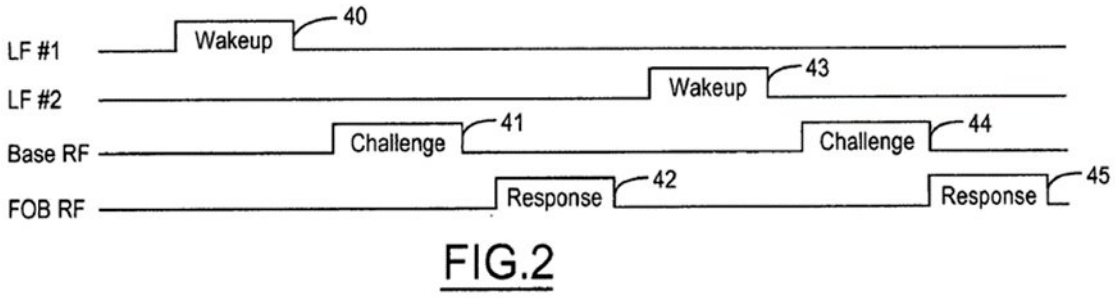


FIG.2

Ghabra, Ex. 1011, Fig. 2

C. U.S. Pub. No. 2012/0092129A1 ("Lickfelt" Ex. 1012)

142. Lickfelt is a U.S. Publication that was filed October 19, 2010, and published April 19, 2012. (Lickfelt, Ex. 1012, Cover.) I understand that Lickfelt is

prior art to all claims of the ’697 Patent under 35 U.S.C. § 102(a)(a) because it published before the earliest claimed priority date of the ’697 Patent.

143. Lickfelt is directed to a vehicle passive entry system. Lickfelt seeks to improve typical passive entry systems by utilizing proximity detection of a device as well as multiple signal strength measurements over time, to increase the accuracy and reliability of locating a portable device. (Lickfelt, Ex. 1012, [0001]-[0006].)

144. Lickfelt discloses “a vehicle 12 [that] includes a fob 14 that is configured to transmit and to receive signals.” (Lickfelt, Ex. 1012, [0010].) Lickfelt discloses that the vehicle 12 includes “[an] ECU 16 [that] is in communication with a transmitter 18 and a receiver 20.” (*Id*.) Lickfelt explains that “[t]he fob 14, similar to known fobs, is typically small enough to be easily carried by an operator of the vehicle 12 and could be combined with or incorporated into other known devices such as a mobile phone or other small electronic device.” (Lickfelt, Ex. 1012, [0012].)

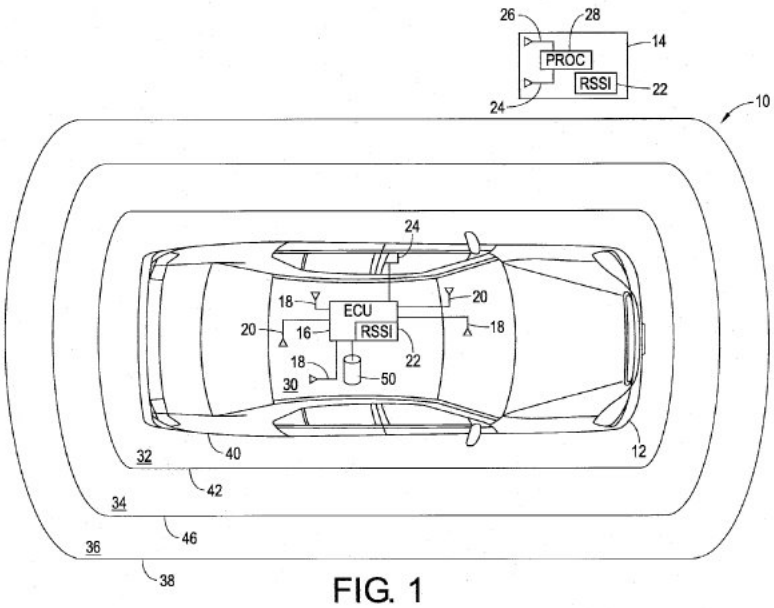


FIG. 1

Lickfelt, Ex. 1012, Fig. 1

145. Lickfelt discloses that "[t]he ECU 16 is configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strength." (Lickfelt, Ex. 1012, [0013].) Lickfelt discloses that if an "RSSI circuit 22 is on the vehicle 12, each receiver 20 can receive a respective fob signal and the RSSI circuit 22 can determine the signal strength of the respective fob signal received from the fob to determine a location of the fob by, for example, triangulation." (Lickfelt, Ex. 1012, [0017].)

146. Lickfelt further discloses "a plurality of zones with respect to vehicle 12. These zones can include an internal zone 30, a proximal zone 32, a hysteresis zone 34, and an outer zone 36." (Lickfelt, Ex. 1012, [0016].) Lickfelt discloses that "[t]he ECU 16 is [] configured to store distance data for each signal received from

the fob 14. The distance data is associated with a distance that the fob 14 is spaced from the vehicle 12." (Lickfelt, Ex. 1012, [0018].) The ECU 16 is then "configured to determine a location of the fob 14 within one of the plurality of zones…based on the distance data. The ECU 16 is further configured to store zone data, which is associated with the zone in which the fob 14 is located." (*Id*.) Lickfelt discloses that "[t]he zone data can be determined based on the measured signal strength and the boundaries of the zones, which can be defined by predetermined distances from the vehicle and coordinates defining zones with respect to the vehicle." (Lickfelt, Ex. 1012, [0031].)

147. Lickfelt discloses that "when an operator approaches the vehicle 12 carrying the fob 14, the ECU 16 polls for the fob by transmitting LF signals." (Lickfelt, Ex. 1012, [0019].) Lickfelt discloses that "the initial FOB signal received by the receiver 20 is typically from the fob 14 located within the outer zone 36." (*Id*.) Lickfelt explains that "[t]he ECU 16 continues to poll for the fob 14 after receiving the initial fob signal and a subsequent fob signal is transmitted from the fob 14 to the receiver 20 in response to the subsequent polling signal from the transmitter 18." (*Id*.) Lickfelt further explains that "[t]he ECU can now determine whether the fob 14 is getting closer to or farther away from the vehicle 12 based on comparing the data associated with the initial signal...compared to the data associated with the subsequent signal . . . ." (Lickfelt, Ex. 1012, [0020].) Further,

"[t]he zone in which the fob 14 is located can be determined based on the signal strength of the respective signals and triangulation…. If the signal strength of the subsequent signal...is greater than the signal strength of the initial signal, then it can be deduced that the fob 14 is getting closer to the vehicle 12." (*Id*.)

148. With reference to Figure 2, Lickfelt discloses a method for controlling locks on vehicle 12. (Lickfelt, Ex. 1012, [0024].) Lickfelt explains that "[a]t 100, the ECU 16…polls for fobs, such as the fob 14 [and] at 102, a determination is made as to whether a reply signal is received from a fob." (Lickfelt, Ex. 1012, [0025].) Lickfelt further explains that "[i]f no reply signal is received, at 102, the algorithm reverts to 100 and continues to poll for fobs. If a reply signal is received at 102, then at 104, a determination is made as to whether the reply signal is authentic." (*Id*.) Lickfelt discloses that "[o]nly fobs associated with the vehicle 12 can unlock the door lock 24 (and perform other vehicle operations). Accordingly, if the reply signal…is determined to be not authentic, at 104, then the ECU 16 continues to poll for fobs that are associated with the vehicle 12." (*Id*.)

149. Lickfelt further discloses that "[t]he method for remotely controlling door locks can [] include determining whether the fob is getting closer to (step 122) or farther from (step 128) the vehicle 12 based on the measured signal strengths" and that "[t]he method can further include determining in which zone, among a

plurality of zones, the fob is located when the fob is transmitting each signal." (Lickfelt, Ex. 1012, [0029].)

150. Lickfelt explains that if it is determined by the ECU 16 "that both the fob 14 is getting closer to the vehicle, at 122, and that the last signal sent from the fob 14 to the receiver 20 was sent with the fob located within the proximal zone 34 [*sic* 32], at 124, then the lock 24 unlocks at 126." (Lickfelt, Ex. 1012, [0027].)

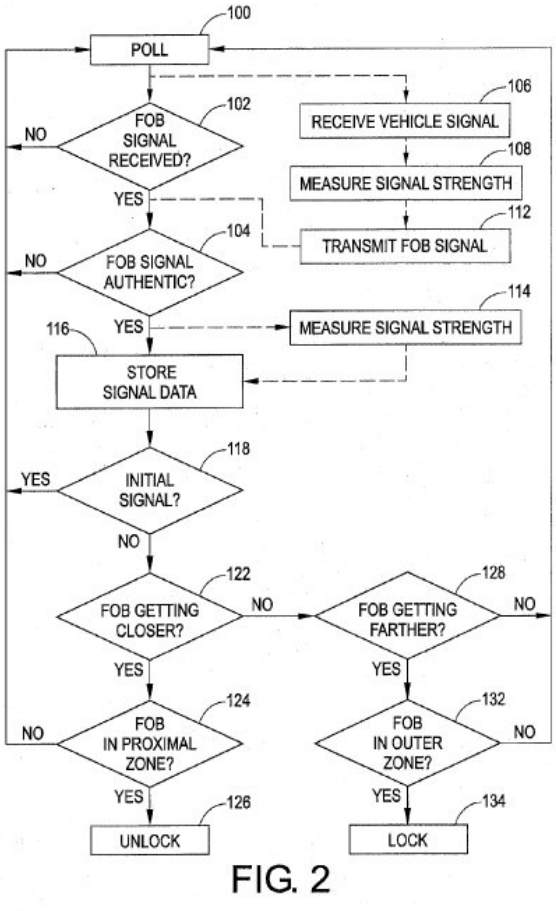


FIG. 2

Lickfelt, Ex. 1012, Fig. 2

151. Lickfelt clarifies that its disclosure may be modified and combined with other features, e.g., other prior art, disclosing that "[t]he descriptions and drawings

herein are merely illustrative and various modifications and changes can be made in the components disclosed without departing from the scope of the appended claims." (Lickfelt, Ex. 1012, [0009].) Lickfelt further explains that "various identified components of an entry system disclosed herein are merely terms of art that may vary from one manufacture to another and should not be deemed to limit the present disclosure." (*Id*.) Lickfelt further states that "[i]t will be appreciated that various of the above disclosed and other features and functions, or alternatives or varieties thereof, may be desirably combined into many other different systems or applications." (Lickfelt, Ex. 1012, [0034].) Additionally, Lickfelt discloses "that various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims." (*Id*.)

VII. Grounds for Challenge

A. Ground 1 – Clement teaches all of the limitations of claims 1-2, 4-9, 11-16, 18-21

1. Independent Claim 1

152. I have given each of the limitations of claim 1 a unique numerical identifier, as shown in the chart below:

U.S. Patent No. 9,020,697

1[pre]. A method, comprising:
[1a] (a) determining, by a 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;
[1b] (b) 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
[1c] (c) applying, by the device discovery daemon, at least the following rules:
[1d] (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
[1e] (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.

… ***1[pre]. A method, comprising:***

153. Clement discloses a vehicle in Figure 1 and a vehicle control unit with reference to Figure 4. (Clement, Ex. 1010, 4:10-17.)

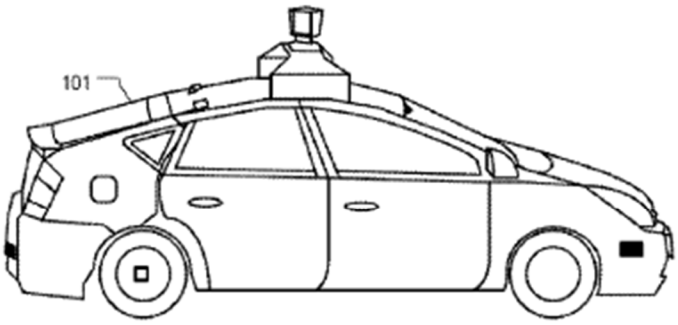


Fig. 1

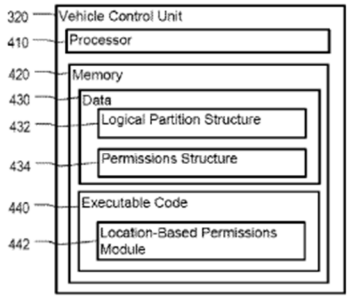


Fig. 4

Clement, Ex. 1010, Fig. 1 and Fig. 4

154. Clement discloses, with reference to Figure 8, a "process associated with controlling of the vehicle of FIG. 1 by the vehicle control unit of FIG. 4." (Clement, Ex. 1010, 4:27-29.) The process includes multiple tasks, including "at task 840, user input is entered into the control device 230 . . . [that] may specify an instruction to change a state of a vehicle system." (Clement, Ex. 1010, 10:27-33.)

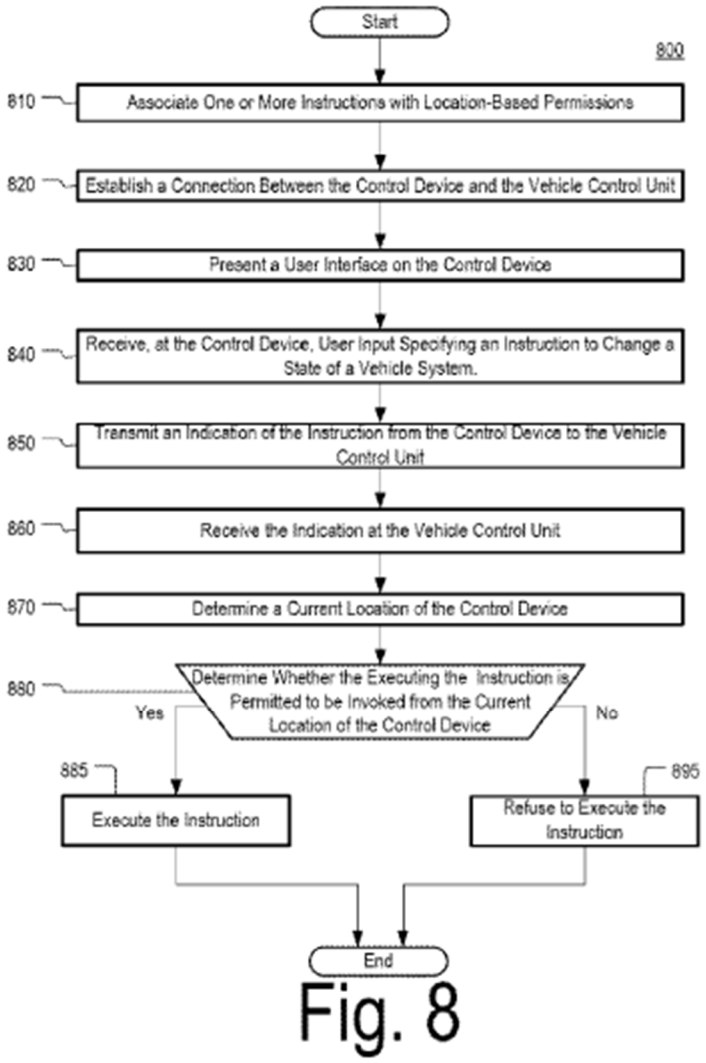


Fig. 8

Clement, Ex. 1010, Fig. 8

155. Clement also describes the process of Figure 8 as a method. For example, claim 1 requires:

> 1. A method comprising:
>
> receiving by one or more processors, over a wireless link, an instruction to change a state of a vehicle system . . . .

(Clement, Ex. 1010, 13:31-33.)

156. Thus, Clement discloses a "*method*."

… ***[1a] (a) determining, by a 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;***

157. In my analysis I apply the proposed construction of the term "*daemon*" as a computer program. (*See* ¶¶ 79-81.)

158. It is therefore my understanding that claim [1a] should be interpreted as "*determining, by a microprocessor executable device discovery* [computer program], *that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

159. Clement discloses a vehicle 101 that includes a vehicle control unit 320 and a portable device location system 330:

> FIG. 3 depicts a schematic diagram of the vehicle 101 in accordance with aspects of the disclosure. As illustrated, vehicle 101 includes vehicle systems 310a-f, a vehicle control unit 320, and a portable device location system 330.

(Clement, Ex. 1010, 6:27-30.)

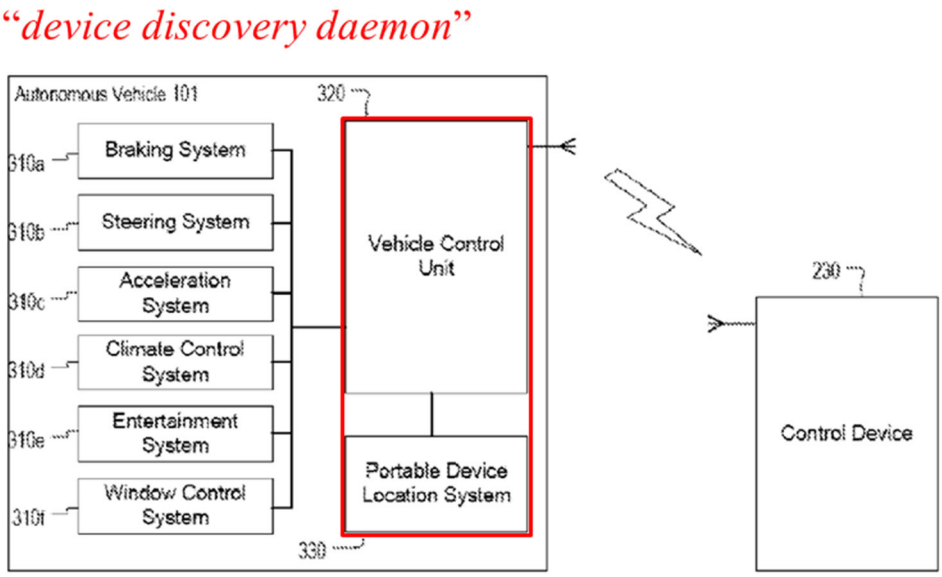


Fig. 3

Clement, Ex. 1010, Fig. 3 (Annotated)

160. Clement further discloses that the vehicle control unit 320 may be integrated with the location system 330:

> Although in this example, the location system 330 and the vehicle control unit 320 are depicted as separate blocks, in some instances, they may be (completely or partially) integrated together.

(Clement, Ex. 1010, 7:32-36.)

161. With reference to Figure 3, the "[v]ehicle control unit 320 may also be operatively connected to one or more of the vehicle systems 310a-f and it may be operable to change the state of any one of these systems." (Clement, Ex. 1010, 6:63-66.) A POSA would have understood that the vehicle control unit 320 and the vehicle

systems 310 would have been connected to each other over a wired connection, i.e., a vehicle communication network ("*network and/or communication subsystem of a vehicle*") to facilitate the vehicle control unit 320 controlling, or changing the state of, the vehicle systems 310a-f.

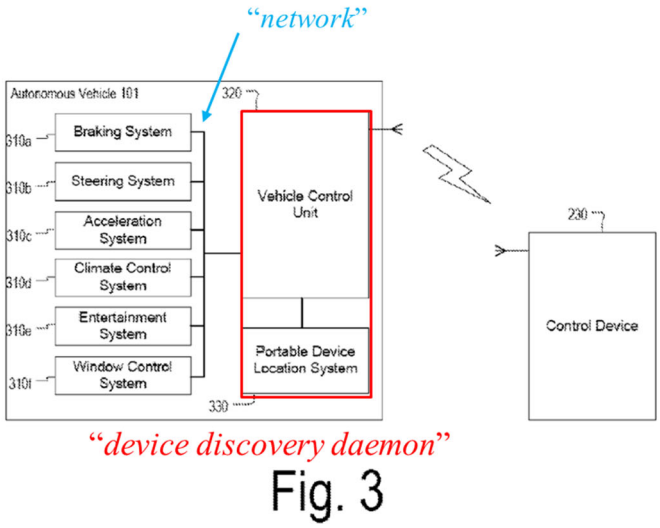


Fig. 3

Clement, Ex. 1010, Fig. 3 (Annotated)

162. Clement also discloses that the vehicle control unit 320 includes a processor 410 and executable code 440 that is executed by the processor 410:

> FIG. 4 depicts a schematic diagram of the vehicle control unit 320 in accordance with aspects of the disclosure. As illustrated, the vehicle control unit 320 may include a processor 410 and memory 420. Memory 420 of vehicle control unit 320 may store information accessible by processor 410, including executable code 440 that may be executed by the processor 410.

(Clement, Ex. 1010, 7:51-57.)

163. Clement further discloses that the executable code 440 of the vehicle control unit 320 includes a location-based permissions module 442 that is configured to enforce location-based restriction policies, such as those described with reference to Figure 8:

> The executable code 440 may perform at least some of the tasks of the process 800 depicted in FIG. 8. For example, the executable code 440 may include a location-based permissions module 442 that is configured to enforce location-based restriction policies.

(Clement, Ex. 1010, 8:13-17.)

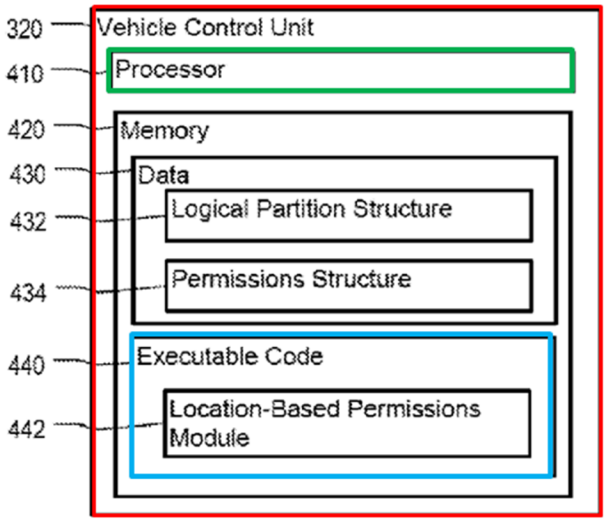


Fig. 4

Clement, Ex. 1010, Fig. 4 (Annotated)

164. The executable code 440, including the location-based permissions module 442, of the vehicle control unit 320 combined with the portable device

location system 330, is a "*microprocessor executable device discovery* [computer program]."

165. Clement explains that the processor 410 may be any well-known commercially available processor:

> The processor 410 may be any well-known processor, such as commercially available processors. Alternatively, the processor may be a dedicated controller such as an ASIC.

(Clement, Ex. 1010, 7:62-65.)

166. A POSA would have understood that a "processor" is "a device that interprets and executes instructions," whereas a "microprocessor," is a specific type of processor that "contains the logic elements for manipulating data and for making decisions," and is implemented on a single silicon chip. (IEEE Dictionary, Ex. 1051[15], 872, 693; *see also* Bosch, Ex. 1050[16], 94.) An ASIC refers to an application specific integrated circuit. (Bosch, Ex. 1050, 96.) Clement's disclosure of a processor teaches a microprocessor, or at a minimum renders it obvious. Clement

[15] IEEE Dictionary, Ex. 1051 is a true and accurate copy of a dictionary that I understand was published by IEEE in December 2000.

[16] Bosch, Ex. 1050 is a true and accurate copy of a book that I understand was published by Robert Bosch GmbH in October 2004.

teaches that its processor may be implemented as an ASIC (a single chip). For this additional reason Clement's disclosure that the processor may be an ASIC teaches a microprocessor. A POSA would have understood that a microprocessor executes a computer program, i.e., software.

167. Clement discloses a control device 230 ("*computational device*") that is "used by the vehicle's driver and/or passengers to control the vehicle." (Clement, Ex. 1010, 5:49-51, Fig. 2.) Clement further discloses that the "control device 230 may be a tablet, a smart phone, a laptop, or another type of portable computing device." (Clement, Ex. 1010, 6:9-10.)

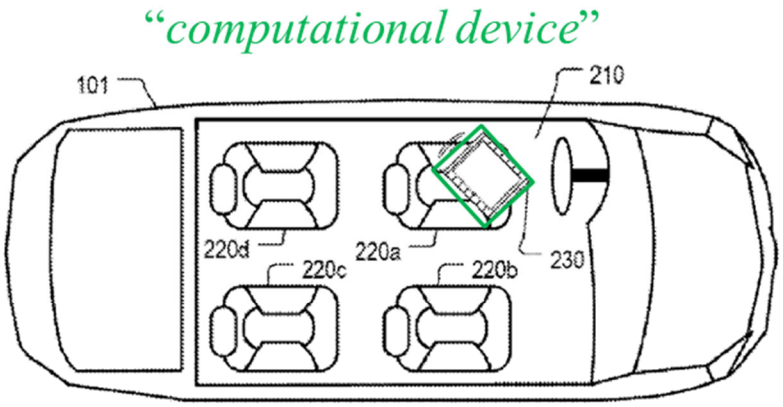


Fig. 2

Clement, Ex. 1010, Fig. 2 (Annotated)

168. Figure 8 "depicts a schematic diagram of a process associated with controlling of the vehicle of FIG. 1 by the vehicle control unit of FIG. 4." (Clement, Ex. 1010, 4:27-29.) At task 820, the vehicle control unit 320 establishes a connection with the control device 230 utilizing "any communication protocol" such as "Bluetooth":

> At task 820, a connection between the control device 230 and the vehicle control unit 320 is established. The connection may be either wired or wireless. To establish the connection, any communications protocol may be utilized, such as TCP/IP, Bluetooth, USB, wireless USB, WiFi, or a custom communications protocol.

(Clement, Ex. 1010, 9:45-50.)

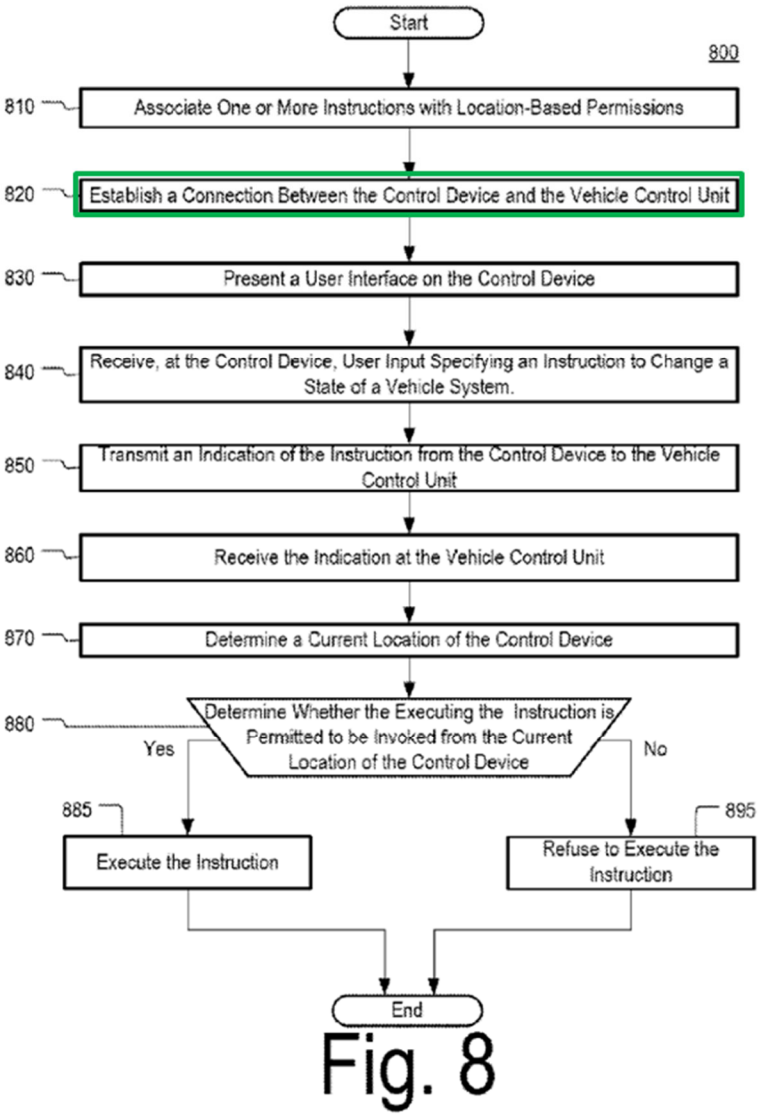


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

169. As I explained in the state-of-the art section, a POSA would have known that Bluetooth was a very popular protocol used by most if not all Automotive Applications, for transmitting wireless signals (RF signals) to/from wireless devices. (*See* ¶¶ 97-101.) As also discussed above, Bluetooth includes aspects of device discovery in which a computer program runs in the background to discover wireless

devices. (7-101.) Accordingly, a POSA would have understood that the vehicle control unit 320 operates in the background to detect the presence of the control device 230, and during this operation, determines that the control device 230 is "*attempting to connect to a network and/or communication subsystem of a vehicle*."

170. Clement discloses that the vehicle control unit 320 communicates with the control device 230 ("*computational device*") (e.g., over a wireless connection) to receive instructions and that its executable code 440 ("*device discovery* [computer program]") controls, or changes the state of, vehicle systems 310a-f (e.g., over a wired connection) based on the instructions:

> The vehicle control unit 320 may be coupled to the control device 230 via a wireless or wired connection and it may be operable to receive instructions from the control device 230 to change the state of one or more of the vehicle systems 310a-f.

(Clement, Ex. 1010, 7:8-11.)

> The location system 330 may include hardware and/or software for determining the location of the control device 230 within the passenger compartment 210. In this example, the location system 330 includes receivers 610a-d (depicted in FIG. 6) located in different parts of the of the passenger compartment 210. The receivers 610a-b [*sic* 610a-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.

(Clement, Ex. 1010, 7:23-32.)

171. 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 310a-f" and the lines connecting the corresponding boxes in Figure 3, indicates that vehicle control unit 320 communicates with the vehicle systems 310a-f over a wired connection. (Clement, Ex. 1010, 7:8-11.) 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 connects to the control device 230 over a wireless connection. 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:

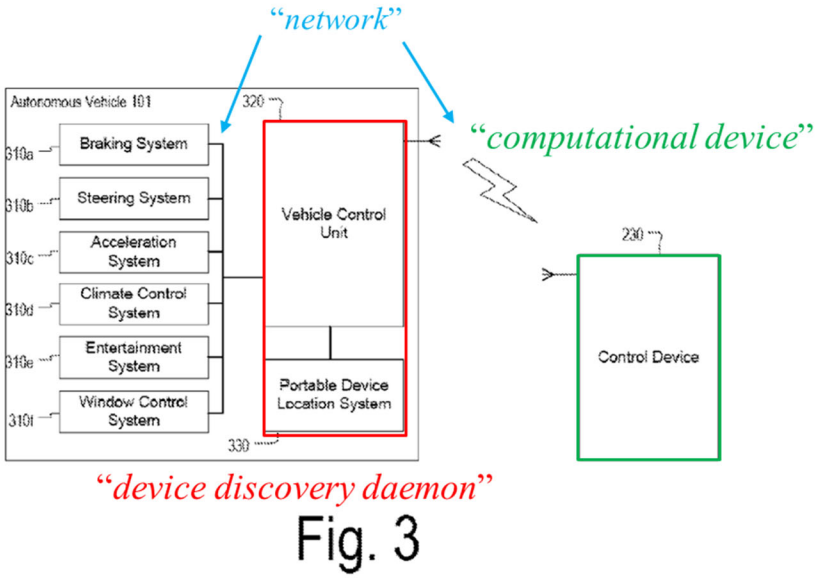


Fig. 3

Clement, Ex. 1010, Fig. 3 (Annotated)

172. Accordingly, Clement teaches "*determining, by a microprocessor executable device discovery* [computer program] [vehicle control unit 320 with portable device location system 330 executable code 440], *that a computational device* [control device 230] *is connected to or attempting to connect to a network and/or communication subsystem of a vehicle* [e.g., by first detecting the control device 230 using its background program, and then establishing a connection between the control device 230 and the vehicle network through the vehicle control unit 320]."

> … ***[1b] (b) 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***

173. 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):

> At task 870, the vehicle control unit 320 determines the current location of the control device 230. Without limitation, the current location of the control device 230 may be the location where the control device is located when task 870 is executed, the location where the control device is located when task 860 is executed, or the location of the control device 230 at another time instant that is substantially cotemporaneous with the time instant when either one of task 860 or task 870 is executed.

(Clement, Ex. 1010, 10:37-45.)

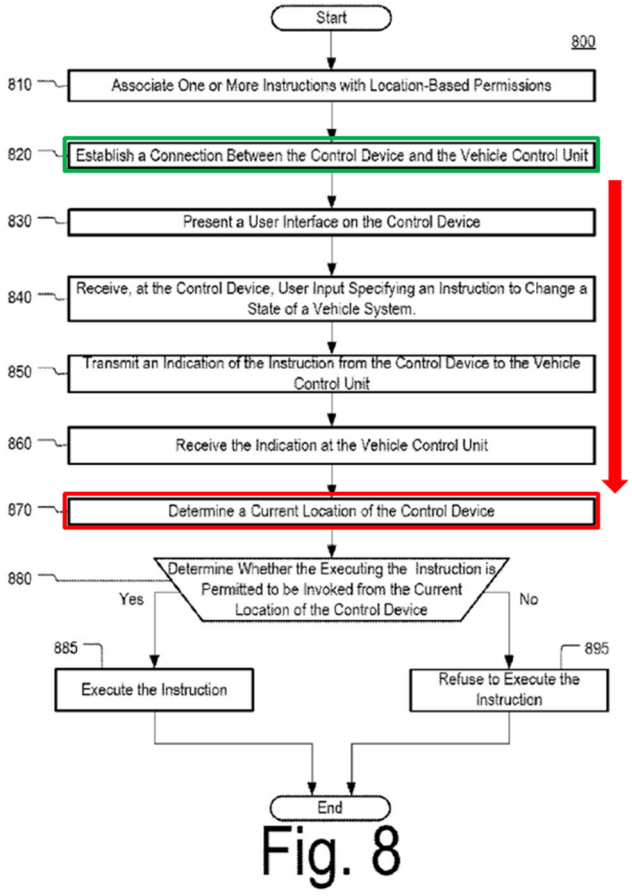


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

174. Clement discloses that the location system 330 software, which may be incorporated with the vehicle control unit 320, ("*device discovery* [computer program]") determines the location of the control device 230 ("*computational device*") within the passenger compartment 210 of the vehicle using multiple approaches, including triangulation based the strength of the radio signal(s) transmitted by the control device 230:

> The location system 330 may include hardware and/or software for determining the location of the control device 230 within the passenger compartment 210. In this example, the location system 330 includes

> receivers 610a-d (depicted in FIG. 6) located in different parts of the of the passenger compartment 210. The receivers 610a-b [*sic* 610a-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.

(Clement, Ex. 1010, 7:23-32.)

175. Clement further discloses that the location of the control device 230 refers to the specific region (e.g., Regions 1-4) of the vehicle that the control device 230 is located in:

> The executable code 440 may perform at least some of the tasks of the process 800 depicted in FIG. 8. For example, the executable code 440 may include a location-based permissions module 442 that is configured to enforce location-based restriction policies. That is, when an instruction is received from the control device 230, 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.

(Clement, Ex. 1010, 8:14-24.)

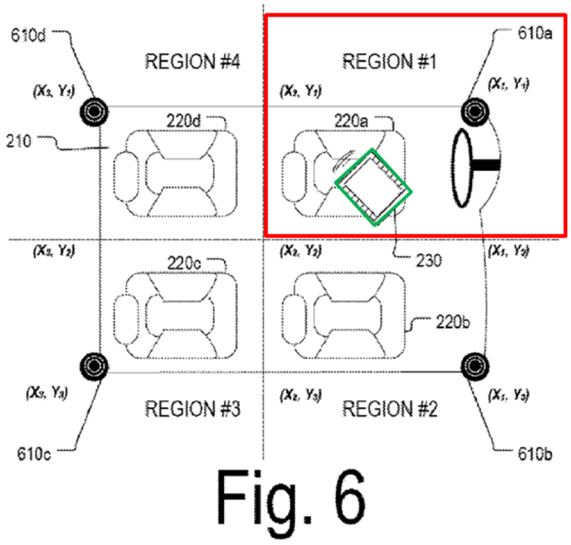


Fig. 6

Clement, Ex. 1010, Fig. 6 (Annotated)

176. Thus, Clement discloses "*in response, determining, by the device discovery* [computer program] [vehicle control unit 320 with location system 330 software], *whether the computational device is located within a predetermined area and/or zone of the vehicle* [Regions 1-4]."

… ***[1c] (c) applying, by the device discovery daemon, at least the following rules:***

177. 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:

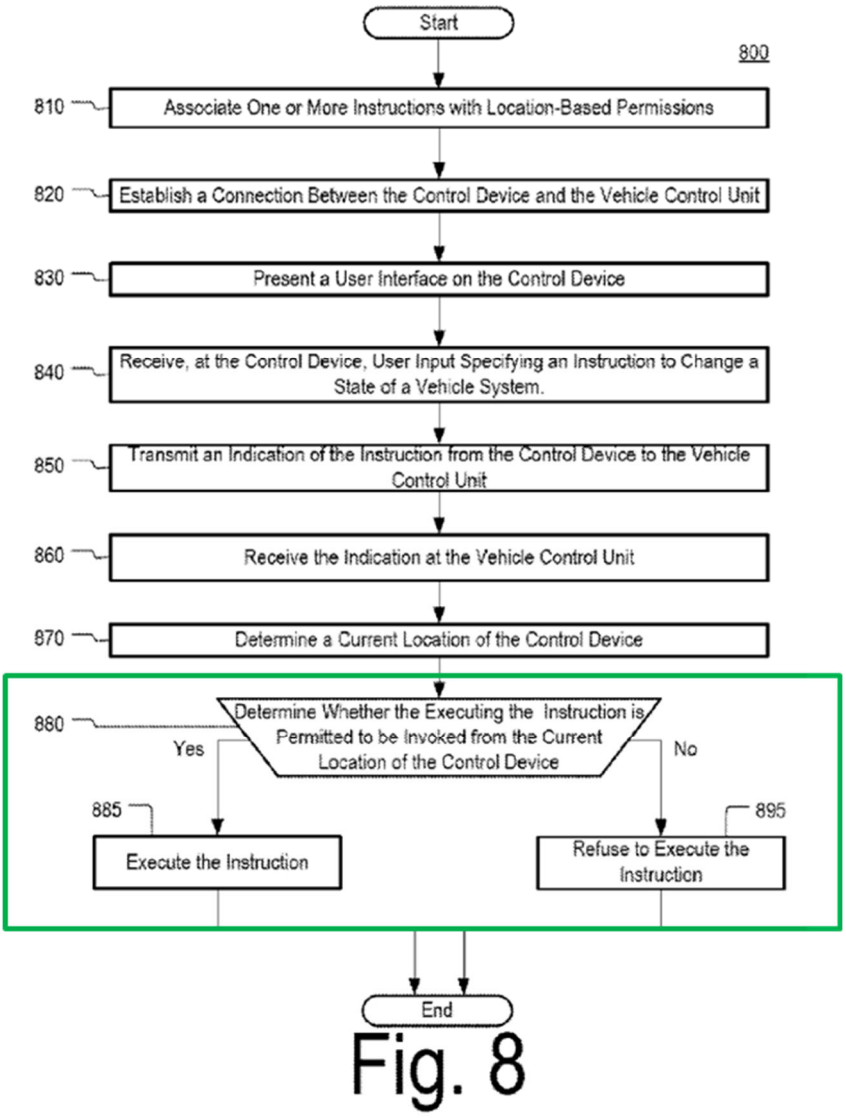


Fig. 8

Clement, Ex. 1010, Fig. 8

178. Thus, Clement discloses "*applying, by the device discovery* [computer program]*, at least the following rules*."

> … ***[1d] (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***

179. In my analysis I apply the proposed construction of 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." (*See* ¶¶ 82-85.)

180. It is therefore my understanding that claim [1d] should be interpreted as "*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* [functionality of] *the vehicle network and/or communication subsystem*."

181. Clement 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":

> The vehicle control unit 320 may use the location system 330 to enforce location-based permissions on instructions received from the control device 230. As discussed above, 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 220a. Thus, before executing an instruction invoked using the control device 230, the vehicle control unit 320 may determine the current location of the control device 230 in the passenger compartment 210 and execute the instruction only if that instruction is permitted to be invoked from the control device's current location.

(Clement, Ex. 1010, 7:40-50.)

182. With reference to Figure 8, 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":

> At 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. The determination may be based on the permissions structure 434 or another similar data structure. The determination may involve finding out whether the current location of the vehicle 101 is within one or more regions in the passenger compartment 210 where the instruction is permitted to be invoked from. If the current location of the control device 230 is within one of the regions where the instruction is permitted to be invoked from, task 885 is executed. Otherwise, if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed.

(Clement, Ex. 1010, 10:55-67.)

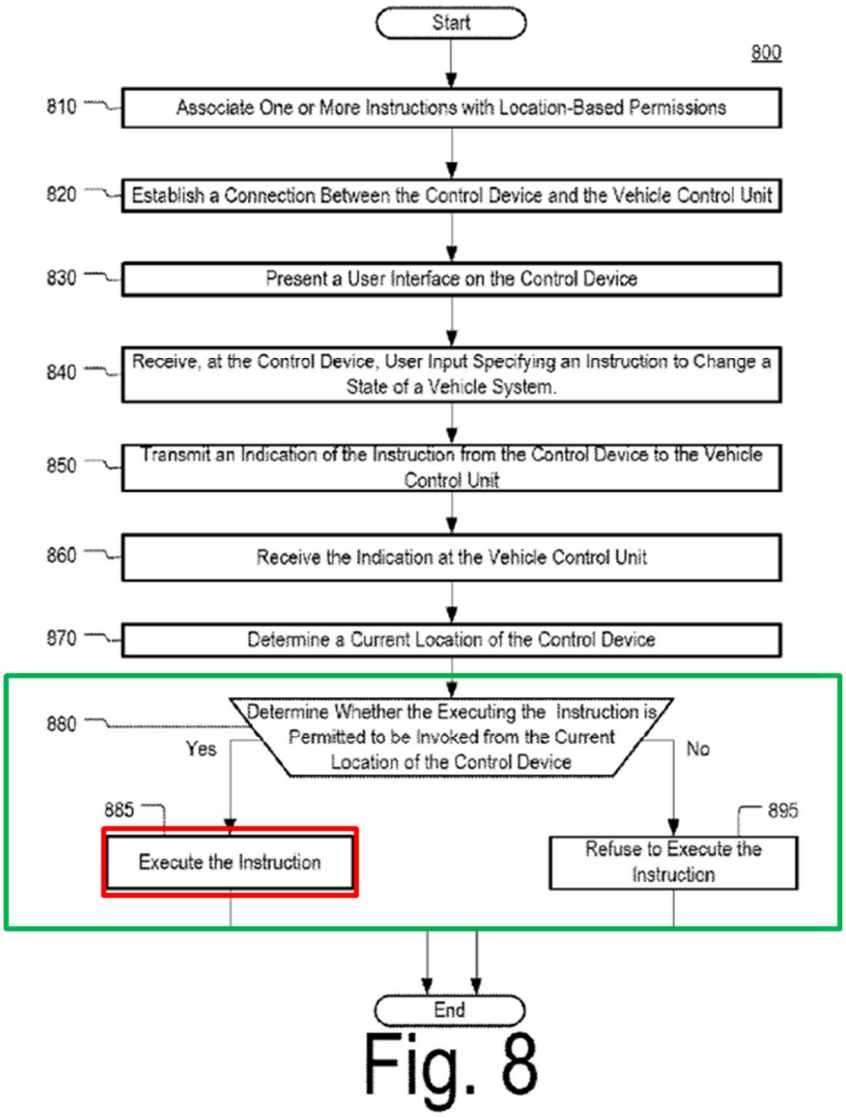


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

183. Clement discloses an example of such a 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 220a." (Clement, Ex. 1010, 7:42-45.) A POSA would have understood that the control device 230 connects to the vehicle network, through the vehicle control unit 320, to control the steering system 310b.

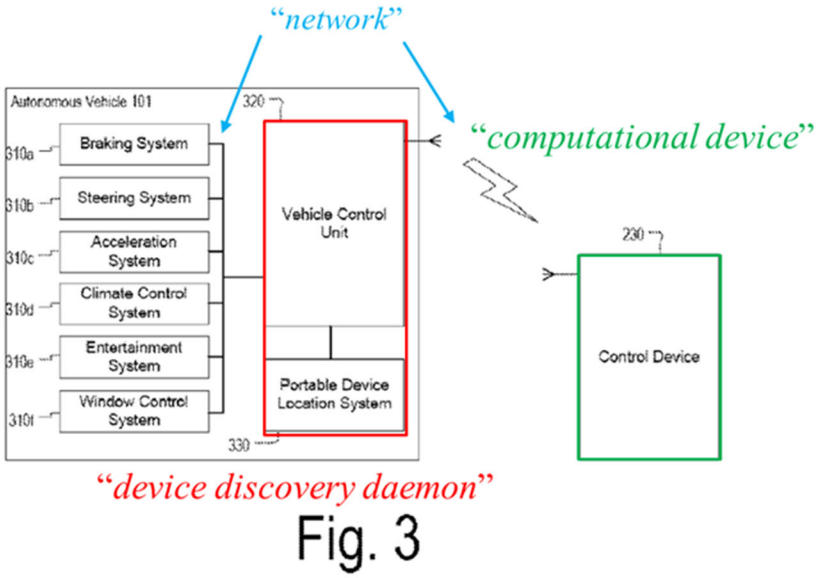


Fig. 3

Clement, Ex. 1010, Fig. 3 (Annotated)

184. Clement also discloses that the user interface of control device 230 displays "buttons" 910a-i (mislabeled as 900a-i in the figures) that allow the user to control different aspects or features:

> As illustrated in FIG. 9A, the user interface 900A may provide buttons 910a-j that enable control over different aspects of the operation of the vehicle 101. For example, clicking on the button 910a may lead users to a menu that enables the steering, stopping, or acceleration of the vehicle 101.

(Clement, Ex. 1010, 9:55-60.)

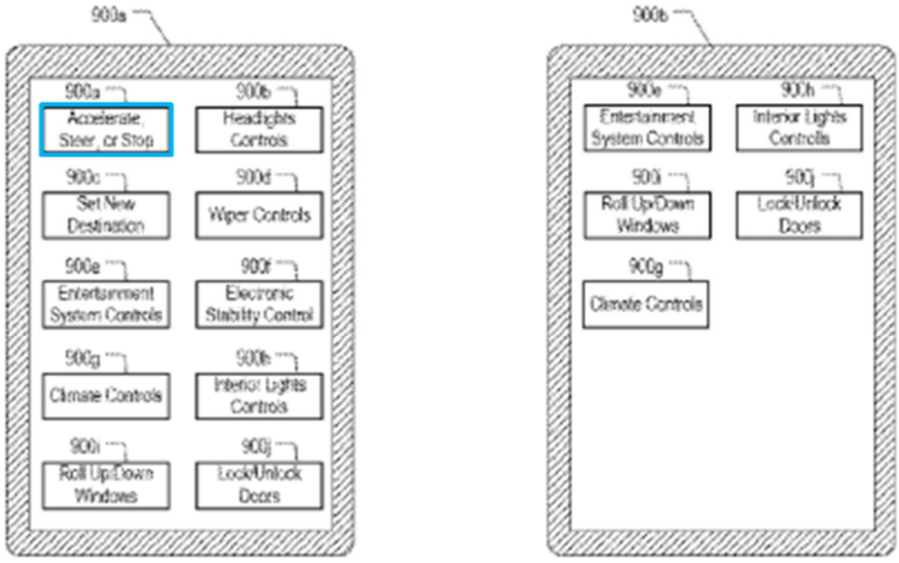


Fig. 9A Fig. 9B

Clement, Ex. 1010, Fig. 9A and Fig. 9B (Annotated)

185. 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 displaying "buttons" for safety-critical features like steering (annotated in blue above) if the control device 230 is located in the area of the driver seat, i.e., region 1:

> In some aspects, the user interface presented by the control device 230 may be varied in dependence upon the location of the control device 230 in the vehicle cab 210. For example, only if the control device 230 is located in region #1, the menu 900A may be displayed. By contrast, when the control device 230 is located in regions #2-3, the menu 900B may be displayed. As illustrated in this example, the interface 900A may include input components (e.g., buttons, text input field, sliders,

> check boxes, etc.) for safety-critical aspects of the operation of the vehicle 101, such as accelerating, **steering**, and braking, whereas the interface 900B may lack such input components for controlling safety-critical aspects of the operation of the vehicle 101.

(Clement, Ex. 1010, 10:14-26.)

186. Thus, Clement discloses *"(c) applying, by the device discovery* [computer program]*, at least the following rules: (C1) when the computational device is located within the predetermined area and/or zone of the vehicle* [e.g., in the driver seat area of Region 1], *permitting the computational device to access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem* [e.g., to control safety critical systems, e.g., accelerating, steering, and braking systems]."

> … ***[1e] (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.***

187. In my analysis I apply the proposed construction of 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." (*See* ¶¶ 82-85.)

188. It is therefore my understanding that claim [1e] should be interpreted as "*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* [functionality of] *the vehicle network and/or communication subsystem*."

189. Clement further discloses that "[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" and as illustrated in Figure 8 below, the vehicle control unit 320 "Refuses to Execute the Instruction" at task 895.

> At 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. The determination may be based on the permissions structure 434 or another similar data structure. The determination may involve finding out whether the current location of the vehicle 101 is within one or more regions in the passenger compartment 210 where the instruction is permitted to be invoked from. If the current location of the control device 230 is within one of the regions where the instruction is permitted to be invoked from, task 885 is executed. Otherwise, if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed.

(Clement, Ex. 1010, 10:55-67.)

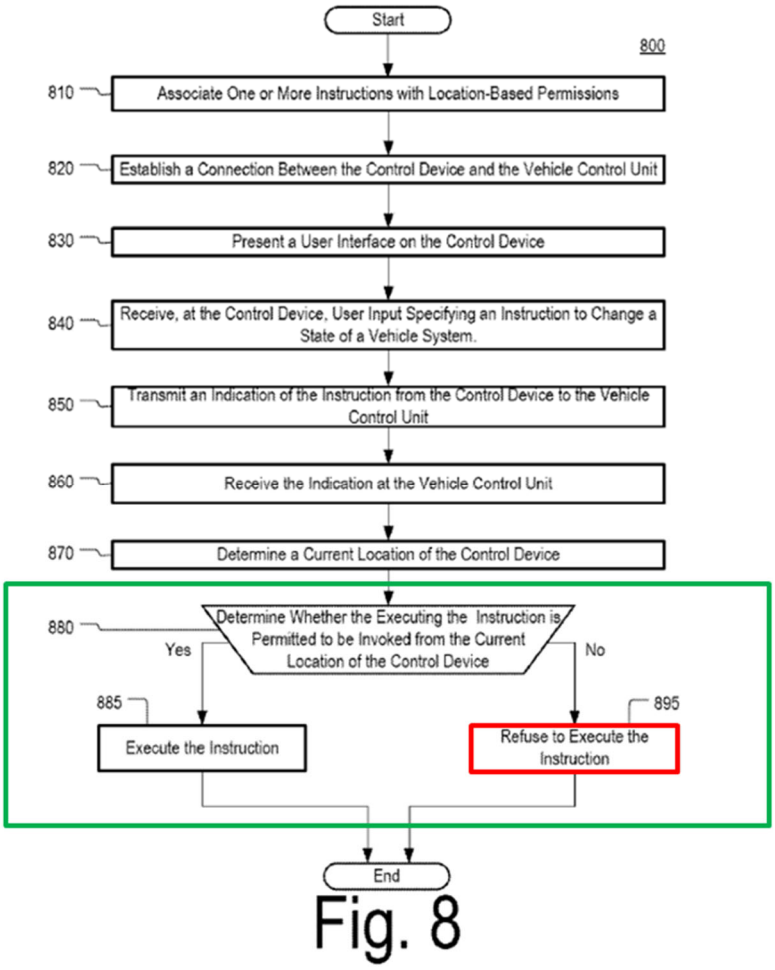


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

190. 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 220a." (Clement, Ex. 1010, 7:42-45.) Steering button 900a is not displayed on the user interface 900b when the user is located in a passenger seat (Fig. 9B), however 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), as illustrated by a comparison of Figures 9A and 9B below:

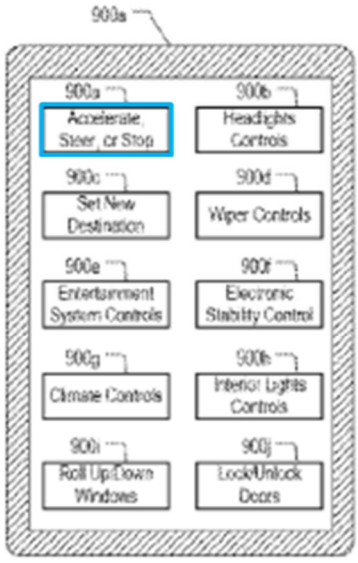


Fig. 9A

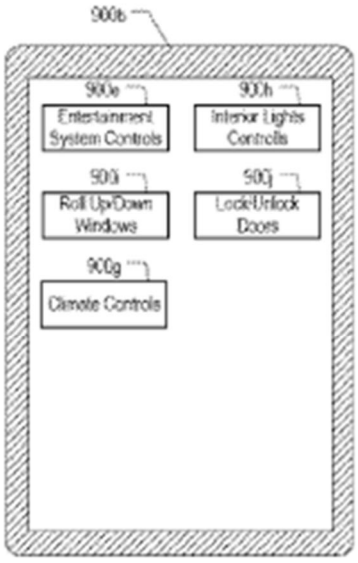


Fig. 9B

Clement, Ex. 1010, Fig. 9A (Annotated) and Fig. 9B

191. Thus, Clement discloses *"(c) applying, by the device discovery* [computer program]*, at least the following rules: . . . (C2) when the computational device* [control device 230] *is not located within the predetermined area and/or zone of the vehicle* [e.g., not located in the driver seat area of Region 1], *not permitting the computational device to access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem* [e.g., prevent control of safety critical systems, e.g., accelerating, steering, and braking systems]."

2. Dependent Claims 2, and 4-7

192. Claims 2 and 4-7 depend from claim 1, which I understand means that these claims require all of the limitations of claim 1 in addition to their own limitations. Clement teaches all of the limitations of claim 1 as described above.

a. Claim 2

… ***[2a] The method of claim 1, 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,***

193. As I explained for claim [1b], the vehicle control unit 320 and location system 330 execute code to determine the location of the control device 230, e.g., using triangulation of the signal strength measurements. (Clement, Ex. 1010, 7:23–32.) Clement also discloses that the control device 230 may determine its own location:

> In other examples, the control device 230 may determine its location and communicate it to the vehicle control unit 320.

(Clement, Ex. 1010, 10:48-49.)

> FIG. 11 depicts a flowchart of a process 1100 that is associated with the operation of the control device 230. Tasks in the process 1100 may be performed by the control device 230 or by both the control device 230 and the vehicle control unit 320. At task 1110, the current location of the control device 230 within the passenger compartment 230 is determined. As noted, the control device 230 may determine the current

> location by itself, or alternatively, it may receive an indication of the current location from the vehicle control unit 230 [*sic* 320]. At task 1120, one of a plurality of user interfaces (or user interface components) is selected based on the location of the control device 230.

(Clement, Ex. 1010, 12:14-25.)

194. Clement further discloses that for such an embodiment, the vehicle may include transmitters instead of receivers, and "the control device 230 may triangulate signal strength measurements from those transmitters to independently determine its location within the passenger compartment 210":

> As discussed above, the current location of the control device 230 may be determined using the radio receivers 610a-d. In other examples, the control device 230 may determine its location and communicate it to the vehicle control unit 230 [*sic* 320]. For example, instead of the radio receivers 610a-d, 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.

(Clement, Ex. 1010, 10:46-54.)

195. As discussed above, Clement expressly teaches that transmitters can be included in the vehicle and have the control device 230 determine its own location. A POSA would have understood that this modification of shifting processing from the vehicle control unit 320 to the control device 230 is just a simple substitution of

one known element for another and can be accomplished to obtain predictable results, e.g., less power consumption by the vehicle system, because it will be performed only when the control device is in the vehicle. Clement further discloses determining the location of control device 230 within a specific region of the passenger compartment:

> At 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. The determination may be based on the permissions structure 434 or another similar data structure. The determination may involve finding out whether the current location of the vehicle 101 [*sic* control device 230] is within **one or more regions in the passenger compartment 210** where the instruction is permitted to be invoked from. If the current location of the control device 230 is within one of the regions where the instruction is permitted to be invoked from, task 885 is executed. Otherwise, if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed.

(Clement, Ex. 1010, 10:55-67.)

196. Clement illustrates Regions 1-4 in Figure 6:

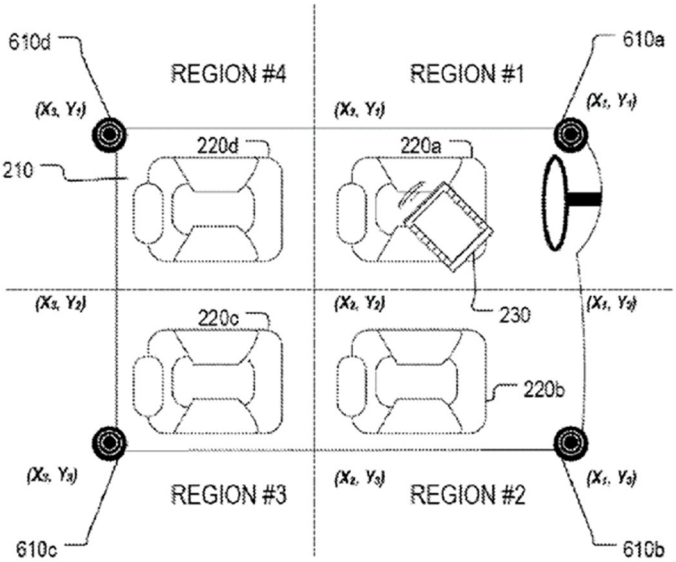


Fig. 6

Clement, Ex. 1010, Fig. 6

197. Therefore, Clement discloses "*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* [e.g., within Region 1 of Regions 1-4], *to be used in applying the rules*."

… ***[2b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and***

198. Clement discloses that:

> The control device 230 may be a tablet, a smart phone, a laptop, or another type of portable computing device.

(Clement, Ex. 1010, 6:9-10.)

199. Thus, Clement discloses that "*the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant*."

… ***[2c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.***

200. Clement discloses that "*predetermined area and/or zone of the vehicle*" may include the passenger compartment 210:

> As discussed above, the current location of the control device 230 may be determined using the radio receivers 610a-d. In other examples, the control device 230 may determine its location and communicate it to the vehicle control unit 230 [*sic* 320]. For example, instead of the radio receivers 610a-d, 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**.

(Clement, Ex. 1010, 10:46-54.)

201. Clement further discloses determining the location of the control device within a specific region of the passenger compartment:

> The method further includes identifying a current location of the portable control device within a **passenger compartment** of the vehicle, and depending on the current location of the portable control device, performing one of the following tasks: executing the instruction when it is determined that the portable control device is located in a **first region** in the passenger compartment of the vehicle, or refusing to execute the instruction when it is determined that the portable control device is located in a **second region** in the passenger compartment of the vehicle.

(Clement, Ex. 1010, 1:42-51.)

202. Clement illustrates Regions 1-4 in Figure 6.

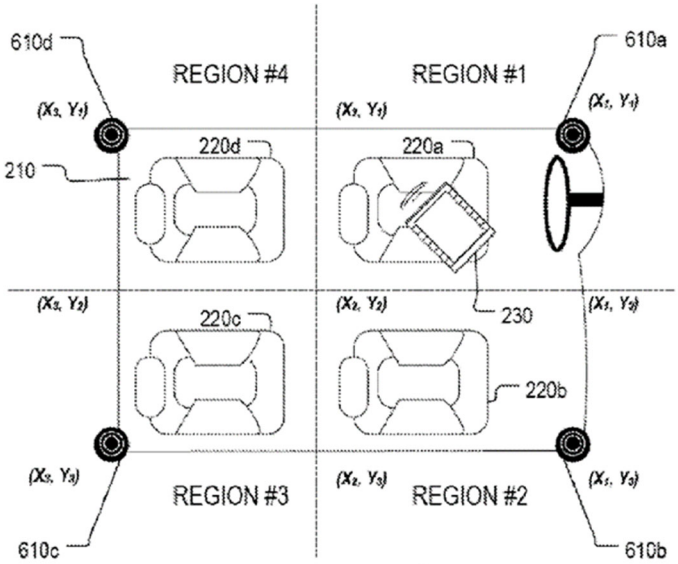


Fig. 6

Clement, Ex. 1010, Fig. 6

203. Clement further discloses permitting different functionality depending on the specific location of the control device within the passenger compartment, and a POSA would have understood that this teaching is also applicable to the embodiment in which the control device 230 determines its own location.

> The operational capabilities of the control device 230 may vary with the control device's location in the **passenger compartment 210**. If the control device 230, for example, is held by the driver occupying seat 220a as shown in FIG. 2, the portable device may be capable of steering or accelerating the vehicle 101. If, however, the portable device 230 is held by a passenger occupying the seat 220b, the portable device may

be permitted to control the vehicle's entertainment system, but not steer or apply the brakes of the vehicle.

(Clement, Ex. 1010, 5:59-67.)

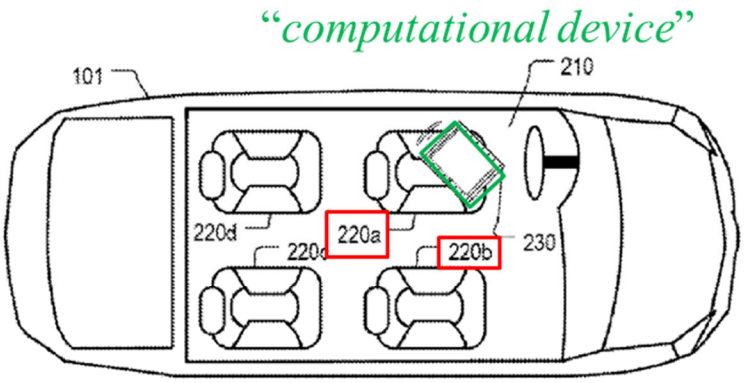


Fig. 2

Clement, Ex. 1010, Fig. 2 (Annotated)

204. Thus, Clement discloses that "*the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment*."

b. Claim 4

… ***[4] The method of claim 1, 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.

205. I understand that since claim 4 requires "*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 . . . .*" followed by a long list of localization options; a reference need only disclose one of the recited localization options to meet the claim.

206. Clement describes the method illustrated in Figure 8 as including a series of "tasks", e.g., "At task 870, the vehicle control unit 320 determines the current location of the control device 230." (Clement, Ex. 1010, 10:37-38.) A POSA would have understood that a task and a step are synonymous terms used in describing a method.

207. Clement discloses determining the location of the control device 230 based on triangulating the radio signals:

> The radio receivers may measure the power of radio signals emitted by the control device 230 and triangulate the signals to determine the location of the control device 230.

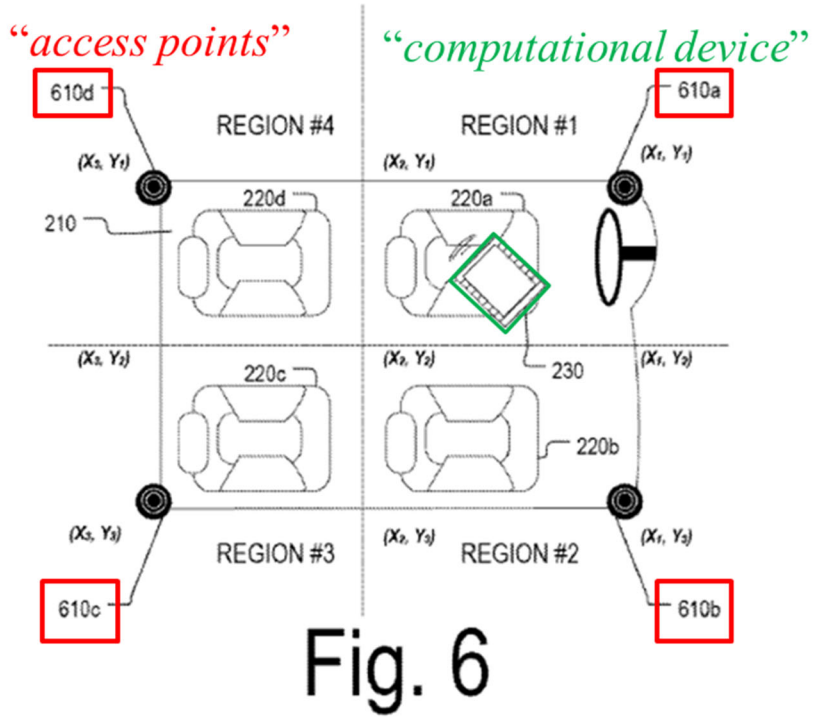
(Clement, Ex. 1010, 8:43-46.)

208. Clement discloses that the location system 330, which as described above may be incorporated with the vehicle control unit 320, ("*device discovery* [computer program]") determines the location of the control device 230 ("*computational device*") within the passenger compartment 210 of the vehicle using triangulation based on the strength of the radio signal(s) that are transmitted by the control device 230 and received by receivers 610a-d of the vehicle ("*multiple access points of the vehicle*"):

> The location system 330 may include hardware and/or software for determining the location of the control device 230 within the passenger compartment 210. In this example, the location system 330 includes **receivers 610a-d** (depicted in FIG. 6) located in different parts of the of the passenger compartment 210. **The receivers 610a-b [*sic* 610a-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**.

(Clement, Ex. 1010, 7:23-32.)

209. Clement illustrates Regions 1-4 of the passenger compartment 210 in Figure 6:



Clement, Ex. 1010, Fig. 6 (Annotated)

210. A POSA would have understood that Clement teaches determining the location of the portable control device within the vehicle using at least triangulation of the measurements of signal strength because the system includes multiple receivers positioned within the vehicle that take measurements of the radio signals transmitted by the control device 230 and the system can calculate and compare the signal strength values from the different receivers and sends those measurements to

the vehicle control unit 320 to estimate the device's location; which is an established triangulation technique.

211. Therefore Clement discloses "*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* [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* [control device 230] *as received by multiple access points* [radio receivers 610a-d] *of the vehicle . . . .*"

c. Claim 5

… ***[5a] The method of claim 4, ~~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***

212. Claim 5 depends on claim 4, therefore I understand that claim 5 includes the limitations of claim 4, in addition to the limitations of claim 1.

213. Claim [5a] is largely duplicative of claim [1d]. To illustrate, the table below shows a side-by-side comparison of claims [5a] and [1d].

'697 Patent Claim [5a]	**'697 Patent Claim [1d]**

[5a] The method of claim 4, ~~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	[1d] (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

214. I understand the additional "*wherein the*" phrase at the beginning of claim 5 to be a typographical error, so I have shown it with strikethrough text above.

215. Due to the similarities in the claims, I refer back to my analysis of this limitation in claim [1d] to establish that it is met by Clement.

> … ***[5b] 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.***

216. Clement 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." (Clement, Ex. 1010, 7:40-42.) With reference to Figure 8, Clement discloses that:

> At 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. The determination may be based on the permissions structure 434 or another similar data structure. The determination may involve finding out whether the current location of the vehicle 101 is within one or more regions in the passenger compartment 210 where the instruction is permitted to be invoked from. If the current location of the control device 230 is within one of the regions where the instruction is permitted to be invoked from, task 885 is executed. Otherwise, if the control device 230 is outside of any regions where the instruction is permitted to be invoked from, task 895 is performed.

(Clement, Ex. 1010, 10:55-67.)

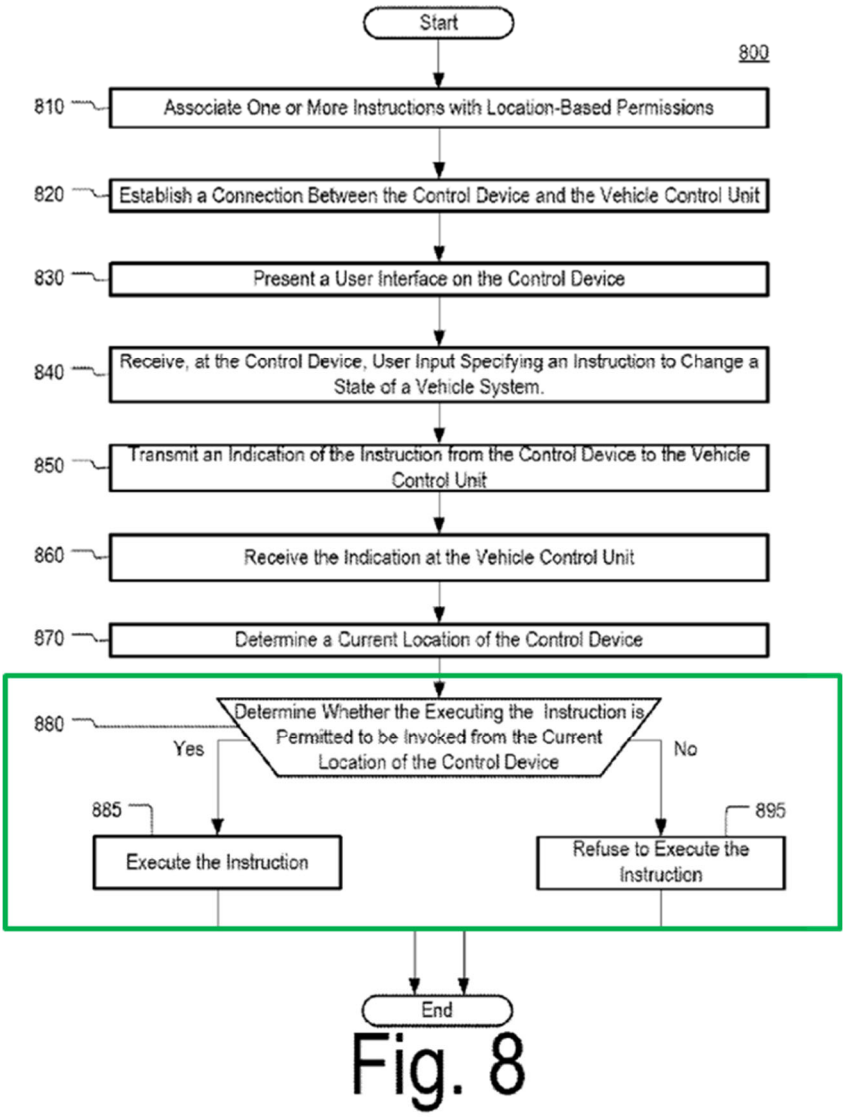


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

217. For example, Clement discloses that if the control device 230 is located in a passenger seat of the vehicle, then the passenger will be able to control the vehicle entertainment system using the control device 230, but not "steer or apply the brakes of the vehicle":

> The operational capabilities of the control device 230 may vary with the control device's location in the passenger compartment 210. If the

> control device 230, for example, is held by the driver occupying seat 220a as shown in FIG. 2, the portable device may be capable of steering or accelerating the vehicle 101. If, however, the portable device 230 is held by a passenger occupying the seat 220b, the portable device may be permitted to control the vehicle's entertainment system, but not steer or apply the brakes of the vehicle.

(Clement, Ex. 1010, 5:59-67.)

218. Clement also discloses varying the menu of buttons corresponding to available input components ("*set of tasks . . . that can be performed*") displayed on the user interface of control device 230 based on its location, e.g., only displaying inputs for operations that are available based on the current location. For example, Figure 9B below depicts buttons for a set of available operations, e.g., entertainment system controls 900e, when the control device 230 is located in passenger Regions #2-3, but lacks buttons for controlling a set of safety-critical aspects of the operation of the vehicle 101 that are only available to the driver located in Region 1:

> In some aspects, the user interface presented by the control device 230 may be varied in dependence upon the location of the control device 230 in the vehicle cab 210. For example, only if the control device 230 is located in region #1, the menu 900A may be displayed. By contrast, when the control device 230 is located in regions #2-3, the menu 900B may be displayed. As illustrated in this example, the interface 900A may include input components (e.g., buttons, text input field, sliders, check boxes, etc.) for safety-critical aspects of the operation of the

vehicle 101, such as accelerating, steering, and braking, whereas the interface 900B may lack such input components for controlling safety-critical aspects of the operation of the vehicle 101.

(Clement, Ex. 1010, 10:14-26.)

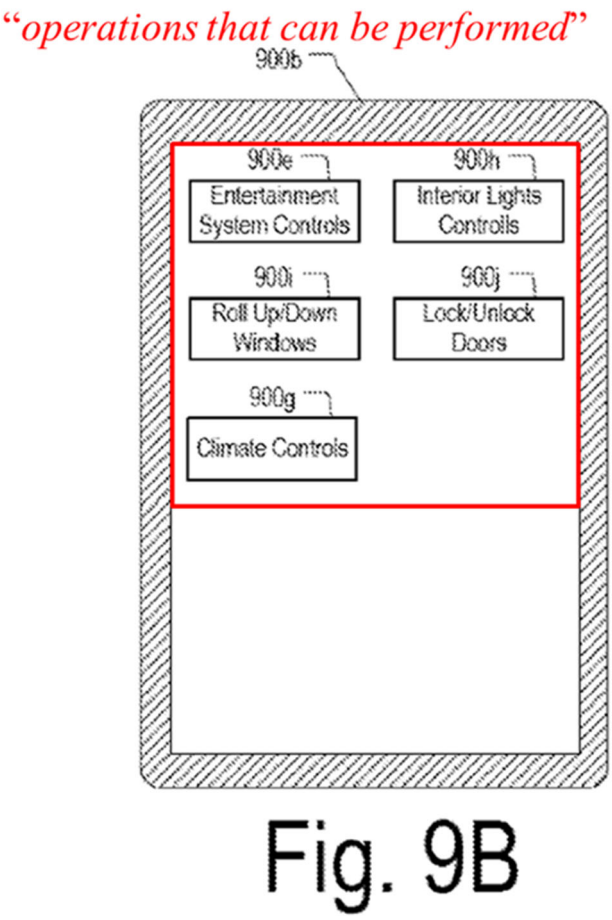


Fig. 9B

Clement, Ex. 1010, Fig. 9B (Annotated)

219. Thus Clement discloses "*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 wherein the device discovery* [computer program] *determines a set of*

tasks, functions, and/or operations that can be performed [e.g., input components displayed in menu 900B when the control device 230 is located in Regions #2-3] *and a set of tasks, functions, and/or operations that cannot be performed based on the determined location of the computational device* [e.g., input components NOT displayed in menu 900B (e.g., steering and braking input components) when the control device 230 is located in Regions #2-3]."

d. Claim 6

… ***[6] The method of claim 4, 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.***

220. Claim 6 depends on claim 4, therefore I understand that claim 6 includes the limitations of claim 4, in addition to the limitations of claim 1.

221. I understand that since claim 6 requires "*wherein the device discovery* [computer program] *uses multiple of the one or more of . . .*" followed by a long list of localization options; a reference need only disclose two of the recited localization options to meet the claim.

222. As illustrated below, claim 6 includes the same list of localization options as claim 4.

'697 Patent Claim 4	**'697 Patent Claim 6**
[4] The method of claim 1, 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	[6] The method of claim 4, 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	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	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.	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.

223. As I explained above with reference to claim 4, Clement discloses determining the location of the control device ("*computational device*") based on triangulation.

224. Clement also discloses determining location of the control device 230 ("*computational device*") based on radio signal strength:

> The location of the portable control device may further be determined based on a radio signal transmitted by the portable control device.

(Clement, Ex. 1010, 3:13-15.)

> The location of the control device 230, as discussed, may be determined using radio receivers 610a-d.

(Clement, Ex. 1010, 8:42-43.)

225. Clement further discloses using a simple coordinate-based model to define a region:

> As illustrated in FIG. 5, the different regions of passenger compartment 210 may be represented as sets of coordinates. In one alternative example however, each region may be presented as a single coordinate and a radius.

(Clement, Ex. 1010, 8:47-50.)

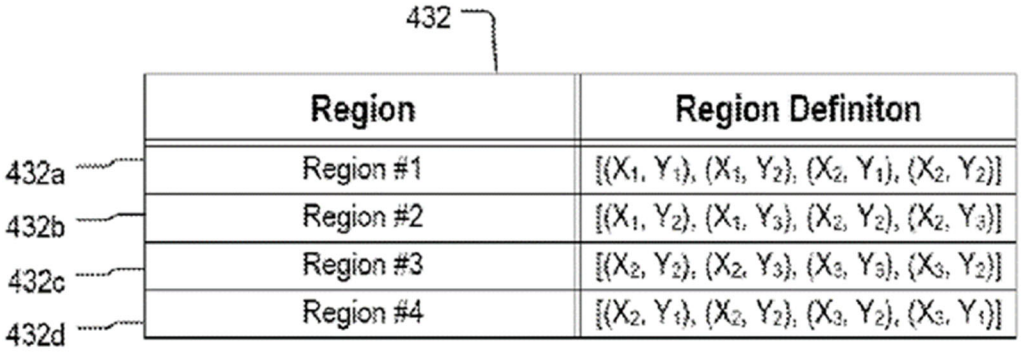


Fig. 5

Clement, Ex. 1010, Fig. 5

226. A POSA would have understood that Clement's disclosure that each region may be represented as a "single coordinate and radius" (Clement, Ex. 1010, 8:47-50) to indicate a range of signal strength values, and thus a single access point can be used to determine whether the device is located within that region, as this reflects a simplified method of localization.

227. Clement further discloses defining each region (i.e., Regions 1-4) using 4-tupples of signal strength ranges:

> As illustrated in FIG. 5, the different regions of passenger compartment 210 may be represented as sets of coordinates . . . . In another alternative example, however, 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 610a-d when the control device 230 is in a given region). Stated succinctly, the indications of regions of the logical partition structure 432 may include any type of information capable of being used to distinguish from one another different portions of the passenger compartment 210.

(Clement, Ex. 1010, 8:47-58.)

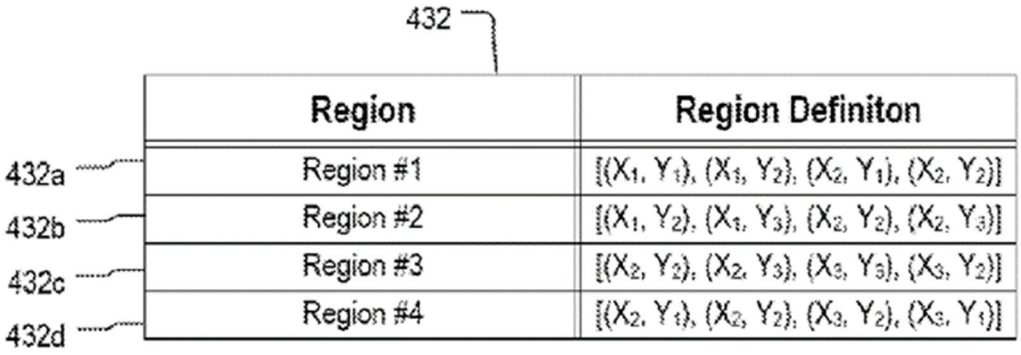


Fig. 5

Clement, Ex. 1010, Fig. 5

228. A POSA would have also understood that each of Clement's radio receivers 610a-d is an "*access point*" as each receiver 610a-d receives signals from the device for localization purposes.

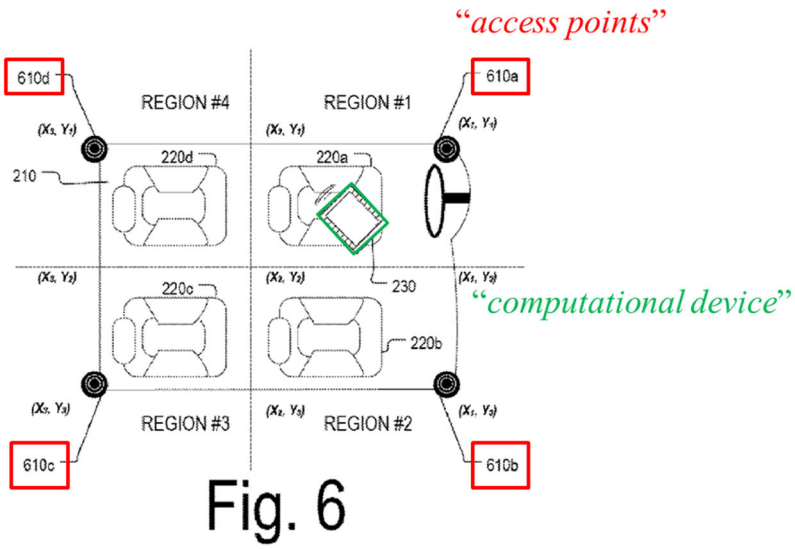


Fig. 6

Clement, Ex. 1010, Fig. 6 (Annotated)

229. In regard to the 4-tupples approach, a POSA would have understood that if a transmitted signal can be received and measured by each of the receivers 610a-d at all four access points, this indicates that each receiver 610a-d is independently capable of detecting and measuring the signal strength of that same transmission. Thus, a POSA would have understood that a single receiver (i.e. a single access point) is used to measure the signal strength and signal strength information from four access points is used to determine the location of the control device.

230. A POSA would have understood that Clement's disclosure of determining the location of the portable control device 230 based on a "radio signal" indicates determining location based on the signal strength of a radio signal from the portable control device as received by an access point of the vehicle because Clement

describes using a receiver within the vehicle to measure the signals strength emitted by the control device and using the signal strength to determine the device's location; which is an approach consistent with well-known methods of using RSSI for localization.

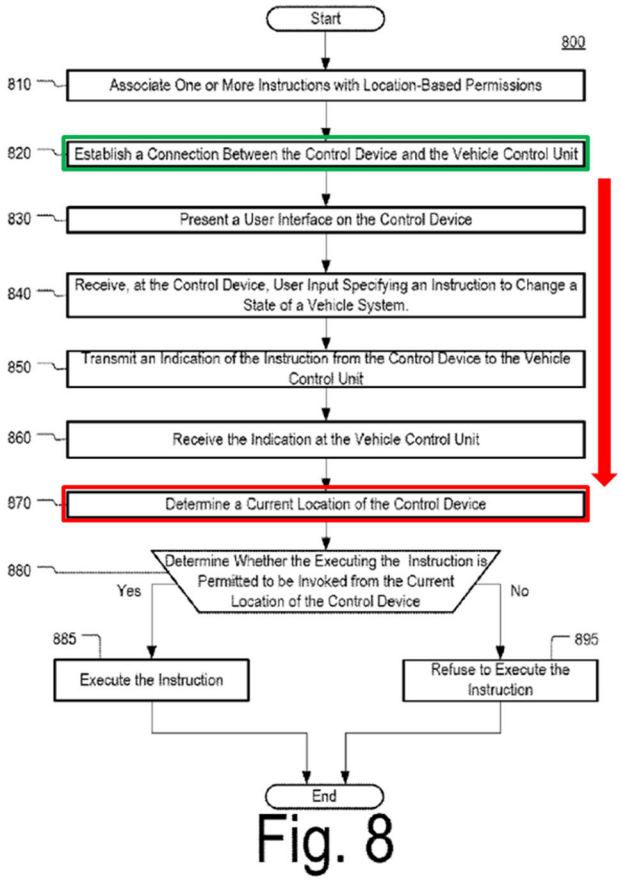


Fig. 8

Clement, Ex. 1010, Fig. 8 (Annotated)

231. Therefore, Clement discloses "*wherein the device discovery* [computer program] *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* [e.g., as a single coordinate and a radius or as sets of signal strength ranges that are measured by each

receiver 610a-d and represented as a 4-tupple of signal strength ranges] , . . . [and] *triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points of the vehicle* [as explained for claim 4]."

e. Claim 7

… ***[7] The method of claim 6, 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.***

232. Claim 7 depends on claim 6, therefore I understand that claim 7 includes the limitations of claim 6, in addition to the limitations of claim 1.

233. Clement discloses that "[t]he receivers 610a-b [*sic* 610a-d] may take measurements of the signal 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." (Clement, Ex. 1010, 7:28-32.)

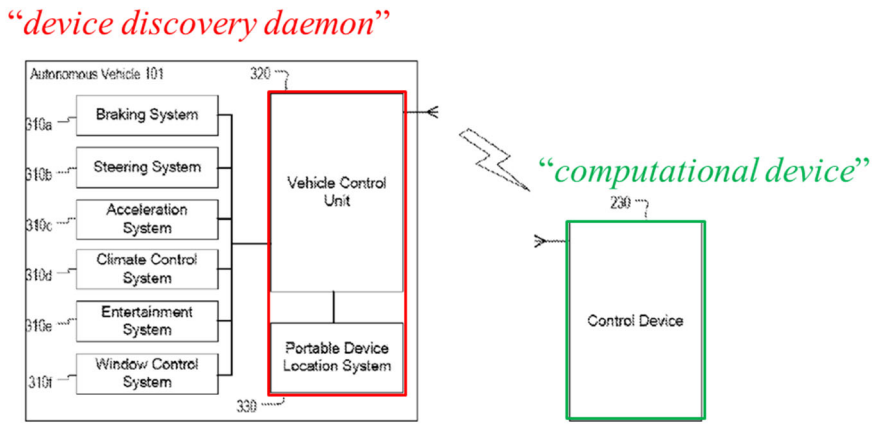


Fig. 3

Clement, Ex. 1010, Fig. 3 (Annotated)

234. Clement further discloses that the passenger compartment 210 may be divided into regions, where each region is associated with a particular signal strength range. The vehicle control unit 320 measures the signal strength transmitted by the control device 230 and determines the location of control device 230 by where in the range the measured signal strength falls:

> As illustrated in FIG. 6, region #1 is collocated with the driver seat 220a, region #2 is collocated with the front passenger seat 220b, and regions #3 and #4 are collocated with the rear passenger seats 220c-d. The location of the control device 230, as discussed, may be determined using radio receivers 610a-d. The radio receivers may measure the power of radio signals emitted by the control device 230 and triangulate the signals to determine the location of the control device 230.
>
> As illustrated in Figure 5, the different regions of passenger compartment 210 may be represented as sets of coordinates. In one

alternative example however, each region may be presented as a single coordinate and a radius. In another alternative example, however, 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 610a-d when the control device 230 is in a given region)."

(Clement, Ex. 1010, 8:38-55.)

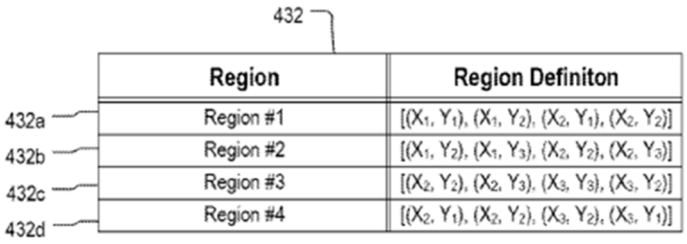


Fig. 5

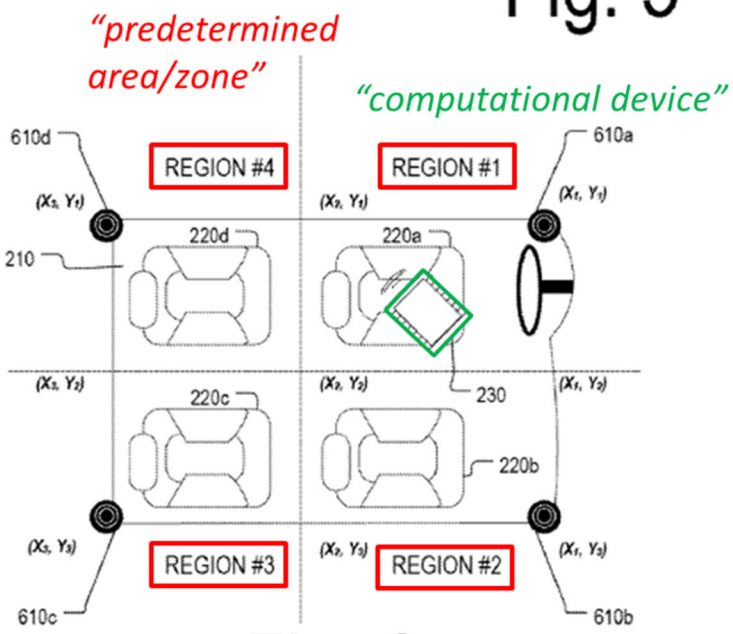


Fig. 6

Clement, Ex. 1010, Fig. 5, Fig. 6 (Annotated)

235. Clement further discloses:

> Stated succinctly, the indications of regions of the logical partition structure 432 may include any type of information capable of being used to distinguish from one another different portions of the passenger compartment 210.

(Clement, Ex. 1010, 8:55-58.)

236. 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*." When the system receives signal strength measurements from the receivers, it compares those values to the expected or predefined signal strength measurements for each region. The degree to which the measured values match a given 4-tupple determines the level of confidence with which the system can identify the device's location. Generally, the closer the measured signal is to the middle of the range for a given region, the more likely it is that the device is located in that region, supporting a high-confidence determination. The farther away the measured signal is from the middle of the range (but still within the range), the less likely it is that the device is located in that region, indicating a low-confidence determination. A POSA would have understood that the structure and use of the 4-tupples teaches a signal-based

framework through which a relative level of confidence in location estimation can be derived.

237. A POSA would have also understood that Clement's use of 4-tupples indicates the use of a threshold value to determine whether the measured signal strengths match a given region. Each signal strength range defines upper and lower bounds, i.e., "*thresholds*" and the system determines whether the received signal measurement falls within those bounds. A POSA would have understood that this process involves comparing the measured values against these predetermined threshold values to assess whether a receiver's signal is strong enough, or weak enough, to be consistent with a specific region's profile.

238. Therefore, Clement discloses "*wherein the device discovery* [computer program] *determines a level of confidence that the computational device is located within the predetermined area and/or zone and wherein the device discovery* [computer program] *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* [e.g., when the measured value is within the predetermined range]."

3. Independent Claim 8

239. Independent claim 8 is largely duplicative of independent claim 1. To illustrate, the table below shows a side-by-side comparison of claims 1 and 8. Claim 8 is "marked up" to show the minor differences.

'697 Patent Claim 1	**'697 Patent Claim 8**
1[pre]. A method, comprising:	**8[pre].** A vehicle, comprising:
[1a] (a) determining, by a 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;	**[8a]** a microprocessor executable device discovery daemon operable to: **[8b] (a)** determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[1b] (b) 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	**[8c] (b)** in response, determining [ ] whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[1c] (c) applying, by the device discovery daemon, at least the following rules:	**[8d] (c)** applying [ ] at least the following rules:

[1d] (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	**[8e] (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
[1e] (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.	**[8f] (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.

… 8[pre]. A vehicle, comprising:

240. Clement discloses a vehicle 100 in Figure 1. (Clement, Ex. 1010, 5:33).

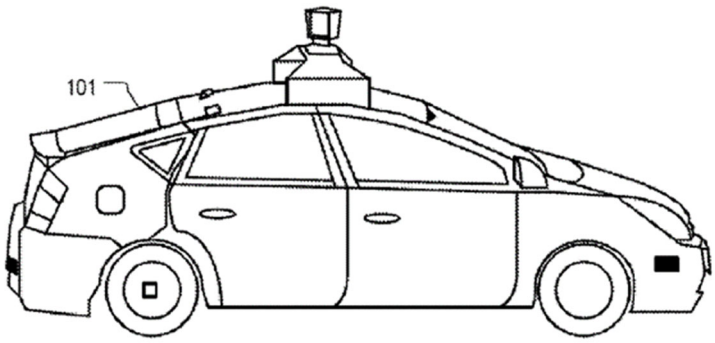


Fig. 1

Clement, Ex. 1010, Fig. 1

241. Clement further discloses "a vehicle is provided that is configured to receive user input for controlling the vehicle." (Clement, Ex. 1010, 4:42-43.)

242. Thus, Clement discloses a "*vehicle*."

… [8a] a microprocessor executable device discovery daemon operable to:

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

243. Claim limitations [8a] and [8b] are substantially similar to limitation [1a] of claim 1. Claims [8a] and [8b] require "*a microprocessor executable device discovery* [computer program] *operable to . . . determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*." Whereas claim [1a] requires "*determining, by a microprocessor executable device discovery* [computer program]*, that a*

computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle." As explained for limitation [1a], Clement discloses that the vehicle control unit 320 and the portable device location system 330 ("*device discovery* [computer program]") determine whether the control device 230 ("computational device") is connected to or attempting to connect to the vehicle network.

244. Thus, Clement discloses "*a microprocessor executable device discovery* [computer program] *operable to . . . determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

… [8c] (b) in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle; and

245. Claim limitation [8c] is substantially similar to claim limitation [1b] in claim 1. Claim [8c] requires "*in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle*," whereas claim [1b] requires "*in response, determining, by the device discovery* [computer program]*, whether the computational device is located within a predetermined area and/or zone of the vehicle*." The only difference between the two limitations is that claim [8c] removes the term "*by the device discovery daemon*" that is required in

claim [1b]. However, the rest of claim [8c] is identical to claim [1b], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Clement.

… [8d] (c) applying at least the following rules:

246. Claim limitation [8d] is substantially similar to claim limitation [1c] in claim 1. Claim [8d] requires "*applying at least the following rules*," whereas claim [1c] requires "*applying, by the device discovery daemon, at least the following rules . . . .*" The only difference between the two limitations is that claim [8d] removes the term "*by the device discovery daemon*" that is required in claim [1c]. However, the rest of claim [8d] is identical to claim [1c], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Clement.

… [8e] (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

247. Limitation [8e] is identical to limitation [1d]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Clement.

… [8f] (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.

248. Limitation [8f] is identical to limitation [1e]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Clement.

4. Dependent Claims 9, and 11-14

249. Claims 9 and 11 depend from claim 8, which I understand means that claims 9 and 11 require all of the limitations of claim 8 in addition to their own limitations.

250. Clement discloses all of the limitations of claim 8 as described above. (*See* ¶¶ 239-247).

f. Claim 9

251. Claim 9 is largely duplicative of claim 2. To illustrate, the table below shows a side-by-side comparison of claims 2 and 9. Claim 9 is "marked up" to show the minor differences.

'697 Patent Claim 2	**'697 Patent Claim 9**
[2a] The method of claim 1, wherein a type of the computational device determines a specific predetermined area and/or zone of the vehicle, from among a plurality	**[9a]** The vehicle of claim 8, 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,	of predetermined areas and/or zones, to be used in applying the rules,
[2b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and	**[9b]** wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and
[2c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.	**[9c]** wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.

… [9a] The vehicle of claim 8, 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,

252. Limitation [9a] is substantially similar to limitation [2a]. Given that claim [9a] encompasses claim 8, which discloses a "*vehicle*," the rest of the language is identical to claim [2a]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

… [9b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and

253. Limitation [9b] is identical to limitation [2b]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

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

254. Limitation [9c] is identical to limitation [2c]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

g. Claim 11

… [11] The vehicle of claim 8, 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.

255. Claim 11 is largely duplicative of claim 4. To illustrate, the table below shows a side-by-side comparison of claims 4 and 11. Claim 11 is "marked up" to show the minor differences.

'697 Patent Claim 4	**'697 Patent Claim 11**
[4] The method of claim 1, wherein the determining step (b)	**[11]** The vehicle of claim 8, 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	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	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.	of the computational device, and input received from a user of the computational device.

256. There are only two changes to claim 11 from claim 4: the claims they depend from are different, and claim 11 requires "*the determining operation (b)*" whereas claim 4 requires "*the determining step*[17] *(b)*."

257. Neither difference is substantial to the meaning of the claim, thus I refer back to my analysis of claim 4 to establish that these limitations are met by Clement.

h. Claim 12

… [12a] The vehicle of claim 11, 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

[17] The '697 Patent uses the terms "step," "operation," and "function" interchangeably, for example: "The present disclosure can include a method, vehicle, and/or tangible and non-transient computer readable medium comprising the steps, operations, and/or functions of . . . . " ('697 Patent, Ex. 1001, 4:47-53.)

> … ***[12b] 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.***

258. Claim 12 depends on claim 11, which in turn depends on independent claim 8. Therefore I understand that claim 12 includes the limitations of claim 11, in addition to the limitations of claim 8.

259. Claim 12 is largely duplicative of claim 5. To illustrate, the table below shows a side-by-side comparison of claims 5 and 12. Claim 12 is "marked up" to show the minor differences.

'697 Patent Claim 5	**'697 Patent Claim 12**
[5a] The method of claim 4, 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	**[12a]** The vehicle of claim 11, 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

[5b] 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.	**[12b]** 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.

260. Because as shown above the differences between claims 5 and 12 are not substantial, and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 5 to establish that these limitations are met by Clement.

i. Claim 13

… [13] The vehicle of claim 11, 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.

261. Claim 13 depends on claim 11, which in turn depends on claim 8. Therefore I understand that claim 13 includes all the limitations of claim 11, in addition to the limitations of claim 8.

262. Claim 13 is largely duplicative of claim 6. To illustrate, the table below shows a side-by-side comparison of claims 6 and 13. Claim 13 is "marked up" to show the minor differences.

'697 Patent Claim 6	**'697 Patent Claim 13**
[6] The method of claim 4,	**[13]** The vehicle of claim 11,
wherein the device discovery daemon uses multiple of the one or more of signal strength of a signal from the computational device as	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	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.	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.

263. Because the differences between claims 6 and 13 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 6 to establish that these limitations are met by Clement.

j. Claim 14

… [14] The vehicle of claim 13, 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.

264. Claim 14 depends on claim 13, which depends on claim 11, and which in turn depends on claim 8. Therefore I understand that claim 14 includes the limitations of claim 13, in addition to the limitations of claims 11 and 8.

265. Claim 14 is largely duplicative of claim 7. To illustrate, the table below shows a side-by-side comparison of claims 7 and 14. Claim 14 is "marked up" to show the minor differences.

'697 Patent Claim 7	**'697 Patent Claim 14**
[7] The method of claim 6,	**[14]** The vehicle of claim 13,
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	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.	zone when the level of confidence has at least a threshold value.

266. Because as shown above the differences between claims 7 and 14 are not substantial, and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 7 to establish that these limitations are met by Clement.

5. Independent Claim 15

267. Independent claim 15 is largely duplicative of independent claim 1. To illustrate, the table below shows a side-by-side comparison of claims 1 and 15. Claim 15 is "marked up" to show the minor differences.

'697 Patent Claim 1	**'697 Patent Claim 15**
1[pre]. A method, comprising:	**15[pre].** A tangible and non-transient computer readable medium including microprocessor executable instructions that, when executed, perform at least the following functions:

[1a] (a) determining, by a 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] (a)** determining [ ] that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[1b] (b) 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] (b)** in response, determining [ ] whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[1c] (c) applying, by the device discovery daemon, at least the following rules:	**[15c] (c)** applying, by the device discovery daemon, at least the following rules:
[1d] (C1) when the computational device is located within the predetermined area and/or zone of	**[15d] (C1)** when the computational device is located within the predetermined area and/or zone of

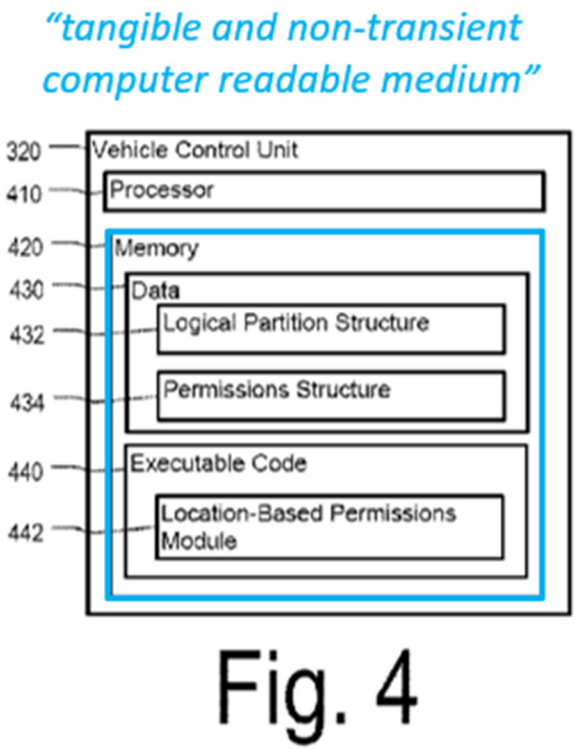
the vehicle, permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem; and	the vehicle, permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem; and
[1e] (C2) when the computational 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.	**[15e] (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.

… ***15[pre]. A tangible and non-transient computer readable medium including microprocessor executable instructions that, when executed, perform at least the following functions:***

268. Clement discloses, with reference to Figure 4, that the vehicle control unit 320 may include a processor 410 and memory 420. Clement further discloses that the memory 420 may be of various types, like ROM and RAM memory:

FIG. 4 depicts a schematic diagram of the vehicle control unit 320 in accordance with aspects of the disclosure. As illustrated, the vehicle control unit 320 may include a processor 410 and memory 420. Memory 420 of vehicle control unit 320 may store information accessible by processor 410, including executable code 440 that may be executed by the processor 410. The memory also includes data 430 that may be retrieved, manipulated or stored by the processor. The memory may be of any type of **tangible** media capable of storing information accessible by the processor, such as a hard-drive, memory card, ROM, RAM, DVD, CD-ROM, write-capable, and read-only memories.

(Clement, Ex. 1010, 7:51-62.)



Clement, Ex. 1010, Fig. 4 (Annotated)

269. A POSA would have understood that a transitory medium is temporary, such as a signal, whereas 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. Semiconductor memories are divided into two main categories: volatile (short-term) memory (e.g., (RAM)) and non-volatile (long-term) memory (e.g., (ROM). (Bosch, Ex. 1050, 94-95; IEEE Dictionary, Ex. 1051, 152.) Therefore, Clement's disclosure of "memory [that] may be of any type of tangible media capable of storing information accessible by the processor, such as a hard-drive, memory card, ROM, RAM, DVD, CD-ROM, write-capable, and read-only memories" (Clement, Ex. 1010, 7:51-62) discloses "*a tangible and non-transient computer readable medium including microprocessor executable instructions*."

… ***[15a] (a) determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;***

270. Claim limitation [15a] is substantially similar to limitation [1a] of claim 1. Claim [15a] requires "*determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*," whereas claim [1a] requires "*determining, by a 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." As explained for limitation [1a], Clement discloses that the vehicle control unit 320 and the portable device location system 330 ("device discovery daemon") determine whether the control device 230 ("computational device") is connected to or attempting to connect to the vehicle network.

271. Thus, Clement discloses "*determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

> … ***[15b] (b) in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle; and***

272. Claim limitation [15b] is substantially similar to claim limitation [1b] in claim 1. Claim [15b] requires "*in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle*," whereas claim [1b] requires "*in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle*." The only difference between the two limitations is that claim [15b] removes the term "*by the device discovery daemon*" that is required in claim [1b]. However, the rest of claim [15b] is identical

to claim [1b], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Clement.

… ***[15c] (c) applying, by the device discovery daemon, at least the following rules:***

273. Limitation [15c] is identical to limitation [1c]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Clement.

… ***[15d] (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***

274. Limitation [15d] is identical to limitation [1d]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Clement.

… ***[15e] (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.***

275. Limitation [15e] is identical to limitation [1e]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Clement.

6. Dependent Claims 16, and 18-21

276. Claims 16 and 18 depend on claim 15, which I understand means that claims 16 and 18 require all the limitations of claim 15 in addition to their own limitations.

277. Clement discloses all the limitations of claim 15 as described above. (*See* ¶¶ 267-275.)

k. Claim 16

278. Claim 16 is largely duplicative of claim 2. To illustrate, the table below shows a side-by-side comparison of claims 2 and 16. Claim 16 is "marked up" to show the minor differences.

'697 Patent Claim 2	**'697 Patent Claim 16**
[2a] The method of claim 1,	**[16a]** The computer readable medium 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,	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,
[2b] 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

[2c] 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.

… ***[16a] The computer readable medium 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,***

279. Limitation [16a] is substantially similar to limitation [2a]. Given that claim [16a] encompasses claim 15 which discloses a "*computer readable medium*," the rest of the language is identical to claim [2a]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

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

280. Limitation [16b] is identical to limitation [2b]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

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

281. Limitation [16c] is identical to limitation [2c]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Clement.

l. Claim 18

… ***[18] The computer readable medium of claim 15, wherein the determining function (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.***

282. Claim 18 is largely duplicative of claim 4. To illustrate, the table below shows a side-by-side comparison of claims 4 and 18. Claim 18 is "marked up" to show the minor differences.

'697 Patent Claim 4	**'697 Patent Claim 18**
[4] The method of claim 1,	**[18]** The computer readable medium of claim 15,
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	wherein the determining function (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,

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	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.

input received from a user of the computational device.	

283. There are only two changes to claim 18 from claim 4: the claims they depend from are different, and claim 18 requires "*the determining function (b)*" whereas claim 4 requires "*the determining step (b)*." Neither difference is substantial to the meaning of the claim, thus I refer back to my analysis of claim 4 to establish that these limitations are met by Clement.

m. Claim 19

… ***[19a] The computer readable medium of claim 18, 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.***

284. Claim 19 depends on claim 18, therefore I understand that claim 19 includes all the limitations of claim 18, in addition to the limitations of claim 15.

285. Claim 19 is largely duplicative of claim 5. To illustrate, the table below shows a side-by-side comparison of claims 5 and 19. Claim 19 is "marked up" to show the minor differences.

'697 Patent Claim 5	**'697 Patent Claim 19**
[5a] The method of claim 4, ~~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 computer readable medium of claim 18, ~~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
[5b] 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	**[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.	determined location of the computational device.

286. Because the differences between claims 5 and 19 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 5 to establish that these limitations are met by Clement.

n. Claim 20

… ***[20] The computer readable medium of claim 18, 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.***

287. Claim 20 depends on claim 18, therefore I understand that claim 20 includes all the limitations of claim 18, in addition to the limitations of claim 15.

288. Claim 20 is largely duplicative of claim 6. To illustrate, the table below shows a side-by-side comparison of claims 6 and 20. Claim 20 is "marked up" to show the minor differences.

'697 Patent Claim 6	**'697 Patent Claim 20**
[6] The method of claim 4,	**[20]** The computer readable medium of claim 18,
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	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	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.	input received from a user of the computational device.

289. Because the differences between claims 6 and 20 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 6 to establish that these limitations are met by Clement.

o. Claim 21

… ***[21] The computer readable medium 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.***

290. Claim 21 depends on claim 20, therefore I understand that claim 21 includes all of the limitations of claim 20, in addition to the limitations of claim 15.

291. Claim 21 is largely duplicative of claim 7. To illustrate, the table below shows a side-by-side comparison of claims 7 and 21. Claim 21 is "marked up" to show the minor differences.

'697 Patent Claim 7	**'697 Patent Claim 21**

[7] The method of claim 6,	**[21]** The computer readable medium 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.	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.

292. Because the differences between claims 7 and 21 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 7 to establish that these limitations are met by Clement.

B. Ground 2 – The Combination of Clement and Ghabra Teaches all of the Limitations of Claims 3, 10, and 17

1. Rationale to Combine

293. It would have been obvious to a POSA at the time of the invention to combine the vehicle permission management system for communicating with a portable communication device, as disclosed in Clement, with the known technique of device discovery and positioning (localization) as disclosed in Ghabra to provide additional functionality and user convenience improvements including passive control, improved security and response time, and conservation of battery life. A POSA would have understood that Clement and Ghabra are complementary technologies that are combinable, for example, Clement discloses that:

> As these and other variations and combinations of the features discussed above can be utilized without departing from the subject matter as defined by the claims, the foregoing description of exemplary aspects should be taken by way of illustration rather than by way of limitation of the subject matter as defined by the claims.

(Clement, Ex. 1010, 13:19-24.)

294. Clement and Ghabra are from the same field – communication between a vehicle system and one or more portable devices:

> In one aspect, a vehicle is provided that is configured to receive user input for controlling the vehicle. The user input may be entered via a control device, such as a portable computing device.

(Clement, Ex. 1010, 4:42-46.)

> The present invention relates in general to remote convenience and security systems for automotive vehicles, and, more specifically, to a

> wireless communication system for integrating functions of a two-way remote keyless entry system and a passive entry system.

(Ghabra, Ex. 1011, 1:16-20.)

295. Clement and Ghabra both disclose vehicle systems that communicate with portable devices to determine the location of the portable device and to facilitate control of specific vehicle functions from the portable device to provide for an enhanced user experience making the vehicle more useful and efficient:

> In one aspect, user instructions may be submitted to a vehicle via a portable computing device, such as a tablet or a smart phone. The instructions may specify a new travel destination, a new travel route, or an action that the user would like the vehicle to perform, such as steering, applying the brakes, accelerating, opening a window, turning up the volume on the vehicle's radio, or activating the vehicle's interior lights. Using the portable computing device to provide user input to the vehicle may increase the ease at which users interact with their vehicles.

(Clement, Ex. 1010, 1:24-33.)

> The present invention relates in general to remote convenience and security systems for automotive vehicles, and, more specifically, to a wireless communication system for integrating functions of a two-way remote keyless entry system and a passive entry system.

(Ghabra, Ex. 1011, 1:16-20.)

a. Improved User Convenience through Passive Control

296. Both Clement and Ghabra seek to improve the comfort and user convenience of operating a vehicle:

> Using the portable computing device to provide user input to the vehicle may increase the ease at which users interact with their vehicles.

(Clement, Ex. 1010, 1:31-33.)

> The present invention has advantages of added convenience, faster response times, and increased security as results of integrating functionality of a passive entry system with a two-way RKE system having an active display.

(Ghabra, Ex. 1011, 2:13-16.)

297. Clement discloses a "vehicle control unit 320…coupled to the control device 230 . . . operable to receive instructions from the control device 230 to change the state of one or more [ ] vehicle systems." (Clement, Ex. 1010, 7:8-11.) Clement further discloses that the vehicle control unit 320 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]," allow or not allow certain vehicle functions. (Clement, Ex. 1010, 1:42-51; *see also*, 7:40-50, Figure 8.)

298. Similarly, Ghabra discloses a vehicle system that determines the location of a key fob ("localizing a fob") for passive entry and passive start vehicle functionality:

> [A] first preferred embodiment for **localizing a fob** in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

299. Early vehicles required manual actuation of a key to enter and start a vehicle, i.e., by inserting the key into a lock or ignition switch.

300. Ghabra discloses prior art remote-keyless entry (RKE) systems that require manual actuation of a button on a key fob, and recognizes that such manual actuation is disadvantageous:

> Typical RKE systems utilize a key fob with a radiofrequency (RF) transmitter which transmits to a base station in the vehicle. When the user is within range, the user actuates a corresponding button on the key fob to send a lock, unlock, or engine start command….
>
> One disadvantage of this type of system is that the user must manually actuate the key fob to achieve the desired results. In an attempt to eliminate this disadvantage, passive entry systems, which operate in a hands-free manner, are being introduced. In order to avoid excessive battery consumption by periodic radio transmission from the fob, 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.

(Ghabra, Ex. 1011, 1:28-33; 1:40-48.)

301. Such prior art passive entry systems typically operated in the background and discovered the fob so that it can sense the user's approach to the vehicle. (*See* ¶ 102.)

302. Clement discloses a portable computing device that provides instructions to the vehicle wirelessly:

> [U]ser instructions may be submitted to a vehicle via a portable computing device, such as a tablet or a smart phone. The instructions may specify a new travel destination, a new travel route, or an action that the user would like the vehicle to perform, such as steering, applying the brakes, accelerating, opening a window, turning up the volume on the vehicle's radio, or activating the vehicle's interior lights. Using the portable computing device to provide user input to the vehicle may increase the ease at which users interact with their vehicles.

(Clement, Ex. 1010, 1:24-33.)

303. However, even with the use of a portable computing device, Clement discloses that the user manually actuates buttons on a user interface to control vehicle systems:

> As illustrated in FIG. 9A, the user interface 900A may provide buttons 910a-j that enable control over different aspects of the operation of the vehicle 101. For example, . . . Clicking on the button 910j [mislabeled as 900j in Fig. 9A] may take users to a menu that enables the locking and unlocking of the vehicle's 101 doors.

(Clement, Ex. 1010, 9:55-58, 10:11-12.)

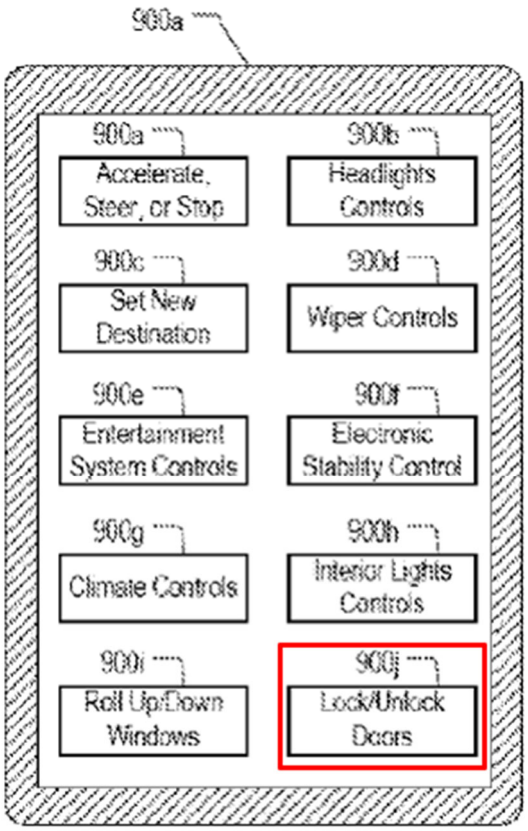


Fig. 9A

Clement, Ex. 1010, Fig. 9A (Annotated)

304. Ghabra discloses a passive entry sequence, and a passive engine start sequence:

> [A] first preferred embodiment for localizing a fob in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

305. Ghabra discloses that the "passive entry system[], [] operate[s] in a hands-free manner." (Ghabra, Ex. 1011, 1:42-44.) Ghabra further discloses that a passive entry system "has [the] advantages of added convenience [and] faster response times," each of which is an improvement over the vehicle communication system disclosed in Clement. (Ghabra, Ex. 1011, 2:13-16.)

306. A POSA would have been motivated to combine the vehicle permission management system disclosed in Clement with the known technique of passive entry and passive start systems disclosed in Ghabra to yield predictable results, e.g., to expand the functionality of the control device outside the vehicle and be able to interact with their vehicle in a "hands-free" manner, thereby eliminating the need for manual actuation for certain functionality, like entering and starting the vehicle. Removing the need for manual actuation provides users with the additional ease and convenience of interacting with their vehicle, which is a clear benefit and improvement over Clement's disclosure alone.

307. A POSA would have understood that the combination of Ghabra and Clement would allow a user to keep their portable device in their pocket/bag and would not have to take it out to unlock the vehicle door or start the vehicle, thereby increasing user convenience.

b. Improved Security

308. Both Clement and Ghabra seek to improve the safety and security of the vehicle:

> Having a permission management system is important with respect to ensuring the safety of the vehicle. For instance, it is unsafe for a 5-year old sitting in the rear seat of the vehicle to be allowed to steer the vehicle, via the control device, should he or she manage somehow to grab the control device and bring it in the backseat. To increase the vehicle's safety, the location of the control device inside the vehicle may be monitored and a determination may be made as to what region of the vehicle's cab the control device is located in. Possible regions may include a region where the driver's seat is located, a region where the front passenger's seat is located, and a region where the backseats are located.

(Clement, Ex. 1010, 5:6-17.)

309. The addition of Ghabra's passive entry system to Clement's vehicle communication system also provides the added benefit of improved security with faster response time. Prior art passive entry systems were susceptible to thieves intercepting wireless communication in a "relay attack[]." (Ghabra, Ex. 1011, 1:64-67.) Ghabra's system provides improved security, e.g., "resistance to relay attacks" with faster response time by authenticating or authorizing a fob before allowing it to access the vehicle network by using unique identifier numbers or security codes sent

using an ultra high frequency (UHF) signal. (Ghabra, Ex. 1011, 3:57-67, 4:8-29, 4:30-40, 6:55-58.)

310. Ghabra discloses that determining whether a fob is authorized or not is based on unique identifier numbers or security codes. Ghabra explains that after the LF wakeup signal is sent "RF transmitter 16 in base station 11 is used to broadcast a UHF challenge signal including [a] random number [to fob 12]." (Ghabra, Ex. 1011, 4:11-13.) Ghabra further explains that the fob 12 "passe[d] the random number through [a] known mathematical transformation. The resulting transformed number is included in [the] response data" sent back to the vehicle. (Ghabra, Ex. 1011, 4:13-20.) Then, the "microcontroller 13 checks the transformed number as received from the fob 12 with its own results of the transformation and determines the UHF response signal to be valid if the transformed numbers match." (Ghabra, Ex. 1011, 4:25-29.)

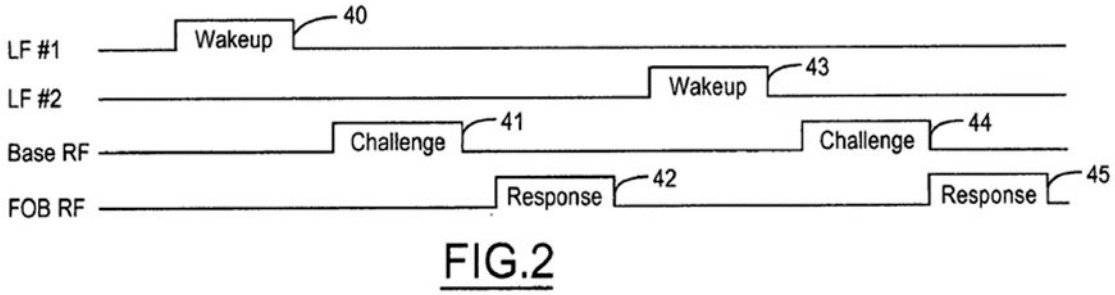


FIG.2

Ghabra, Ex. 1011, Fig. 2

311. "The UHF challenge and response signals are sent with a much shorter time delay than if they were sent at the low frequency" which reduces the time delay

in authenticating a fob common with prior art systems utilizing LF signals. (Ghabra, Ex. 1011, 4:19-21, 2:4-9.)

c. Conservation of Battery Life

312. Ghabra also discloses that by sending a wakeup signal in response to a trigger event, its passive entry 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." (Ghabra, Ex. 1011, 1:44-48.) Further, "[p]assive entry communication operat[es] 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." (Ghabra, Ex. 1011, 1:54-58.)

d. A POSA would have understood how to combine Clement and Ghabra

313. A POSA would have understood how to combine Clement and Ghabra with a reasonable expectation of succuss. In terms of hardware modifications, a POSA would have modified Clement's vehicle communication system to include at least one LF receiver and LF antenna to enable wake-up signaling and zone-specific localization, as used in Ghabra's passive entry/passive start system. A POSA would have further modified Clement's vehicle communication system to include at least

one RF (or UHF) receiver and transmitter to enable the two-way communication model utilized in Ghabra.

314. Clement discloses using radio receivers or transmitters for communicating between the control device 230 and the vehicle control unit 320:

> [T]he location system 330 includes receivers 610a-d (depicted in FIG. 6) located in different parts of the of the passenger compartment 210. The receivers 610a-b [*sic* 610a-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.

(Clement, Ex. 1010, 7:26-32.)

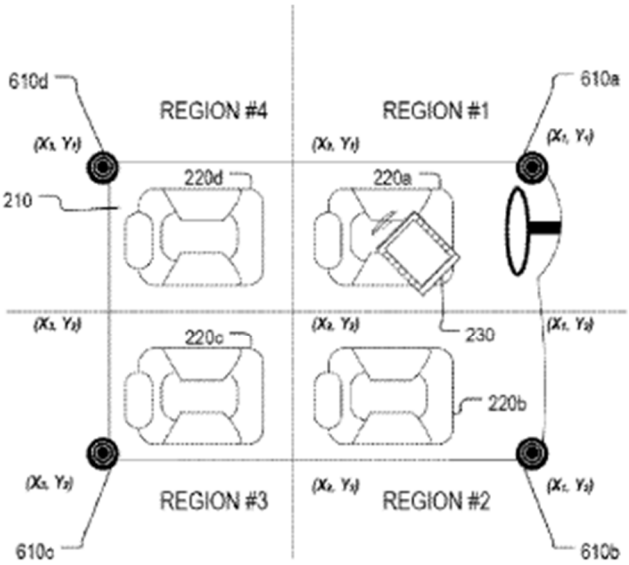


Fig. 6

Clement, Ex. 1010, Fig. 6

315. However, Clement does not specifically disclose the use of LF transmitters/receivers or LF antennas. Clement also does not disclose the use of ultra high frequency (UHF) RF receivers and transmitters.

316. Ghabra discloses that the fob includes an LF receiver and LF antenna:

> An LF receiver 37 is coupled to microcontroller 30 and to LF antenna 38 for detecting wakeup signals broadcast from vehicle 10.

(Ghabra, Ex. 1011, 3:43-45.)

317. Ghabra discloses that the base station 11 of the vehicle 10 includes "a microcontroller 13 coupled to an LF transmitter 14, an RF receiver 15, and an RF transmitter 16." (Ghabra, Ex. 1011, 2:63-67.) Ghabra further discloses that the LF transmitter 14 "may also use a plurality of LF antennas at respective locations within the vehicle such as an LF antenna 20 deployed in base station 11 . . . ." (Ghabra, Ex. 1011, 3:5-8.)

318. Ghabra further discloses communication using an RF receiver and transmitter:

> Referring to FIG. 1, a vehicle 10 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.

(Ghabra, Ex. 1011, 2:63-67.)

319. Ghabra further discloses that the "RF transmitter 16 in base station 11 is used [to] broadcast a UHF challenge signal . . . ." (Ghabra, Ex. 1011, 4:11-16.) "The UHF challenge and response signals are sent with a much shorter time delay than if they were sent at the low frequency" which reduces the time delay in authenticating a fob common with prior art systems utilizing LF signals. (Ghabra, Ex. 1011, 4:19-21; 2:4-9.)

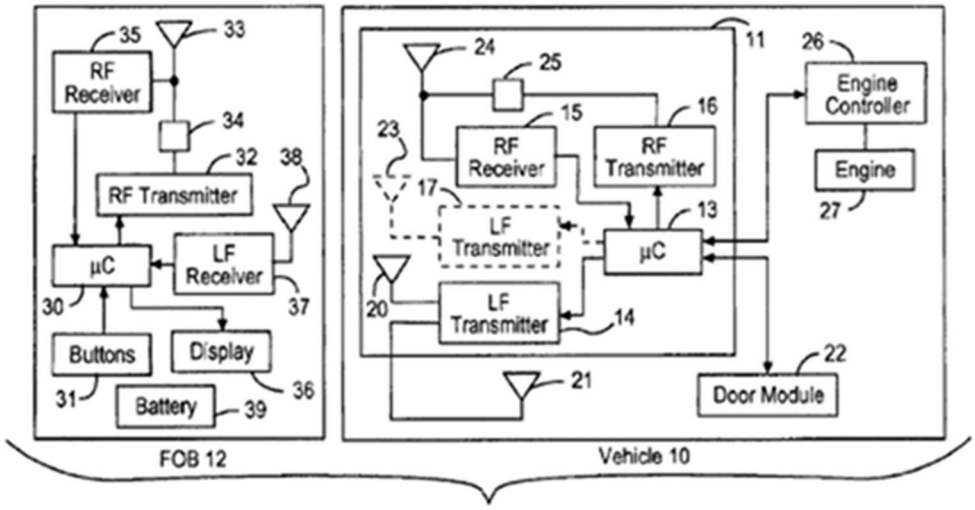


FIG.1

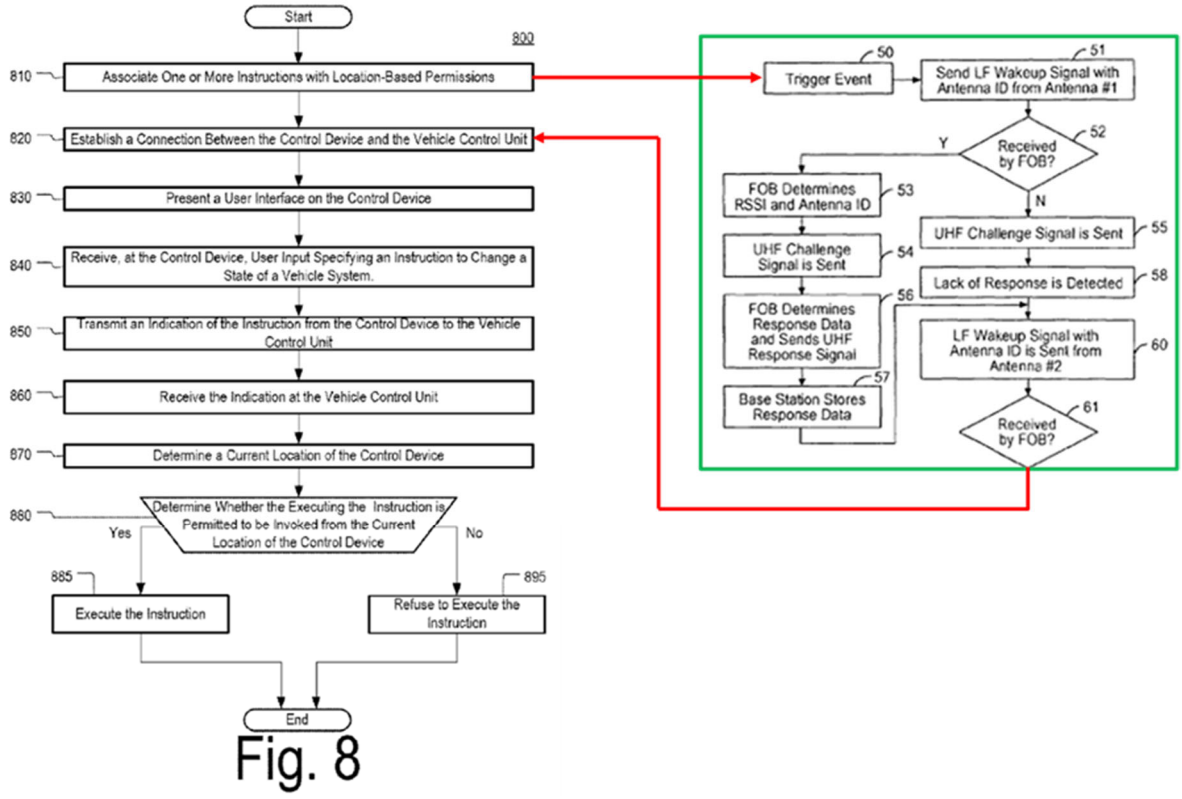
Ghabra, Ex. 1011, Fig. 1

320. A POSA would have understood that the combination of Clement and Ghabra also includes the addition of sensors that provide a trigger signal in response to a trigger event, e.g., lifting a door handle or pressing an engine start switch, such as those disclosed by Ghabra. (Ghabra, Ex. 1011, 3:10-15, 4:57-63.)

321. A POSA would have been motivated to combine Ghabra's additional receivers, transmitters, and vehicle sensors with Clement's system to yield

predictable results, e.g., two-way communication and trigger signal generation to facilitate passive entry and passive start functionality.

322. Regarding software, a POSA would have been motivated to modify Clement's vehicle control strategy described with reference to Figure 8 to include Ghabra's device discovery technique in response to a triggering event, e.g., as shown in the image below:



Clement, Ex. 1010, Fig. 8; Ghabra, Ex. 1011, Fig. 3 (Annotated)

323. The modification to Clement's communication strategy would include the vehicle control system sending out a signal to poll, e.g., using the RF transmitter,

for devices in response to a triggering event and determining if a response signal was received, indicating that a new device is attempting to connect to the vehicle.

324. These modifications would have been a straightforward and well-known combination of known elements in the prior art, e.g., door sensors and engine start buttons/sensors and corresponding software, yielding the predictable result of determining whether a new device signal was received by the vehicle control system.

325. Accordingly, a POSA would have been motivated to modify Clement to include Ghabra's device discovery technique. This modification would have been a simple combination of known elements in the prior art, e.g., Ghabra's vehicle sensors for providing a trigger signal in response to door handle and start button activation, and transmitters/receivers, along with associated software.

2. Dependent Claims 3, 10, and 17

e. Claim 3

326. Claim 3 depends on claim 1, which I understand means that claim 3 requires all of the limitations of claim 1 in addition to its own limitations.

327. Clement discloses all of the limitations of claim 1, as described above. (*See* ¶¶ 152-191.)

… ***3[pre]. The method of claim 1, wherein step (a) comprises the substeps:***

328. As explained for limitation 1[pre], Clement discloses a process associated with controlling the vehicle 101 by the vehicle control unit 320. Clement further describes this process as a method with reference to Figure 8 and claim 1. (Clement, Ex. 1010, 10:27-30, 13:31-33, Figure 8.)

329. As explained for limitation [1a] which is referenced by "*step (a)*", Clement discloses that the vehicle control unit 320 and the portable device location system 330 ("*device discovery daemon*") communicate with the control device 230 ("*computational device*") to receive instructions for controlling various vehicle systems. (Clement, Ex. 1010, 12:8-36.)

> … ***[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

330. Ghabra discloses passive entry and passive start systems that involve wireless communication between a vehicle base station 11 and a key fob 12.

> Referring to FIG. 1, a vehicle 10 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.

(Ghabra, Ex. 1011, 2:63-67, *see also* 2:67-3:15.)

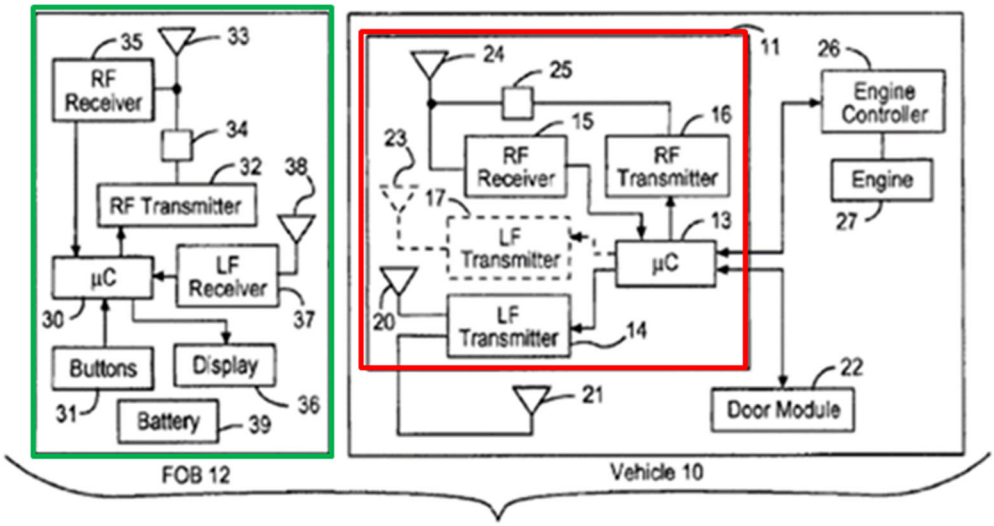


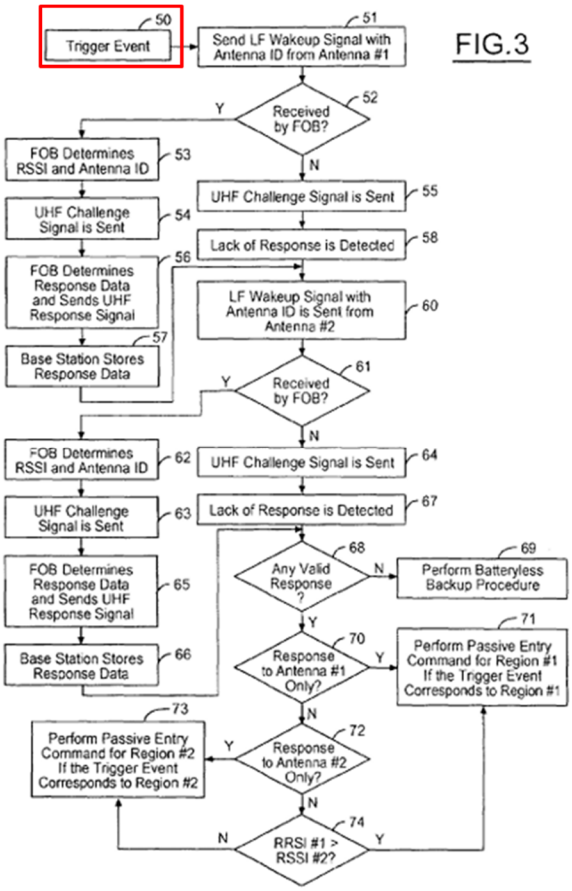
FIG.1

Ghabra, Ex. 1011, Fig. 1 (Annotated)

331. With reference to Figure 3, Ghabra discloses initiating wireless communication in response to a "trigger event":

> In step 50, 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)."

(Ghabra, Ex. 1011, 5:22-25.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

332. Ghabra discloses that the door module 22 includes a sensing switch ("*on board vehicle sensor*") that generates a trigger pulse when the handle is lifted and sends it to microcontroller 13, indicating an attempt to enter the vehicle 101 is being made:

> Referring to FIG. 1, a vehicle 10 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. In certain embodiments of the present invention, additional LF transmitters or LF antennas may be provided such as an LF transmitter 17. The additional

transmitters or antennas may be located in vehicle 10 remotely from base station 11 at an entry zone being monitored by a passive entry system, for example. A single LF transmitter 14 may also use a plurality of LF antennas at respective locations within the vehicle such as an LF antenna 20 deployed in base station 11 and an LF antenna 21 disposed near a door module 22 in vehicle 10 (e.g., in a side view mirror housing). Door module 22 is coupled to microcontroller 13 and may preferably include a sensing switch for detecting the lifting of a door handle and a power lock mechanism for remotely locking and unlocking a corresponding door lock. If a separate LF transmitter 17 is used, an LF antenna 23 is coupled thereto.

(Ghabra, Ex. 1011, 2:63-3:15.)

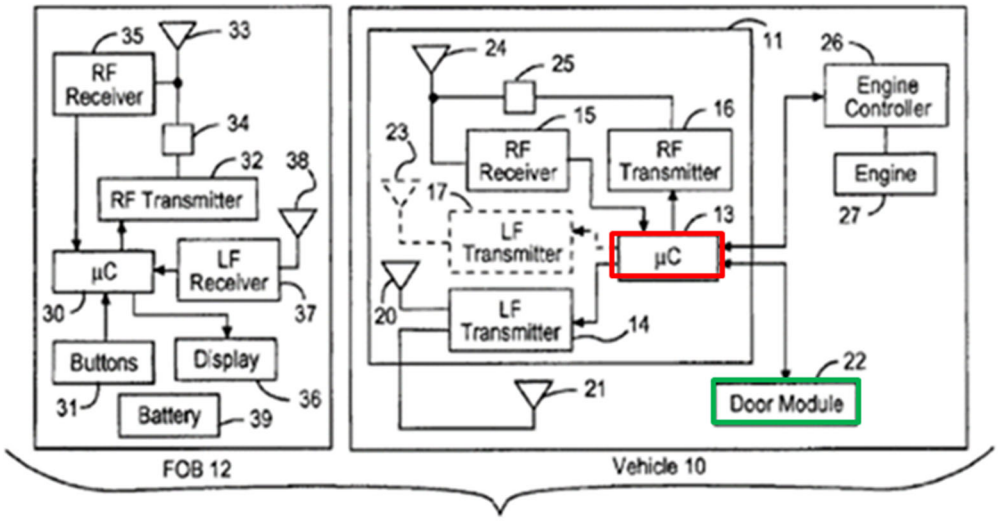


FIG.1

Ghabra, Ex. 1011, Fig. 1 (Annotated)

333. A POSA would have understood that lifting the door handle, indicates that a new occupant is entering or attempting to enter the vehicle.

334. Ghabra also discloses an embodiment in which a trigger event occurs in response to a user pressing an engine start switch ("*on board vehicle sensor*") which in turn provides a trigger signal:

> FIG. 2 shows a first preferred embodiment for localizing a fob in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

335. A POSA would have understood that the trigger signal generated by the engine start switch ("*on board vehicle sensor*") also provides an indication, or "*information that a new occupant has entered the vehicle*."

336. As I explained in the rational to combine section, the combination of Clement and Ghabra includes Clement's vehicle control unit 320 and Ghabra's sensors that provide a trigger signal in response to a triggering event.

337. Accordingly, the combination of Clement and Ghabra teaches "*receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle* [e.g., a trigger signal from the engine start switch, or door module]."

338. Ghabra also discloses determining whether a fob is authorized by using unique identifier numbers or security codes. For example, Ghabra discloses:

> The LF wakeup signal has a known format including an operation code for identifying the signal as a wakeup signal and preferably also including an antenna identifier unique to the antenna being used to transmit each LF wake-up signal. Localization of the fob is necessary to ensure that a person carrying an authorized fob is properly located in the area where the passive function is being requested (e.g., located outside the door with the triggering door handle for a passive entry function and located within the passenger compartment for a passive engine start function).

(Ghabra, Ex. 1011, 3:57-67.)

> For example, microcontroller 13 in base station 11 generates a random number to be used as a seed number in a secret mathematical transformation that is also known to microcontroller 30 in fob 12. RF transmitter 16 in base station 11 is used broadcast a UHF challenge signal including the random number. RF receiver 35 in fob 12 receives the UHF challenge signal and microcontroller 30 passes the random number through the known mathematical transformation. The resulting transformed number is included in response data together with the RSSI signal and a fob identifier for inclusion in a UHF response signal broadcast via RF transmitter 32 and antenna 33. The UHF challenge and response signals are sent with a much shorter time delay than if they were sent at the low frequency. The challenge and response may both be sent at 9.6 k baud, for example. The UHF response signal is

> received by RF receiver 15 via antenna 24 in base station 11 and is processed by microcontroller 13 in a known manner. For instance, microcontroller 13 checks the transformed number as received from fob 12 with its own results of the transformation and determines the UHF response signal to be valid if the transformed numbers match.

(Ghabra, Ex. 1011, 4:8-29.)

> Fob 12 and base station 11 also function to provide remote keyless entry functions in a conventional manner. Thus, when a user presses a manual input key (i.e., push button) 31 for a desired remote control function, a UHF control signal incorporating a remote control message having a corresponding function identifier and a pre-assigned fob ID is broadcast. When base station 11 receives a UHF control signal, it validates the fob ID and any security codes and then initiates the remote control function via a vehicle message sent from base station controller 13 to an actuator such as door module 22 or engine controller 26.

(Ghabra, Ex. 1011, 4:30-40.)

339. A POSA would have understood that an "authorized fob" can include a fob that has been previously connected to the vehicle communication system, thus it is recognizable. 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.

… ***[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

340. Ghabra discloses transmitting a wakeup signal 40 ("*ping*"), in response to receiving a trigger signal ("*information*") that indicates lifting a door handle or pressing an engine start button, to awaken ("*discover*") the fob, and then sending a challenge signal 41:

> FIG. 2 shows a first preferred embodiment for localizing a fob in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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). A first LF wakeup signal 40 is generated from a first antenna preferentially transmitting to a first area with respect to the vehicle (e.g., outside the vehicle adjacent to a particular door or other closure such as a trunk). After waiting an amount of time sufficient to allow the fob to awaken, the base station sends a challenge signal 41 via the base station RF transmitter and antenna.

(Ghabra, Ex. 1011, 4:57-5:3.)

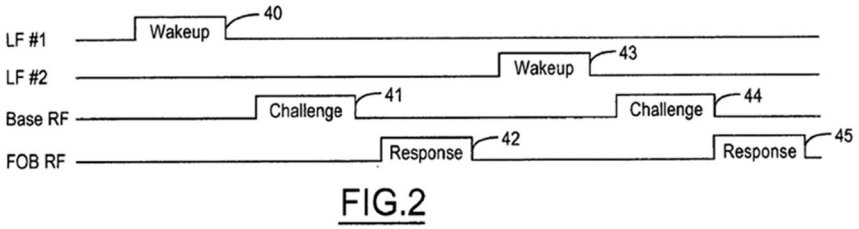
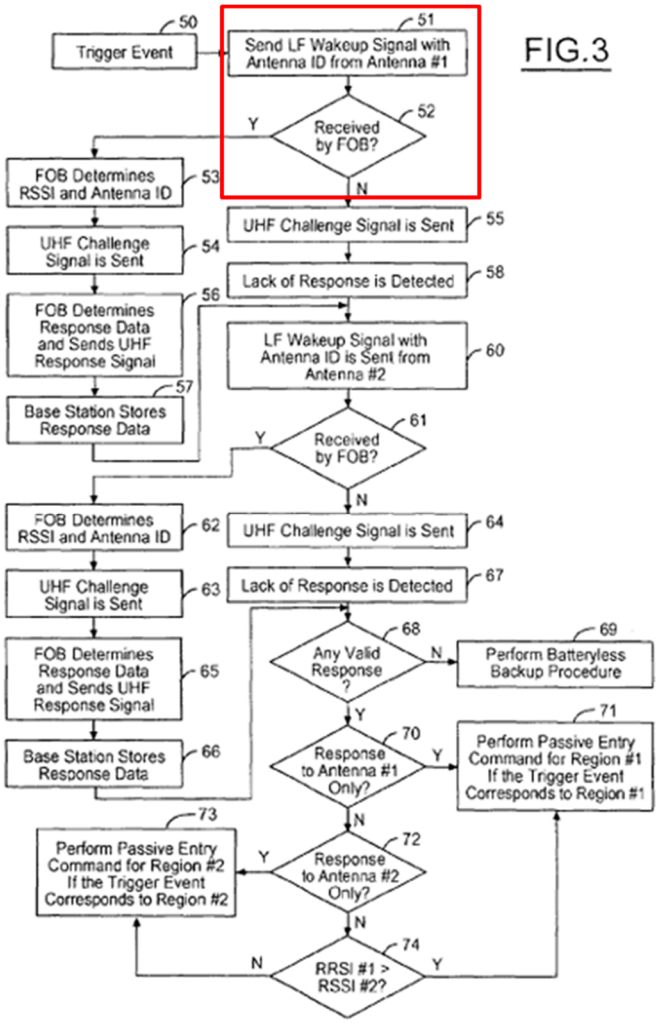


FIG.2

Ghabra, Ex. 1011, Fig. 2

341. Ghabra further discloses, with reference to Figure 3, that "[a]n LF wakeup signal with a corresponding antenna ID is sent in step 51 from the first antenna. At point 52, either a fob is actually present or not in the area being interrogated by the first antenna." (Ghabra, Ex. 1011, 5:25-28.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

342. As I explained above with reference to the rationale to combine Clement and Ghabra, a POSA would have been motivated to modify Clement's vehicle control strategy described with reference to Figure 8 to include Ghabra's device discovery technique in response to a triggering event as shown in the image below, along with corresponding transmitters and receivers to interrogate an area for Clement's control device 230:

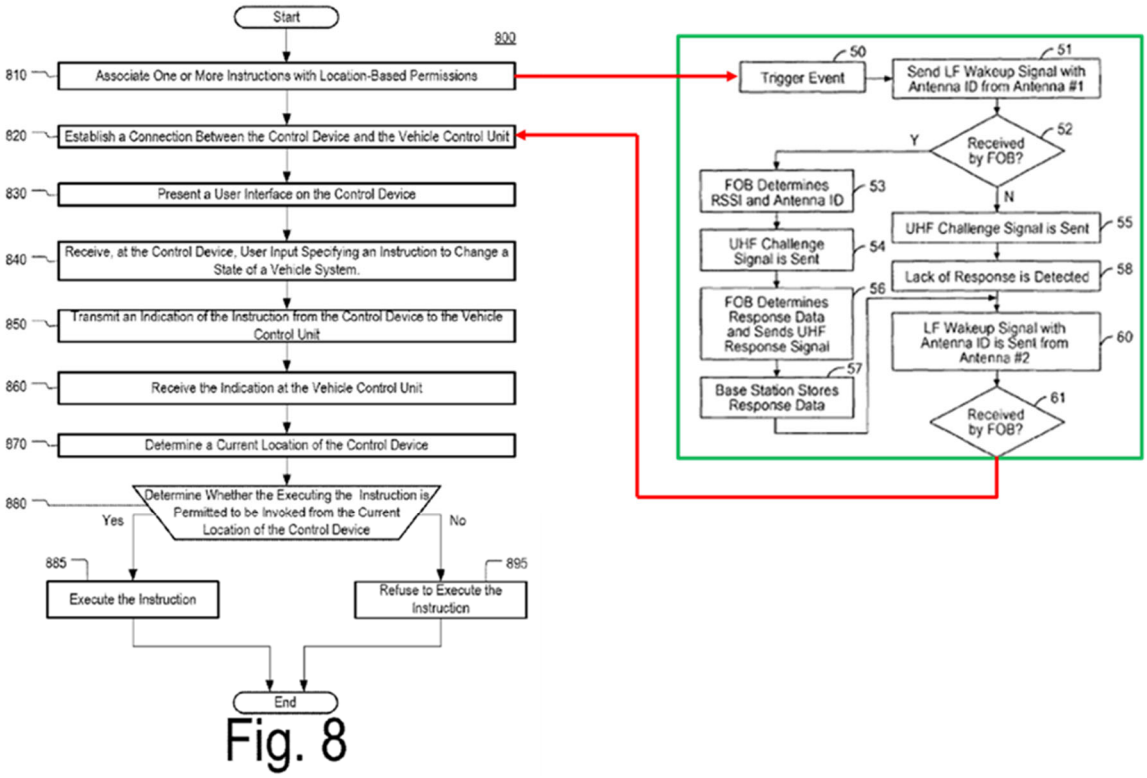


Fig. 8

Clement, Ex. 1010, Fig. 8; Ghabra, Ex. 1011, Fig. 3 (Annotated)

343. Thus, the combination of Clement and Ghabra teaches, "*in response to the receipt of the information* [trigger signal], *emitting, by the device discovery daemon, a ping to discover the computational device* [transmitting a wakeup signal from a first antenna and sending a challenge signal from the base station to interrogate an area for Clement's control device 230]."

> … ***[3c] 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.***

344. Ghabra discloses that once the wakeup signal 40 is sent, the base station waits for a response signal 42 indicating whether the fob is attempting to connect to the vehicle network. (Ghabra, Ex. 1011, 5:31-38.) Ghabra further discloses:

> After waiting an amount of time sufficient to allow the fob to awaken, the base station sends a challenge signal 41 via the base station RF transmitter and antenna. If the fob is in fact in the first area being preferentially transmitted to, then after receiving the challenge signal and formulating response data the fob RF transmitter sends a UHF response signal 42. When the fob is located in the area, then the response includes RSSI data showing strong reception. If outside the first area, then the RSSI data will reflect a weak signal. If the fob is not close enough to the target area, the wakeup signal will not have been received and there will no response to the challenge signal at all. In order to poll an additional location, an LF wakeup signal 43 is sent via a second LF antenna preferentially transmitting to a second area (e.g., inside the vehicle). Following sufficient time to allow a fob to awaken, a UHF challenge signal 44 is sent via the RF transmitter in the base station. **If 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.**

(Ghabra, Ex. 1011, 4:67-5:19.)

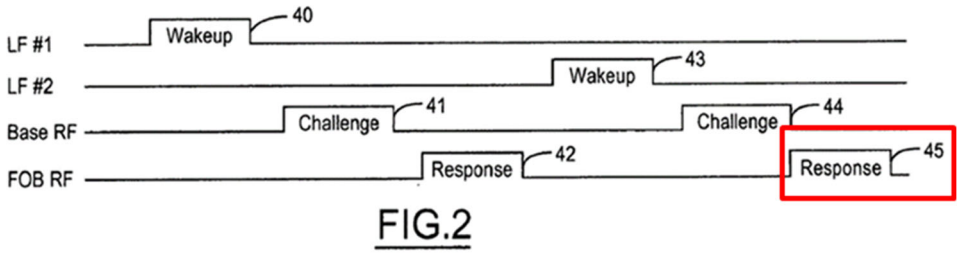


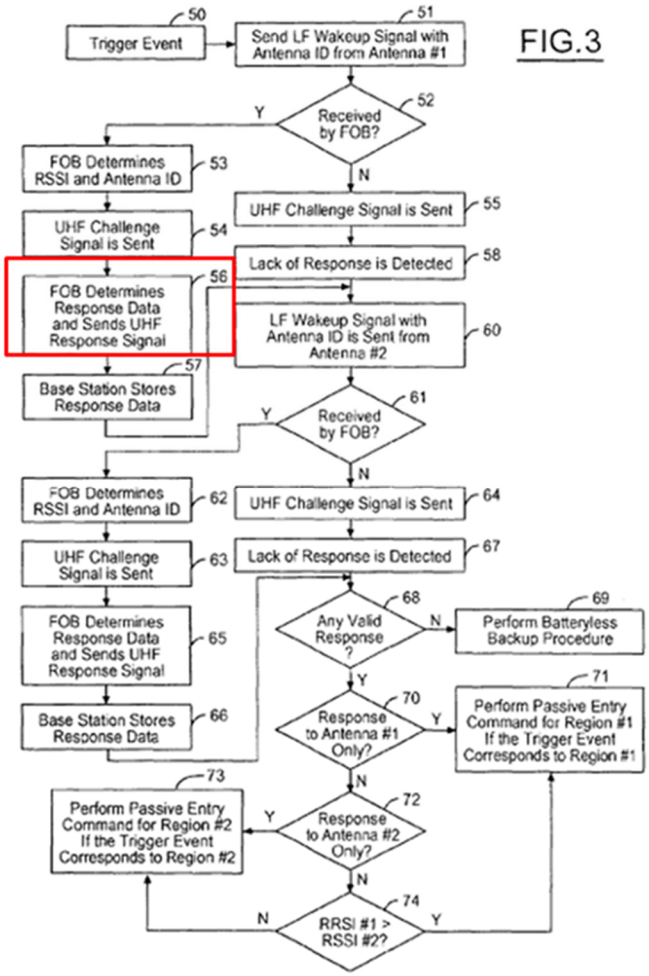
FIG.2

Ghabra, Ex. 1011, Fig. 2 (Annotated)

345. Ghabra further discloses:

> If the UHF challenge signal is received by a fob, then the fob determines response data and sends a UHF response signal in step 56. In step 57, the base station stores the response data. If no fob is awakened or an awakened fob fails to send a valid response signal, then the lack of a response is detected in step 58.

(Ghabra, Ex. 1011, 5:33-38.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

346. 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 connect to the vehicle network. The presence of the response signal 45 confirms that the fob was successfully awakened and is therefore actively engaging in communication with the vehicle. A POSA would have recognized that such response only occurs when the device is within the proper zone, receives the challenge signal and responds within

the expected timing window, thereby signaling an attempt to connect with the vehicle, e.g., to unlock a door or start the vehicle.

347. As I explained regarding the rational to combine Clement and Ghabra, a POSA would have been motivated to modify Clement's vehicle control strategy described with reference to Figure 8 to include Ghabra's device discovery technique including receipt of a response signal from a fob as shown in the image below:

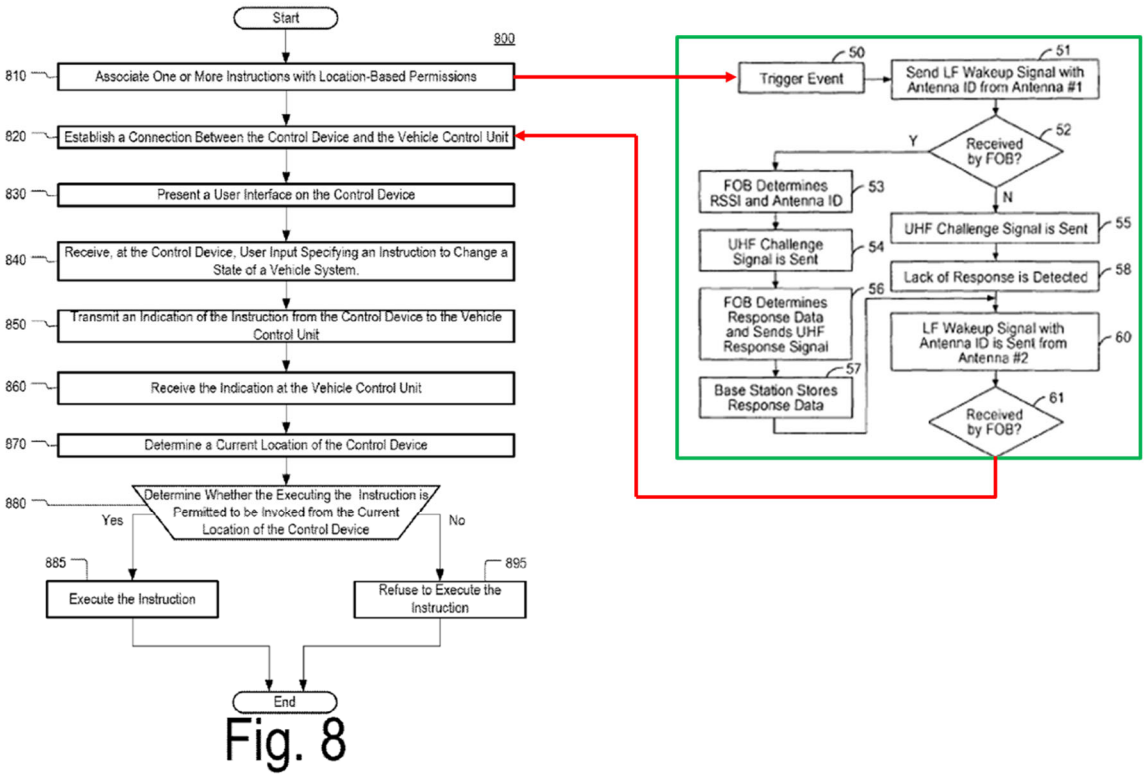


Fig. 8

Clement, Ex. 1010, Fig. 8; Ghabra, Ex. 1011, Fig. 3 (Annotated)

348. Thus, the combination of Clement and Ghabra teaches, "*when a responsive signal is received from the computational device* [e.g., response 45], *determining, by the device discovery* [computer program], *that the computational*

device is attempting to connect to a network and/or communication subsystem of a vehicle."

f. Claim 10

349. Claim 10 depends on claim 8, which I understand means that claim 10 requires all of the limitations of claim 8 in addition to its own limitations.

350. The combination of Clement and Ghabra teaches all of the limitations of claim 8, as described above. (*See* ¶¶ 239-248.)

351. Claim 10 is largely duplicative of claim 3. To illustrate, the table below shows a side-by-side comparison of claims 3 and 10. Claim 10 is "marked up" to show the minor differences.

'697 Patent Claim 3	**'697 Patent Claim 10**
3[pre]. The method of claim 1, wherein step (a) comprises the substeps:	**10[pre].** The vehicle of claim 8, wherein operation (a) comprises the suboperations:
[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;	**[10a]** receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;

[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and	**[10b]** in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and
[3c] 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.	**[10c]** 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.

… ***10[pre]. The vehicle of claim 8, wherein operation (a) comprises the suboperations:***

352. Limitation 10[pre] is substantially similar to limitation 3[pre]. Claim 10[pre] requires "*the vehicle of claim, wherein operation (a) comprises the suboperations*," whereas claim 3[pe] requires "*the method of claim 1, wherein step*

(a) comprises the substeps[18] . . . ." A POSA would have understood that these differences are not substantial to the meaning of the claims and are taught by the combination of Clement and Ghabra. Because claim 10 depends on claim 8 which discloses a "vehicle," and the rest of the language is only minimally different to claim 3[pre], I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

> … ***[10a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

353. Limitation [10a] is identical to limitation [3a]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

> … ***[10b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

354. Limitation [10b] is identical to limitation [3b]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

---

[18] The '697 Patent uses the terms "step," "operation," and "function" interchangeably. (*See* '697 Patent, Ex. 1001, 4:47-53.)

… ***[10c] 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.***

355. Limitation [10c] is identical to limitation [3c]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

g. Claim 17

356. Claim 17 depends on claim 15, which I understand means that claim 17 requires all the limitations of claim 15 in addition to its own limitations.

357. The combination of Clement and Ghabra teaches all of the limitations of claim 15 as described above. (*See* ¶¶ 267-275.)

358. Claim 17 is largely duplicative of claim 3. To illustrate, the table below shows a side-by-side comparison of claims 3 and 17. Claim 17 is "marked up" to show the minor differences.

'697 Patent Claim 3	**'697 Patent Claim 17**
3[pre]. The method of claim 1,	**17[pre].** The computer readable medium of claim 15,
wherein step (a) comprises the substeps:	wherein function (a) comprises the subfunctions:

[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;	**[17a]** receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;
[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and	**[17b]** in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and
[3c] 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, determining, by the device discovery daemon, that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.

… ***17[pre]. The computer readable medium of claim 15, wherein function (a) comprises the subfunctions:***

359. Limitation 17[pre] is substantially similar to limitation 3[pre]. Claim 17[pre] discloses "*the computer readable medium of claim 15, wherein function (a) comprises the subfunctions*," whereas claim 3[pre] discloses "*the method of claim 1, wherein step (a) comprises the substeps . . . .*" Because claim 17 encompasses claim 15 which discloses a "computer readable medium," and the rest of the language is only minimally different to claim 3[pre], I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

… ***[17a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

360. Limitation [17a] is identical to limitation [3a]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

… ***[17b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

361. Limitation [17b] is identical to limitation [3b]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

… ***[17c] 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.

362. Limitation [17c] is identical to limitation [3c]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Clement and Ghabra.

C. Ground 3 – Lickfelt Teaches all of the Limitations of Claims 1-2, 4, 6-9, 11, 13-16, 18, and 20-21

1. Independent Claim 1

363. I have given each of the limitations of claim 1 a unique numerical identifier, as shown in the chart below:

U.S. Patent No. 9,020,697
1[pre]. A method, comprising:
[1a] (a) determining, by a 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;
[1b] (b) 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
[1c] (c) applying, by the device discovery daemon, at least the following rules:

[1d] (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
[1e] (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.

… ***1[pre]. A method, comprising:***

364. Lickfelt discloses a vehicle 12 with a passive entry system 10 that includes an electronic control unit (ECU):

> With reference to FIG. 1, a passive entry system 10 for a vehicle 12 includes a fob 14 that is configured to transmit and to receive signals. The entry system 10 further includes an ECU 16 on the vehicle 12. . . .

(Lickfelt, Ex. 1012, [0010].)

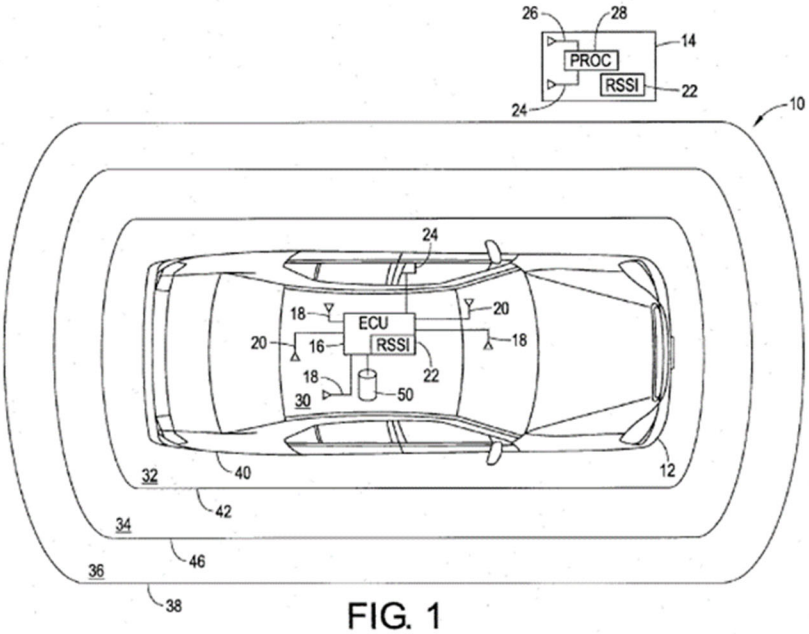


FIG. 1

Lickfelt, Ex. 1012, Fig. 1

365. Lickfelt also discloses "[a] method for remotely controlling locks on a vehicle . . . with reference to FIGS. 1 and 2." (Lickfelt, Ex. 1012, [0024].)

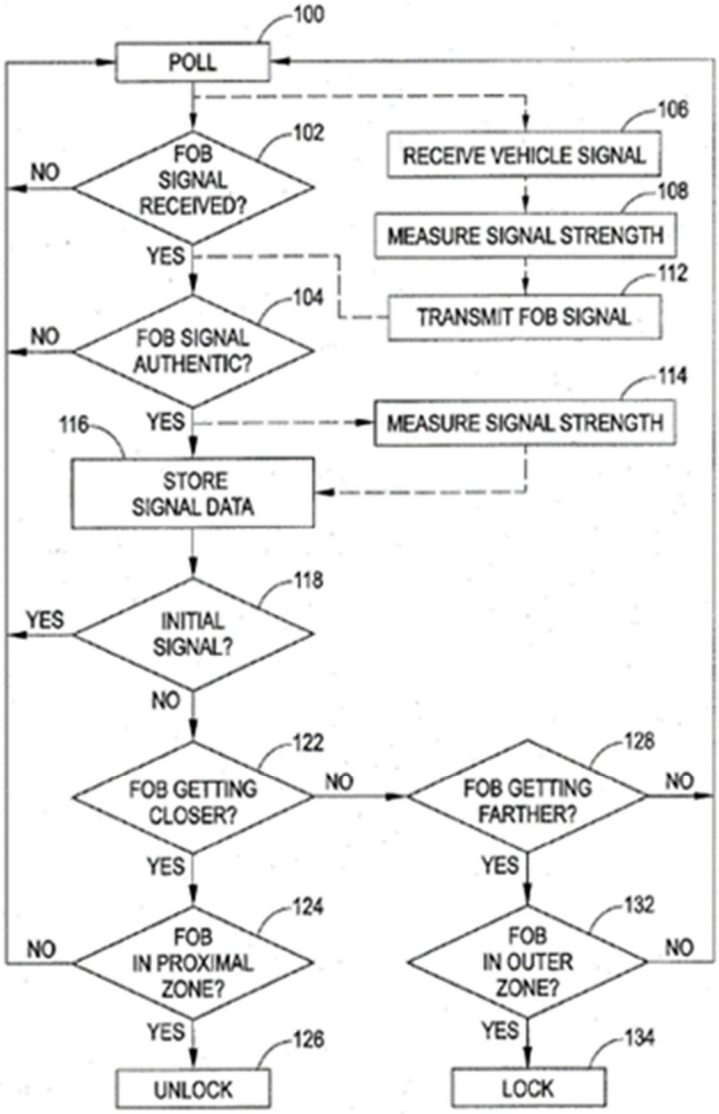


FIG. 2

Lickfelt, Ex. 1012, Fig. 2

366. Thus, Lickfelt discloses a "*method*."

… ***[1a] (a) determining, by a 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;***

367. I understand that the proposed construction of the term "*daemon*" is a computer program. (*See* ¶¶ 79-81.)

368. It is therefore my understanding that claim [1a] should be interpreted as "*determining, by a microprocessor executable device discovery* [computer program], *that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

369. Lickfelt discloses that the vehicle 12 includes a passive entry system 10 with an ECU 16. (Lickfelt, Ex. 1012, [0010].)

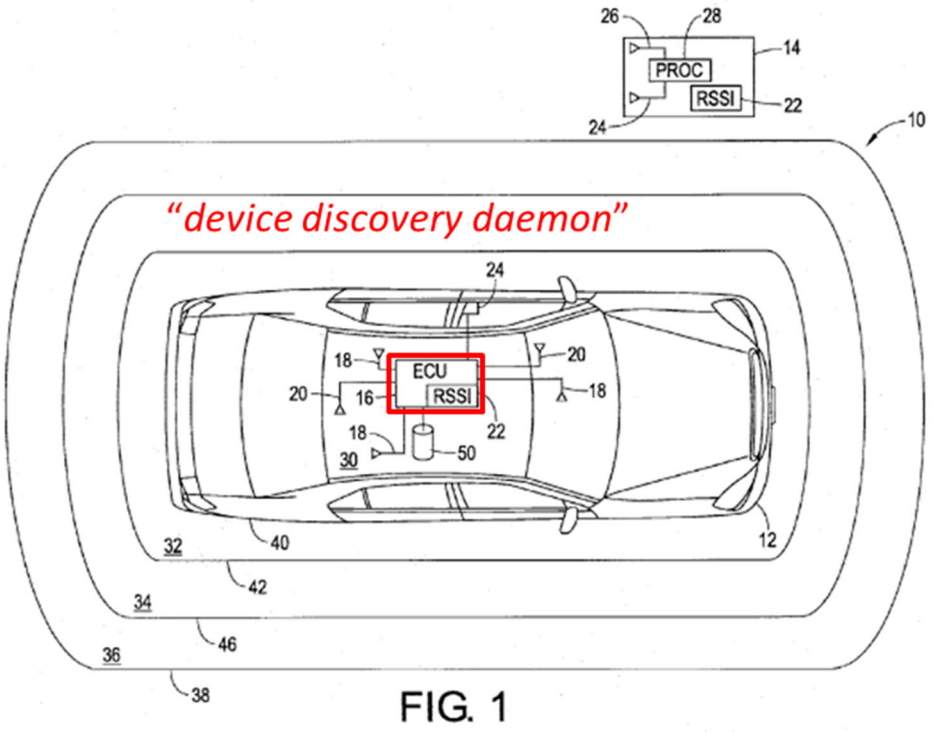


FIG. 1

Lickfelt, Ex. 1012, Fig. 1 (Annotated)

370. Lickfelt further discloses that "the ECU 16 is in communication with a transmitter 18 and a receiver 20" on the vehicle that communicates with a fob 14:

> With reference to FIG. 1, a passive entry system 10 for a vehicle 12 includes a fob 14 that is configured to transmit and to receive signals. **The entry system 10 further includes an ECU 16 on the vehicle 12.** The ECU 16 is in communication with a transmitter 18 and a receiver 20. The transmitter 18 is also found on the vehicle and is for transmitting signals to the fob 14. For clarity purposes, signals transmitted from the fob 14 will be referred to as "fob signals" and signals transmitted from the transmitter 18 on the vehicle 12 will be referred to as "vehicle signals." The receiver 20 is on the vehicle and is for receiving fob signals transmitted from the fob 20. Even though only three transmitters 18 and two receivers 20 are shown in FIG. 1, a fewer or a greater number of transmitters and/or receivers can be provided on the vehicle. Moreover, a plurality of transmitters and receivers can be beneficial when determining a location of the fob 14 with respect to the vehicle 12, which will be described in more detail below.

(Lickfelt, Ex. 1012, [0010].)

371. Lickfelt further discloses that the fob 14 may be any well-known fob, and be combined or incorporated with other devices, such as a mobile phone:

> [T]he fob 14 transmits radio frequency ("RF") signals and receives LF EM signals. Accordingly, the fob 14 can include internal antennas 24, 26 and a processor 28 to receive and to transmit these signals. Alternatively, the fob 14 could transmit and receive other types of

> wireless signals, if desired. The fob 14, similar to known fobs, is typically small enough to be easily carried by an operator of the vehicle 12 and could be combined with or incorporated into other known devices such as a mobile phone or other small electronic device.

(Lickfelt, Ex. 1012, [0012].)

372. Lickfelt discloses that the ECU 16 is "configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strength." (Lickfelt, Ex. 1012, [0013].)

373. Lickfelt further discloses that the ECU 16 may be associated with an RSSI circuit 22 for measuring signal strength:

> [T]he system 10 can include an RSSI circuit 22 to measure signal strength of signals. The RSSI circuit 22 can be associated with the ECU 16 on the vehicle and/or the RSSI circuit 22 can be located in the fob 14.

(Lickfelt, Ex. 1012, [0011].)

374. Lickfelt discloses that the ECU 16 polls for the fob 14 as the user approaches the car carrying the fob 14:

> For example, when an operator approaches the vehicle 12 carrying the fob 14, the ECU 16 polls for the fob by transmitting LF signals. An RF fob signal is transmitted from the fob 14 to the receiver 20 in reply to the polling signal when the fob enters within a range to receive the polling signal. When an operator of the vehicle 12 is approaching the vehicle 12, the initial FOB signal received by the receiver 20 is typically

> from the fob 14 located within the outer zone 36. The location of the fob 14 can be determined by measuring the strength of the polling signal received by the fob in the RSSI circuit 22 on the fob or by measuring the strength of the fob signal sent in reply to the polling signal in the RSSI circuit 22 on the vehicle 12. The ECU 16 stores data associated with the signals in a memory 50 associated with the ECU 16. The ECU 16 continues to poll for the fob 14 after receiving the initial fob signal and a subsequent fob signal is transmitted from the fob 14 to the receiver 20 in response to the subsequent polling signal from the transmitter 18.

(Lickfelt, Ex. 1012, [0019].)

375. Figure 2 depicts a schematic diagram of the process associated with the ECU 16 communicating with the fob 14:

> At 100, the ECU 16 (FIG. 1) polls for fobs, such as the fob 14. At 102, a determination is made as to whether a reply signal is received from a fob. If no reply signal is received, at 102, the algorithm reverts to 100 and continues to poll for fobs. If a reply signal is received at 102, then at 104, a determination is made as to whether the reply signal is authentic. More than one fob may transmit reply signals in response to the polling signal transmitted from the receiver 20. Only fobs associated with the vehicle 12 can unlock the door lock 24 (and perform other vehicle operations). Accordingly, if the reply signal received by the receiver 20 is determined to be not authentic, at 104, then the ECU 16 continues to poll for fobs that are associated with the vehicle 12.

(Lickfelt, Ex. 1012, [0025].)

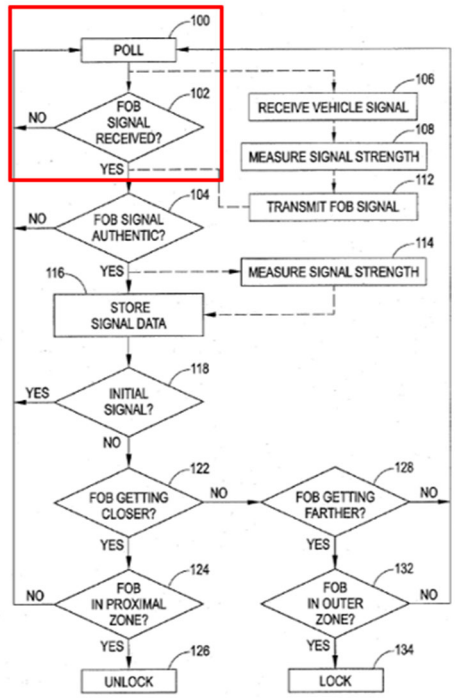


FIG. 2

Lickfelt, Ex. 1012, Fig. 2 (Annotated)

376. Lickfelt further discloses that:

The transmitter is for transmitting the vehicle signals to the fob. The receiver is for receiving the fob signals from the fob. The control unit is in communication with the transmitter and the receiver. The control unit is configured to determine whether the fob is getting closer to or farther from the vehicle based on the fob signals received by the receiver. The vehicle lock locks or unlocks in response to the control unit determining that the fob is getting closer to or farther from the vehicle and that the fob is not located in a hysteresis zone, which is disposed between a proximal zone, which is closer to the vehicle, and an outer zone, which is farther from the vehicle.

(Lickfelt, Ex. 1012, [0005].)

377. At any one time, the fob is either in a proximal zone, hysteresis zone, or outer zone, and the vehicle is correspondingly unlocked or locked. A POSA would have understood that Lickfelt's transmitter, receiver, and control unit operate continuously, i.e. in the background, to perform discovery of the fob and based on the results to unlock or lock the vehicle.

378. As I explained in the state-of-the art section, a POSA would have understood that Bluetooth was a very popular protocol used by most if not all Automotive Applications, for transmitting wireless signals (RF signals) to/from wireless devices. (*See* ¶¶ 96-98.) As also discussed above, Bluetooth includes aspects of device discovery in which a computer program runs in the background to discover wireless devices. (*See* ¶¶ 99-102.) Lickfelt discloses that "the fob 14 transmits radio frequency ("RF") signals and receives LF EM signals . . . the fob 14 could transmit and receive other types of wireless signals, if desired." (Lickfelt, Ex. 1012, [0012].) Accordingly, a POSA would have understood that the ECU 16 operates in the background to detect the presence of the fob 14 and during this operation and determines that the fob 14 is "*attempting to connect to a network and/or communication subsystem of a vehicle*."

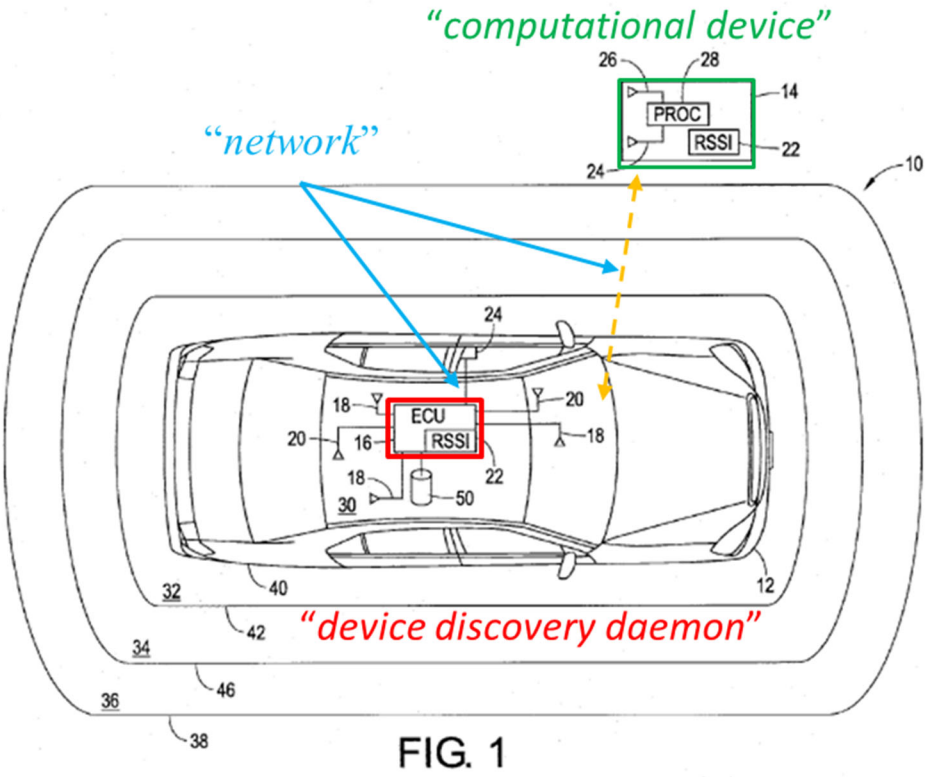
379. A microprocessor is a specific type of processor that "contains the logic elements for manipulating data and for making decisions," and is implemented on a

single silicon chip. (IEEE Dictionary, Ex. 1051, 693; Bosch, Ex. 1050, 94.) A POSA would have understood that the ECU 16 includes both hardware, e.g., a microprocessor, and software ("*discovery daemon*") that is executed by the microprocessor based on, for example, Lickfelt's description of the ECU 16 as being "in communication with a transmitter 18 and a receiver 20," "poll[ing] for fobs," and "configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12". (Lickfelt, Ex. 1012, [0010],[0025],[0027].) Further, it was well-known that automotive ECU's included microprocessors. (Bosch, Ex. 1050, 94.)

380. Lickfelt discloses that the passive entry "system 10 also includes a lock 24 that is in communication with the ECU 16" e.g., over a wired connection. (Lickfelt, Ex. 1012, [0015].) Therefore the ECU 16 and lock 24 communicate over a "*network and/or communication subsystem*."

381. A POSA would have understood that a user carrying a fob and approaching a vehicle having a passive entry system is attempting to connect to a vehicle network to unlock the door because the communication between the ECU 16 polling for fob(s) 14 and the reply signal emitted from the fob 14 shows how the system interprets the presence and movement of the fob 14 as an attempt to engage with the vehicle network. Further, Lickfelt discloses that only fobs associated with the vehicle 12 can unlock the door lock 24. A POSA would have understood that the association of the fob 14 and the vehicle 12 is indicating a communicative

connection between the fob 14 and the vehicle 12. As illustrated in the image below, the wireless and wired connections between the ECU 16, the fob 14, and the lock 24 collectively provide a "*network*" to enable the fob 14 to control vehicle system functionality (e.g., passive entry) through the ECU 16:



Lickfelt, Ex. 1012, Fig. 1 (Annotated)

382. A POSA would have further understood that by polling for the fob 14 as the user approaches, the ECU 16 is "*determining*" that the fob 14 is "*connected to or attempting to connect to*" the vehicle network. Thus, Lickfelt discloses "*determining, by a microprocessor executable* [computer program] [ECU 16 software], *that a computational device* [fob 14] *is connected to or attempting to*

connect to a network and/or communication subsystem of a vehicle [e.g., by first detecting the fob 14 using its background program, and then establishing a connection between the fob 14 and the lock 24 over the vehicle network through the ECU 16]."

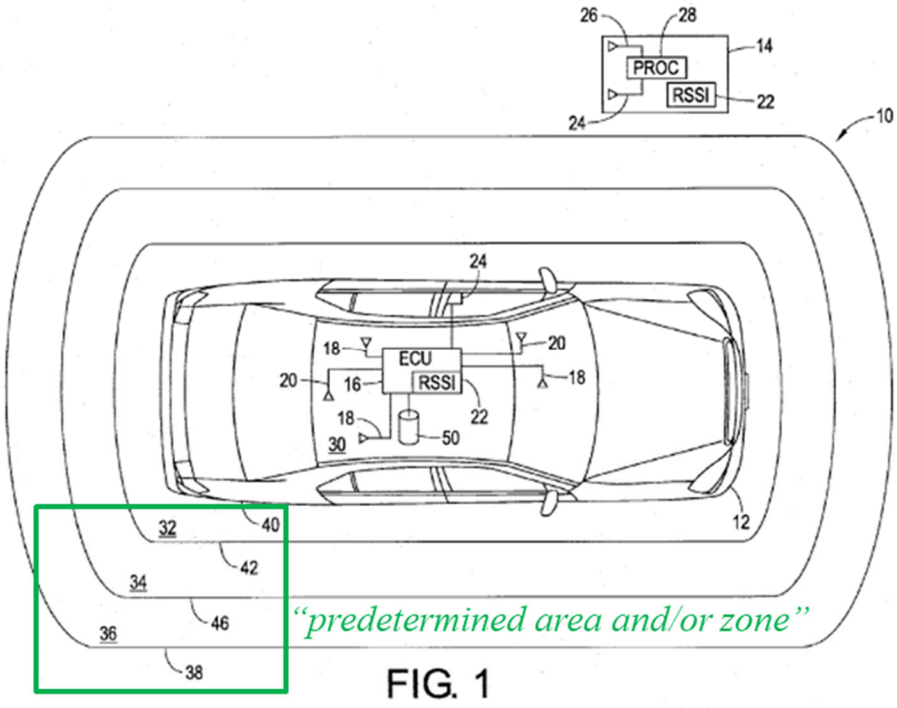
> … ***[1b] (b) in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle; and***

383. Lickfelt discloses that the entry system 10 defines a plurality of zones of the vehicle 12 including an internal zone 30, a proximal zone 32, a hysteresis zone 34, and an outer zone 36 that are illustrated in Figure 1:

> The entry system 10 is configured to define a plurality of zones with respect to the vehicle 12. These zones can include an internal zone 30, a proximal zone 32, a hysteresis zone 34, and an outer zone 36. The internal zone 30 is defined by the external boundary 40 of the vehicle 12, which is typically the outer surface of the vehicle body . . . . The proximal zone 32 is the zone closest to the vehicle 12, but located outside of or external to the vehicle. The outer zone 36 is defined at its outer limit 38 by the range of the signals sent from the transmitter 18 that can be detected by the fob 14 or by an outer limit in which the fob 14 can send detectible signals to the receiver 20. The hysteresis zone 34 is interposed between the proximal zone 32 and the outer zone 36. The proximal zone 32 and the hysteresis zone 34 share a common proximal/hysteresis boundary 42, which can be located about 1 meter

from an external boundary 40 of the vehicle 12. The outer zone 36 and the hysteresis zone 34 share a common outer/hysteresis boundary 46.

(Lickfelt, Ex. 1012, [0016].)



Lickfelt, Ex. 1012, Fig. 1 (Annotated)

384. Lickfelt further discloses that the zones can be defined by predetermined distances:

The zone data can be determined based on the measured signal strength and the boundaries of the zones, which can be defined by predetermined distances from the vehicle and coordinates defining zones with respect to the vehicle.

(Lickfelt, Ex. 1012, [0031].)

385. As discussed above in limitation [1a], Lickfelt discloses that the ECU 16 is "configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strength." (Lickfelt, Ex. 1012, [0013].) Lickfelt further discloses determining which zone the fob 14 is located in based on the measured signal strength using triangulation:

> The ECU 16 can now determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on comparing the data associated with the initial signal (fob or polling signal) compared to the data associated with the subsequent signal (fob or polling). **The zone in which the fob 14 is located can be determined based on the signal strength of the respective signals and triangulation by knowing the respective transmitter that initiated the polling signal or the respective receiver that received the fob signal**. This zone data can also be stored in the memory 50. If the signal strength of the subsequent signal (fob or polling signal) is greater than the signal strength of the initial signal, then it can be deduced that the fob 14 is getting closer to the vehicle 12.

(Lickfelt, Ex. 1012, [0020].)

386. Thus, Lickfelt discloses "*in response, determining, by the device discovery daemon* [electronic control unit (ECU) 16 software], *whether the computational device* [fob 14] *is located within a predetermined area and/or zone of the vehicle* [zones 30, 32, 34, 36]."

… ***[1c] (c) applying, by the device discovery daemon, at least the following rules:***

387. Lickfelt discloses, with reference to Figure 2, that the ECU 16 makes determinations, e.g., at steps 122-126, which a POSA would have understood to be applying rules:

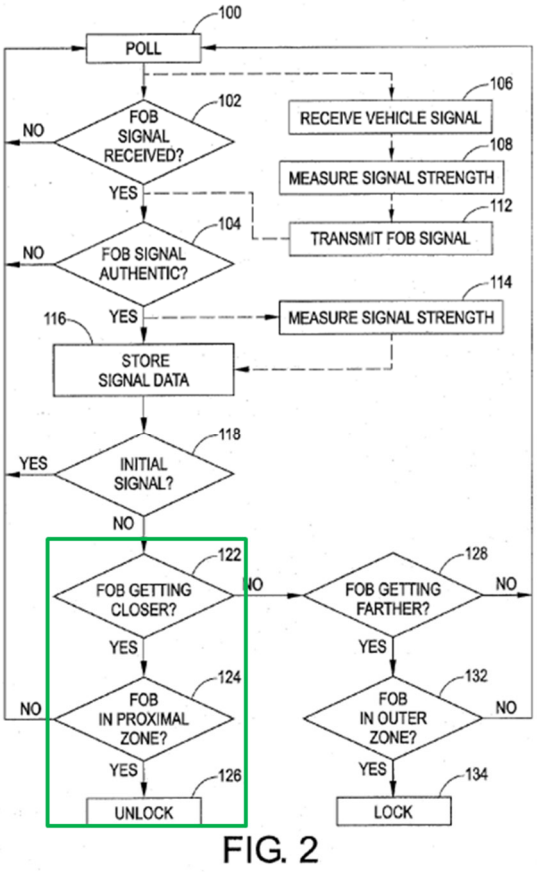


FIG. 2

Lickfelt, Ex. 1012, Fig. 2 (Annotated)

388. Thus, Lickfelt discloses "*applying, by the device discovery daemon, at least the following rules*."

… ***[1d] (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

389. In my analysis I apply the proposed construction of 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*." (*See* ¶¶ 82-85.)

390. It is therefore my understanding that claim [1d] should be interpreted as "*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* [functionality of] *the vehicle network and/or communication subsystem*."

391. Lickfelt discloses that the entry system 10 includes "a lock 24 that is in communication with the ECU 16." (Lickfelt, Ex. 1012, [0015].) Lickfelt further discloses that "the vehicle door lock 24 locks or unlocks in response to the ECU 16 determining that the fob 14 is getting closer to or farther from the vehicle 12." (Lickfelt, Ex 1012, [0018].)

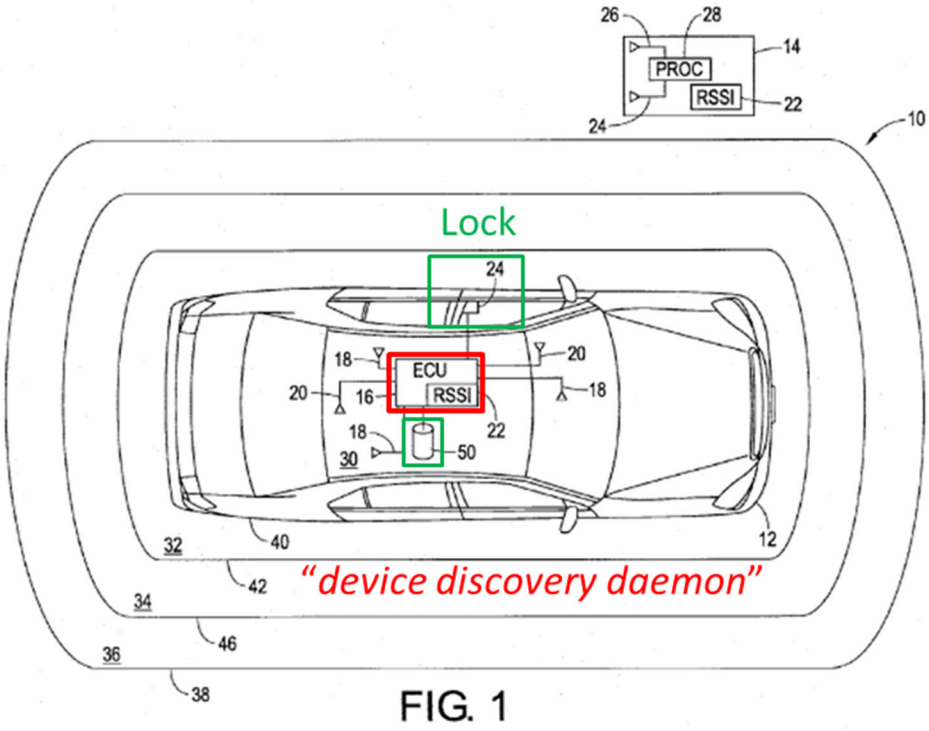


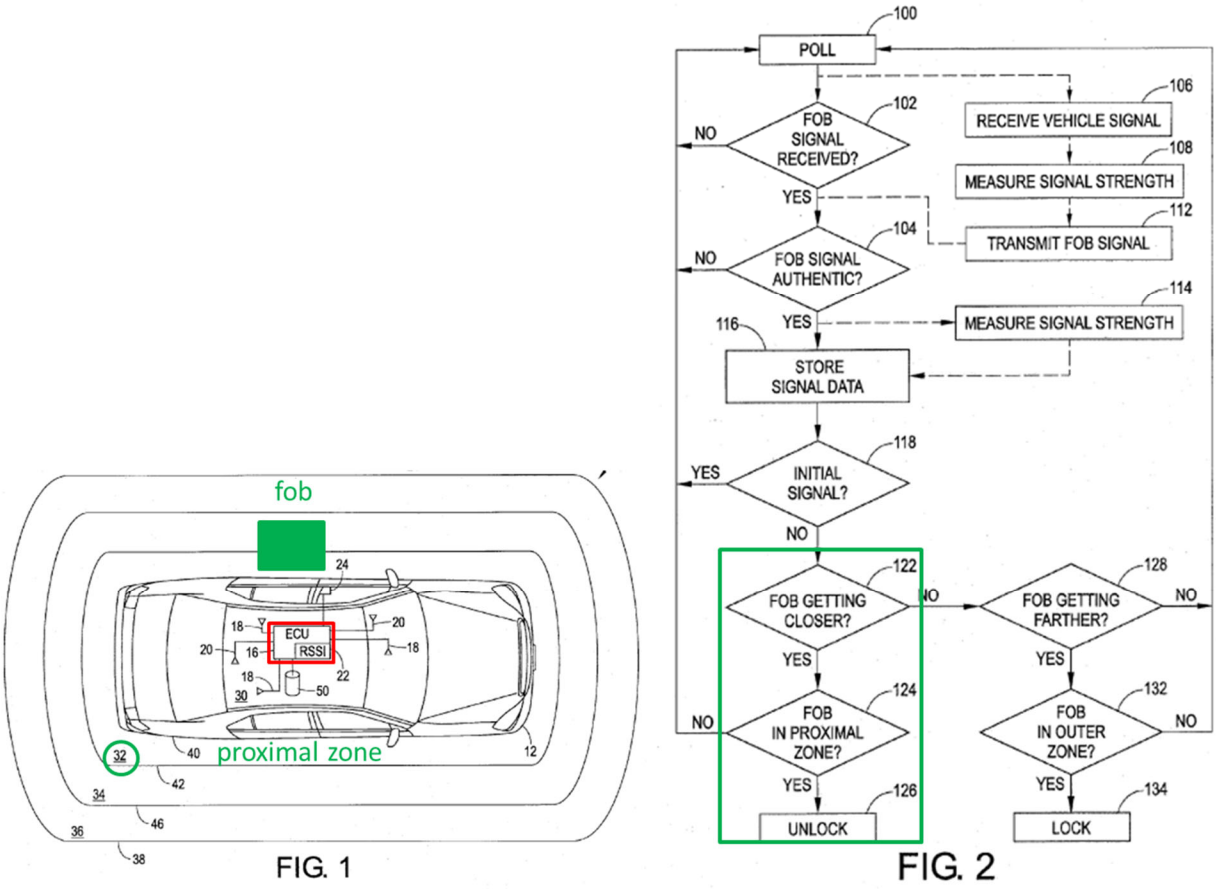
FIG. 1

Lickfelt, Ex. 1012, Fig. 1 (Annotated)

392. Lickfelt further discloses that the ECU 16 unlocks the lock 24 if the fob 14 is getting closer to the vehicle and is located in the proximal zone 32:

> The ECU 16 can determine whether the fob 14 is getting closer to the vehicle, at 122, by comparing the strength of a subsequent vehicle or fob signal to the strength of a preceding vehicle or fob signal. At 124, a determination is made as to whether the fob 14 is located within the proximal zone 32. If it is determined that both the fob 14 is getting closer to the vehicle, at 122, and that the last signal sent from the fob 14 to the receiver 20 was sent with the fob located within the proximal zone 34 [*sic* 32], at 124, then the lock 24 unlocks at 126.

(Lickfelt, Ex. 1012, [0027].)



Lickfelt, Ex. 1012, Fig. 1 and Fig. 2 (Annotated)

393. Thus, Lickfelt discloses "*(c) 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* [e.g., proximal zone 32], *permitting the computational device to access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem* [to unlock lock 24]."

> … ***[1e] (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.***

394. In my analysis I apply the proposed construction of 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*." (*See* ¶¶ 82-85.)

395. It is therefore my understanding that claim [1e] should be interpreted as "*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* [functionality of] *the vehicle network and/or communication subsystem*."

396. Lickfelt discloses that if the ECU 16 determines that the fob 14 is within the outer zone 36 and not within the proximal zone 32, then the lock 24 of the vehicle will not be unlocked:

> If it is determined that the fob 14 is getting farther from the vehicle and the latest reply signal received from fob is where the fob is within the outer zone 36, then the lock 24 locks. After the lock 24 locks, the lock will not unlock until it is determined that the fob 14 is getting closer to the vehicle and the reply signal triggering the unlock event is received from the fob 14 where the fob is located within the proximal zone 32.

(Lickfelt, Ex. 1012, [0023].)

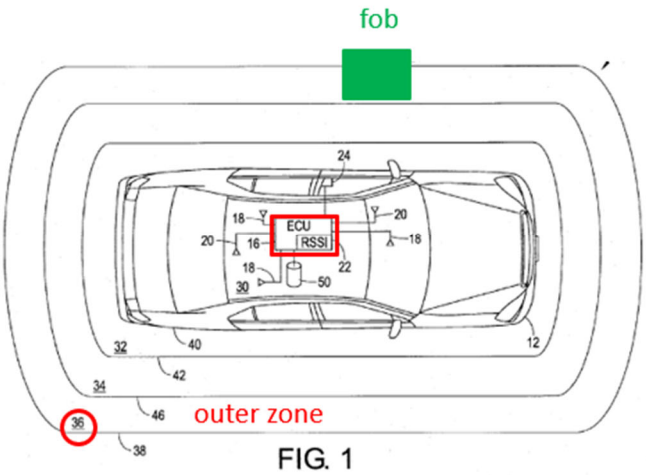


FIG. 1

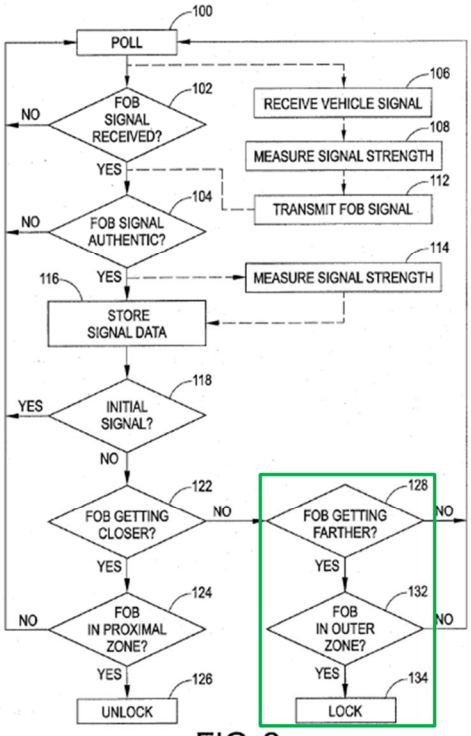


FIG. 2

Lickfelt, Ex. 1012, Fig. 1 and Fig. 2 (Annotated)

397. Thus, Lickfelt discloses "*(c) applying, by the device discovery daemon, at least the following rules: . . . (C2) when the computational device is not located within the predetermined area and/or zone of the vehicle* [e.g., outer zone 36 and not the proximal zone 32], *not permitting the computational device to access or attempt to access* [functionality of] *the vehicle network and/or communication subsystem* [prevent the lock 24 from unlocking]."

2. Dependent Claims 2, 4, and 6-7

398. Claims 2 and 4-7 depend on claim 1, which I understand means that these claims require all of the limitations of claim 1 in addition to their own limitations.

399. Lickfelt teaches all of the limitations of claim 1 as described above.

a. Claim 2

… ***[2a] The method of claim 1, 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,***

400. Lickfelt discloses that the ECU determines the location of the fob 14 based on measuring signal strength using the RSSI circuit as discussed above with reference to claim limitations [1a] and [1b]. Lickfelt discloses an embodiment in which the fob 14 ("*computational device*") includes the RSSI circuit 22 for measure the signal strength:

> As discussed above, the fob 14 can include the RSSI circuit 22 for measuring the strength of the polling signal. At 112, the fob 14 can transmit the fob signal to the receiver 20 and the fob signal can include signal strength data associated with the polling signal that was received by the fob and the fob signal can further include transmitter identification data identifying the transmitter 18 on the vehicle 12 that transmitted the respective polling signal.

(Lickfelt, Ex. 1012, [0026].)

401. Lickfelt further discloses that:

> The zone data can be determined based on the measured signal strength and the boundaries of the zones, which can be defined by predetermined

> distances from the vehicle and coordinates defining zones with respect to the vehicle."

(Lickfelt, Ex. 1012, [0031].)

402. A POSA would have understood that this modification of shifting processing from the RSSI circuit 22 to the fob 14 is just a simple substitution of one known element for another to obtain predictable results, e.g., reducing power consumption by the vehicle system. Therefore, Lickfelt discloses "*a type of the computational device* [e.g., the fob 14 with the RSSI circuit] *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*."

> … ***[2b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and***

403. Lickfelt discloses that the fob 14 is incorporated into the mobile phone in one embodiment:

> The fob 14, similar to known fobs, is typically small enough to be easily carried by an operator of the vehicle 12 and could be <u>combined with or incorporated into other known devices such as a mobile phone</u> or other small electronic device.

(Lickfelt, Ex. 1012, [0012].)

404. A smart phone refers to a mobile phone with advanced computing capabilities. Such devices were common in the market by 2013. (*See* ¶¶ 87-89.)

Accordingly, a POSA would have understood Lickfelt's description of incorporating the fob 14 into a mobile phone to indicate that Lickfelt's mobile phone is a smart phone.

405. Thus, Lickfelt discloses that "*the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant*."

… ***[2c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.***

406. Lickfelt discloses determining the location of the fob 14 within the cabin of the vehicle:

> If it is determined that the fob 14 is located in the internal zone 30, then it is assumed the fob 14 is located within the vehicle, e.g. within the cabin or the trunk of the vehicle.

(Lickfelt, Ex. 1012, [0016].)

407. The cabin of the vehicle refers to the passenger compartment. Thus, Lickfelt discloses that "*the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment*."

b. Claim 4

… ***[4] The method of claim 1, 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.

408. I understand that since claim 4 requires "*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 . . . .*" followed by a long list of localization options; a reference need only disclose one of the recited localization option to meet the claim.

409. Lickfelt discloses determining the location of the fob 14 using triangulation based on signal strength:

> Where the RSSI circuit 22 is on the vehicle 12, each receiver 20 can receive a respective fob signal and the RSSI circuit 22 can determine

> the **signal strength** of the respective fob signal received from the fob to determine a location of the fob by, for example, **triangulation**.

(Lickfelt, Ex. 1012, [0017].)

> The ECU 16 can now determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on comparing the data associated with the initial signal (fob or polling signal) compared to the data associated with the subsequent signal (fob or polling). The zone in which the fob 14 is located can be determined based on the **signal strength** of the respective signals and **triangulation** by knowing the respective transmitter that initiated the polling signal or the respective receiver that received the fob signal. This zone data can also be stored in the memory 50. If the signal strength of the subsequent signal (fob or polling signal) is greater than the signal strength of the initial signal, then it can be deduced that the fob 14 is getting closer to the vehicle 12.

(Lickfelt, Ex. 1012, [0020].)

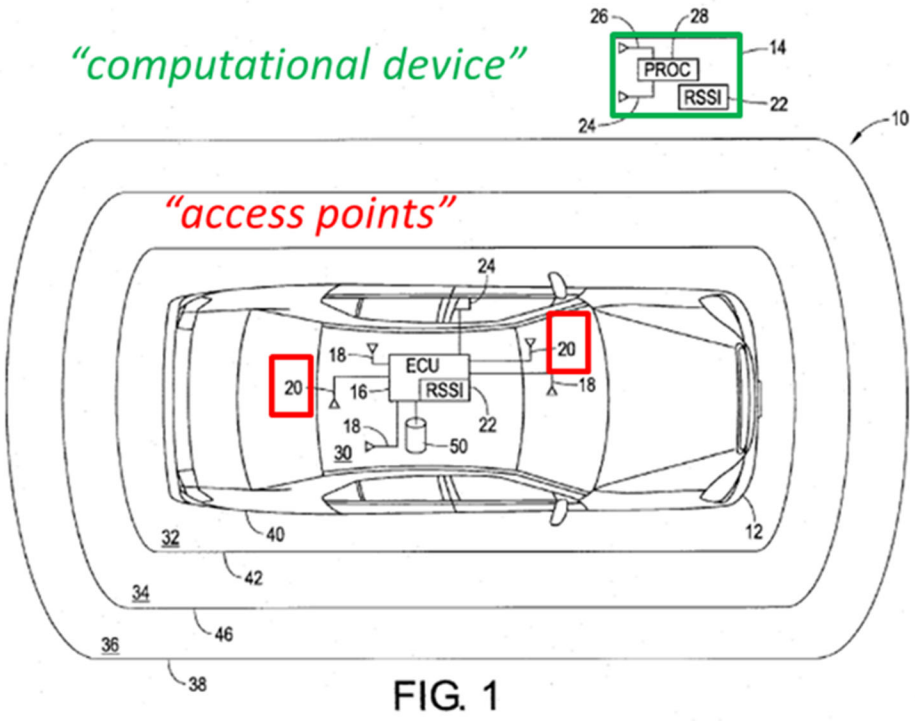
410. Lickfelt further discloses that the location of the fob 14 ("*computational device*") can be determined based on the signals received by the receivers 20 of the vehicle ("*multiple access points of the vehicle*"):

> The receiver 20 is on the vehicle and is for receiving fob signals transmitted from the fob 20. Even though only three transmitters 18 and two receivers 20 are shown in FIG. 1, a fewer or greater number of transmitters and/or receivers can be provided on the vehicle.

(Lickfelt, Ex. 1012, [0010].)

> Which receiver 20 that receives each respective fob signal can also be used to determine whether the fob 14 is getting closer to or farther from the vehicle 12.

(Lickfelt, Ex. 1012, [0014].)



Lickfelt, Ex. 1012, Fig. 1 (Annotated)

411. A POSA would have understood that Lickfelt teaches determining the location of the fob within the vehicle using at least triangulation of the measurements of signal strength because the system can include multiple receiver(s) 20 positioned within the vehicle that take measurements of the radio signals transmitted by the fob 14. The system can also calculate and compare the signal strength values from the different receivers to estimate the fob's location; which is an established triangulation technique.

412. A POSA would have also understood that Lickfelt's disclosure of receiver(s) 20 describes multiple "*access points*" as the receiver(s) 20 are used to receive signals from the fob 14 for triangulation purposes, which is conventionally what access points is used for.

413. Therefore Lickfelt discloses "*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 . . . triangulation based on relative received signal strengths of a signal from the computational device as received by multiple access points* [receiver(s) 20] *of the vehicle . . . .*"

c. Claim 6

… ***[6] The method of claim 4, 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, <u>whether the computational device has moved relative to a selected access point during a defined time interval</u>, 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.

414. Claim 6 depends on claim 4, therefore I understand that claim 6 includes the limitations of claim 4, in addition to the limitations of claim 1.

415. I understand that since claim 6 requires "*wherein the device discovery daemon uses <u>multiple</u> of the one or more of . . .*" followed by a long list of localization options; a reference need only disclose two of the recited localization options to meet the claim.

416. As illustrated below, claim 6 includes the same list of localization options as claim 4.

'697 Patent Claim 4	**'697 Patent Claim 6**
[4] The method of claim 1, wherein the determining step (b) bases the determination on whether the computational device is located within the predetermined area and/or	[6] The method of claim 4, wherein the device discovery daemon **uses multiple** of the one or more of

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	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	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.	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.

417. As I explained above with reference to claim 4, Lickfelt discloses determining the location of the fob 14 ("*computational device*") based on triangulation. (Lickfelt, Ex. 1012, [0017].)

418. Lickfelt also discloses determining the location of the fob 14 ("*computational device*") based on signal strength:

> The ECU 16 is configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strengths. For example, where the transmitters 18 on the vehicle transmit LF signals, one of the antennas on the fob 14 receives this LF signal and the received LF signal is processed by the RSSI circuit 22 on the fob 14. The fob 14 can then transmit a fob signal to the receiver 20 on the vehicle 12 that includes signal strength data for the received vehicle signal. The RSSI circuit 22 on the fob 14 can measure the signal strength of vehicle signals sent from each transmitter 20 on the vehicle, e.g. a transmitter located near the trunk of the vehicle and a transmitter located near a passenger door of the vehicle. The fob signal, which is sent to the receiver 20 on the vehicle from the fob 14, can also include transmitter identification data, which is associated with the transmitter from which the vehicle signal was received. The ECU 16 on the vehicle 12 can calculate the fob position based on the signal strength data and the transmitter identification data. The ECU 16 can determine whether the fob 14 is getting closer to or farther from the vehicle 12 by comparing signal strength and transmitter identification data from earlier received signals to signal strength and transmitter identification data from later received signals.

(Lickfelt, Ex. 1012, [0013].)

419. Lickfelt further discloses that the location of the fob 14 ("*computational device*") can be determined based on the signal strength received by the receiver(s) 20 of the vehicle ("*access points of the vehicle*"):

> The receiver 20 is on the vehicle and is for receiving fob signals transmitted from the fob 20. Even though only three transmitters 18 and two receivers 20 are shown in FIG. 1, a fewer or greater number of transmitters and/or receivers can be provided on the vehicle.

(Lickfelt, Ex. 1012, [0010].)

420. A POSA would have understood that Lickfelt's disclosure of receiver(s) 20 teaches an "*access point*" as the receiver(s) are used to receive signals from the fob 14 for localization purposes, which is conventionally what an access point is used for. Additionally, Lickfelt discloses that there could be a fewer or greater number of receiver(s) 20, indicating that there could be a singular access point or multiple. A POSA would have further understood that if there is only one receiver 20 (one access point), there would only be one signal strength value used in determining the location of the fob 14.

421. A POSA would have understood that Lickfelt's disclosure of determining the location of the fob based on signal strength indicates determining location based on the signal strength of a signal from the fob as received by an access point of the vehicle because Lickfelt describes using a receiver within the vehicle to measure the signals strength emitted by the fob and using the signal strength to determine the fob's location; which is an approach consistent with well-known methods of using RSSI for localization.

422. Lickfelt also discloses determining the location of the fob 14 ("*computational device*") based on signal strength at different time intervals:

> The ECU 16 on the vehicle 12 can calculate the fob position based on the signal strength data and the transmitter identification data. The ECU 16 can determine whether the fob 14 is getting closer to or farther from the vehicle 12 by comparing signal strength and transmitter identification data from earlier received signals to signal strength and transmitter identification data from later received signals.

(Lickfelt, Ex. 1012, [0013].)

423. Therefore, Lickfelt discloses "*wherein the device discovery daemon* [ECU 16 computer program] *uses multiple of the one or more of signal strength of a signal from the computational device* [fob 14] *as received by an access point of the vehicle* [receiver 20]. . . . [and] *whether the computational device* [fob 14] *has moved relative to a selected access point during a defined time interval* [by comparing earlier received signals to later received signals]."

d. Claim 7

… ***[7] The method of claim 6, 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.***

424. Claim 7 depends on claim 6, therefore I understand that claim 7 includes the limitations of claim 6, in addition to the limitations of claim 1.

425. Lickfelt discloses that the ECU 16 can store previous signal and zone data from the fob 14 and use the data to compare subsequent signals to determine a location of the fob 14:

> The ECU 16 can now determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on comparing the data associated with the initial signal (fob or polling signal) compared to the data associated with the subsequent signal (fob or polling). The zone in which the fob 14 is located can be determined based on the signal strength of the respective signals and triangulation by knowing the respective transmitter that initiated the polling signal or the respective receiver that received the fob signal. This zone data can also be stored in the memory 50. If the signal strength of the subsequent signal (fob or polling signal) is greater than the signal strength of the initial signal, then it can be **deduced** that the fob 14 is getting closer to the vehicle 12.

(Lickfelt, Ex. 1012, [0020].)

426. Lickfelt discloses determining a "*level of confidence*" because the ECU 16 stores previous signal data and compares that "*threshold*" value to a subsequent signal strength value to determine the location of the device based the relationship of those values. If the signal strength of the subsequent signal is greater than the initial or stored signal, a POSA would have understood that this indicates a higher

probability that the fob 14 is getting closer to the vehicle 12 because it was well-established principal that signal strength generally increases as the distance between a transmitter (e.g. a fob) and a receiver (e.g. receiver in ECU) decreases. A POSA would have further understood that the ability for the ECU 16 to determine a probability level based on the compared signal strength values teaches that the ECU 16 determines a "*level of confidence*," because the temporal comparison of signal strength values and signal strength itself serve as an indicator of a confidence-based mechanism.

427. Therefore, Lickfelt discloses "*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* [if the signal strength of the subsequent signal is greater than the initial or stored signal]."

3. Independent Claim 8

428. Independent claim 8 is largely duplicative of independent claim 1. To illustrate, the table below shows a side-by-side comparison of claims 1 and 8. Claim 8 is "marked up" to show the minor differences.

'697 Patent Claim 1	**'697 Patent Claim 8**

1[pre]. A method, comprising:	**8[pre].** A vehicle, comprising:
[1a] (a) determining, by a 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;	**[8a]** a microprocessor executable device discovery daemon operable to: **[8b] (a)** determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[1b] (b) 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	**[8c] (b)** in response, determining [ ] whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[1c] (c) applying, by the device discovery daemon, at least the following rules:	**[8d] (c)** applying [ ] at least the following rules:
[1d] (C1) when the computational device is located within the	**[8e] (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	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
[1e] (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.	**[8f] (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.

… 8[pre]. A vehicle, comprising:

429. Lickfelt discloses a vehicle 12 in Figure 1. (Lickfelt, Ex. 1012, [0010].)

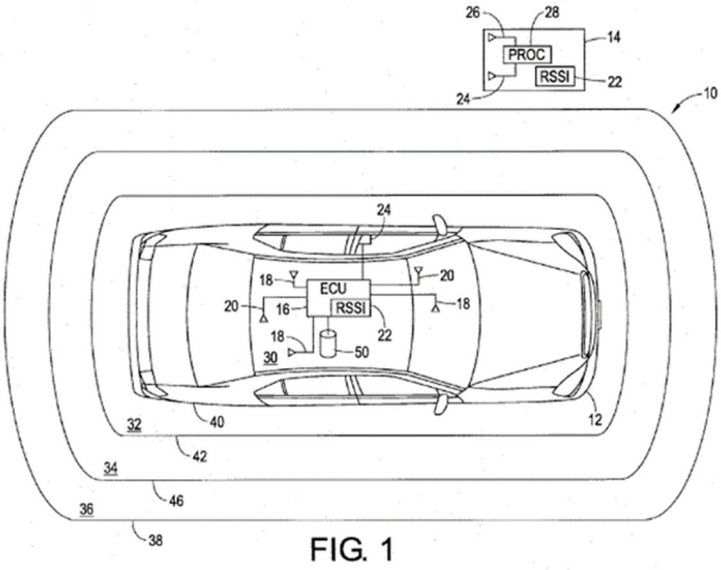


FIG. 1

Lickfelt, Ex. 1012, Fig. 1

430. Lickfelt further discloses "a passive entry system 10 for a vehicle 12 includes a fob 14 that is configured to transmit and to receive signals." (Lickfelt, Ex. 1012, [0010].)

431. Thus, Lickfelt discloses a "*vehicle*."

… [8a] a microprocessor executable device discovery daemon operable to:

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

432. Claim limitations [8a] and [8b] are substantially similar to limitation [1a] of claim 1. Claims [8a] and [8b] require "*a microprocessor executable device discovery daemon operable to . . . determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem*

of a vehicle." Whereas claim [1a] requires "*determining, by a 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*." As explained for limitation [1a], Lickfelt discloses that the ECU 16 computer program ("*device discovery daemon*") determines whether the fob 14 ("*computational device*") is connected to or attempting to connect to the vehicle network.

433. Thus, Lickfelt discloses "*a microprocessor executable device discovery daemon operable to . . . determine that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

… [8c] (b) in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle; and

434. Claim limitation [8c] is substantially similar to claim limitation [1b] in claim 1. Claim [8c] requires "*in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle*," whereas claim [1b] requires "*in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle*." The only difference between the two limitations is that claim [8c] removes the term "*by the device discovery daemon*" that is required in claim

[1b]. However, the rest of claim [8c] is identical to claim [1b], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Lickfelt.

… [8d] (c) applying at least the following rules:

435. Claim limitation [8d] is substantially similar to claim limitation [1c] in claim 1. Claim [8d] requires "*applying at least the following rules*," whereas claim [1c] requires "*applying, by the device discovery daemon, at least the following rules . . . .*" The only difference between the two limitations is that claim [8d] removes the term "*by the device discovery daemon*" that is required in claim [1c]. However, the rest of claim [8d] is identical to claim [1c], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Lickfelt.

… [8e] (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

436. Limitation [8e] is identical to limitation [1d]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Lickfelt.

… [8f] (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.

437. Limitation [8f] is identical to limitation [1e]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Lickfelt.

4. Dependent Claims 9, 11, and 13-14

438. Claims 9 and 11 depend from claim 8 which I understand means that claims 9 and 11 require all of the limitations of claim 8 in addition to their own limitations.

439. Lickfelt discloses all of the limitations of claim 8 as described above. (*See* ¶¶ 429-437.)

440. Claim 9 is largely duplicative of claim 2. To illustrate, the table below shows a side-by-side comparison of claims 2 and 9. Claim 9 is "marked up" to show the minor differences.

'697 Patent Claim 2	**'697 Patent Claim 9**
[2a] The method of claim 1,	**[9a]** The vehicle of claim 8,
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,	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,
[2b] wherein the computational device is one or more of a tablet	**[9b]** wherein the computational device is one or more of a tablet

computer, laptop, smart phone, and personal digital assistant, and	computer, laptop, smart phone, and personal digital assistant, and
[2c] wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.	**[9c]** wherein the specific predetermined area and/or zone of the vehicle is at least part of the passenger compartment.

a. Claim 9

… [9a] The vehicle of claim 8, 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,

441. Limitation [9a] is substantially similar to limitation [2a]. Given that claim [9a] encompasses claim 8 which discloses a "*vehicle*," the rest of the language is identical to claim [2a]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

… [9b] wherein the computational device is one or more of a tablet computer, laptop, smart phone, and personal digital assistant, and

442. Limitation [9b] is identical to limitation [2b]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

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

443. Limitation [9c] is identical to limitation [2c]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

b. Claim 11

… [11] The vehicle of claim 8, 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.

444. Claim 11 is largely duplicative of claim 4. To illustrate, the table below shows a side-by-side comparison of claims 4 and 11. Claim 11 is "marked up" to show the minor differences.

'697 Patent Claim 4	**'697 Patent Claim 11**
[4] The method of claim 1, wherein the determining step (b)	**[11]** The vehicle of claim 8, 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	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	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.	input received from a user of the computational device.

445. There are only two changes to claim 11 from claim 4: the claims they depend from are different, and claim 11 requires "*the determining operation (b)*" whereas claim 4 requires "*the determining step (b)*." Neither difference is substantial to the meaning of the claim, thus I refer back to my analysis of claim 4 to establish that these limitations are met by Lickfelt.

c. Claim 13

… [13] The vehicle of claim 11, 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.

446. Claim 13 depends on claim 11, therefore I understand that claim 13 includes the limitations of claim 11, in addition to the limitations of claim 8.

447. Claim 13 is largely duplicative of claim 6. To illustrate, the table below shows a side-by-side comparison of claims 6 and 13. Claim 13 is "marked up" to show the minor differences.

'697 Patent Claim 6	**'697 Patent Claim 13**
[6] The method of claim 4, 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	**[13]** The vehicle of claim 11, 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	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.	input received from a user of the computational device.

448. Because the differences between claims 6 and 13 are not substantial, and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 6 to establish that these limitations are met by Lickfelt.

d. Claim 14

… [14] The vehicle of claim 13, 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.

449. Claim 14 depends on claim 13, therefore I understand that claim 14 includes the limitations of claim 13, in addition to the limitations of claim 8.

450. Claim 14 is largely duplicative of claim 7. To illustrate, the table below shows a side-by-side comparison of claims 7 and 14. Claim 14 is "marked up" to show the minor differences.

'697 Patent Claim 7	**'697 Patent Claim 14**
[7] The method of claim 6,	**[14]** The vehicle of claim 13,

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.	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.

451. Because the differences between claims 7 and 14 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 7 to establish that these limitations are met by Lickfelt.

5. Independent Claim 15

452. Independent claim 15 is largely duplicative of independent claim 1. To illustrate, the table below shows a side-by-side comparison of claims 1 and 15. Claim 15 is "marked up" to show the minor differences.

'697 Patent Claim 1	**'697 Patent Claim 15**
1[pre]. A method, comprising:	**15[pre].** A tangible and non-transient computer readable medium including microprocessor executable instructions that, when executed, perform at least the following functions:
[1a] (a) determining, by a 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] (a)** determining [ ] that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;
[1b] (b) in response, determining, by the device discovery daemon,	**[15b] (b)** in response, determining [ ]

whether the computational device is located within a predetermined area and/or zone of the vehicle; and	whether the computational device is located within a predetermined area and/or zone of the vehicle; and
[1c] (c) applying, by the device discovery daemon, at least the following rules:	**[15c] (c)** applying, by the device discovery daemon, at least the following rules:
[1d] (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	**[15d] (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
[1e] (C2) when the computational device	**[15e] (C2)** when the computational device is not located within the predetermined area and/or zone of

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.	the vehicle, not permitting the computational device to access or attempt to access the vehicle network and/or communication subsystem.

… ***15[pre]. A tangible and non-transient computer readable medium including microprocessor executable instructions that, when executed, perform at least the following functions:***

453. Lickfelt discloses an "entry system 10 [including] an ECU 16 on the vehicle 12." (Lickfelt, Ex. 1012, [0010].) Lickfelt further discloses that "[t]he ECU 16 stores data associated with the signals in a memory 50 associated with the ECU 16." (Lickfelt, Ex. 1012, [0019].)

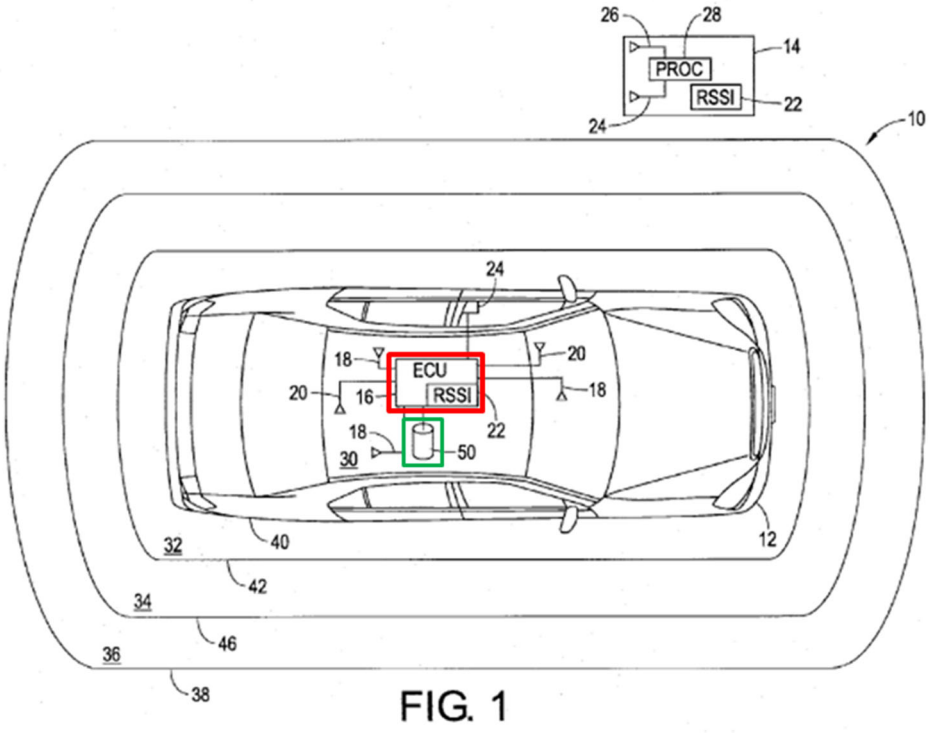


FIG. 1

Lickfelt, Ex. 1012, Fig. 1 (Annotated)

454. Lickfelt discloses, with reference to Figure 2, "[a] method for remotely controlling locks on a vehicle." (Lickfelt, Ex. 1012, [0024].) Lickfelt also discloses that the ECU 16 performs the steps of the method, e.g., "At 100, the ECU 16 (FIG. 1) polls for fobs, such as the fob 14." (Lickfelt, Ex. 1012, [0025].)

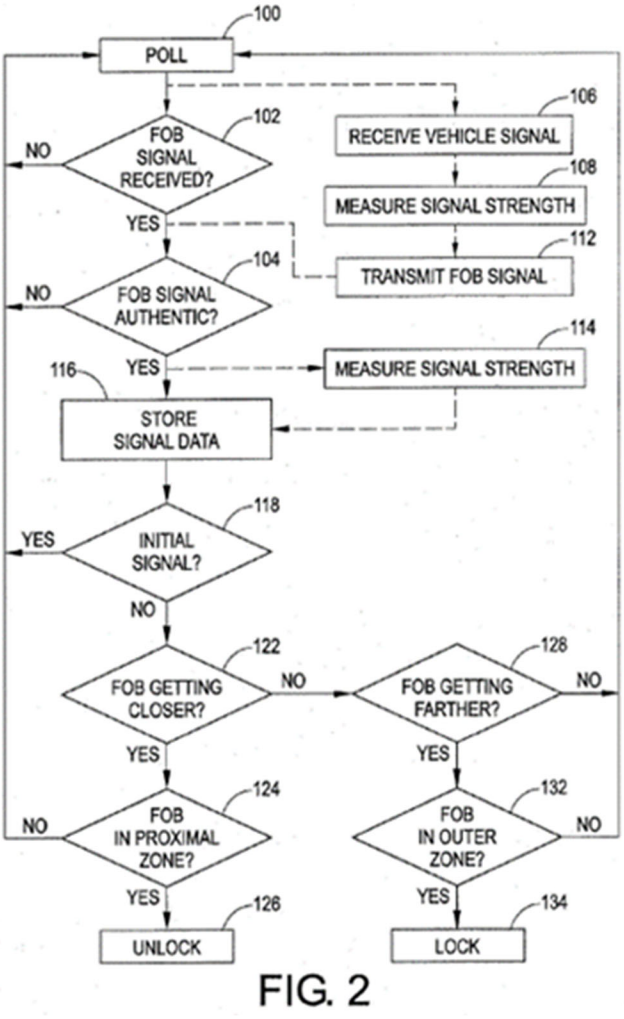


FIG. 2

Lickfelt, Ex. 1012, Fig. 2

455. A POSA would have understood that data, including the computer program associated with the method illustrated in Figure 2, would have been stored in memory 50. Semiconductor memory include volatile and non-volatile memory, both of which store data. (Bosch, Ex. 1050, 94-95; IEEE Dictionary, Ex. 1051, 684, 743, 1260.) Therefore, Lickfelt's memory 50 is a "*tangible and non-transient computer readable medium including microprocessor executable instructions*."

… ***[15a] (a) determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle;***

456. Claim limitation [15a] is substantially similar to limitation [1a] of claim 1. Claim [15a] requires "*determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*," whereas claim [1a] requires "*determining, by a microprocessor executable device discovery* [computer program]*, that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*." As explained for limitation [1a], Lickfelt discloses that the ECU 16 ("*device discovery* [computer program] *daemon*") determines whether the fob 14 ("*computational device*") is connected to or attempting to connect to the vehicle network.

457. Thus, Lickfelt discloses "*determining that a computational device is connected to or attempting to connect to a network and/or communication subsystem of a vehicle*."

… ***[15b] (b) in response, determining whether the computational device is located within a predetermined area and/or zone of the vehicle; and***

458. Claim limitation [15b] is substantially similar to claim limitation [1b] in claim 1. Claim [15b] requires "*in response, determining whether the*

computational device is located within a predetermined area and/or zone of the vehicle," whereas claim [1b] requires "*in response, determining, by the device discovery daemon, whether the computational device is located within a predetermined area and/or zone of the vehicle*." The only difference between the two limitations is that claim [15b] removes the term "*by the device discovery daemon*" that is required in claim [1b]. However, the rest of claim [15b] is identical to claim [1b], therefore, I refer back to my analysis of this limitation of claim 1 to establish that it is met by Lickfelt.

… ***[15c] (c) applying, by the device discovery daemon, at least the following rules:***

459. Limitation [15c] is identical to limitation [1c]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Lickfelt.

… ***[15d] (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***

460. Limitation [15d] is identical to limitation [1d]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Lickfelt.

… ***[15e] (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.***

461. Limitation [15e] is identical to limitation [1e]. Therefore, I refer back to my analysis of this limitation in claim 1 to establish that it is met by Lickfelt.

6. Dependent Claims 16, 18, and 20-21

462. Claims 16 and 18 depend on claim 15 which I understand means that claims 16 and 18 require all of the limitations of claim 15 in addition to their own limitations.

463. Lickfelt discloses all of the limitations of claim 15 as described above. (*See* ¶¶ 452-461.)

464. Claim 16 is largely duplicative of claim 2. To illustrate, the table below shows a side-by-side comparison of claims 2 and 16. Claim 16 is "marked up" to show the minor differences.

'697 Patent Claim 2	**'697 Patent Claim 16**
[2a] The method of claim 1,	**[16a]** The computer readable medium 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	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,	of predetermined areas and/or zones, to be used in applying the rules,
[2b] 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
[2c] 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.

… ***[16a] The computer readable medium 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,***

465. Limitation [16a] is substantially similar to limitation [2a]. Given that claim [16a] encompasses claim 15 which discloses a "*computer readable medium*," the rest of the language is identical to claim [2a]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

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

466. Limitation [16b] is identical to limitation [2b]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

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

467. Limitation [16c] is identical to limitation [2c]. Therefore, I refer back to my analysis of this limitation in claim 2 to establish that it is met by Lickfelt.

… ***[18] The computer readable medium of claim 15, wherein the determining function (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.

468. Claim 18 is largely duplicative of claim 4. To illustrate, the table below shows a side-by-side comparison of claims 4 and 18. Claim 18 is "marked up" to show the minor differences.

'697 Patent Claim 4	**'697 Patent Claim 18**
[4] The method of claim 1,	**[18]** The computer readable medium of claim 15,
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,	wherein the determining function (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 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 information	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

received by an on board vehicle sensor, whether the computational device is attempting to device, and input received from a user of the computational device.	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.

469. There are only two changes to claim 18 from claim 4: the claims they depend from are different, and claim 18 requires "*the determining function (b)*" whereas claim 4 requires "*the determining step (b)*." Neither difference is substantial to the meaning of the claim, thus I refer back to my analysis of claim 4 to establish that these limitations are met by Lickfelt.

> … ***[20] The computer readable medium of claim 18, 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.

470. Claim 20 depends on claim 18, therefore I understand that claim 20 includes all the limitations of claim 18, in addition to the limitations of claim 15.

471. Claim 20 is largely duplicative of claim 6. To illustrate, the table below shows a side-by-side comparison of claims 6 and 20. Claim 20 is "marked up" to show the minor differences.

'697 Patent Claim 6	**'697 Patent Claim 20**
[6] The method of claim 4,	**[20]** The computer readable medium of claim 18,
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	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,	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	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.	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.

472. Because the differences between claims 6 and 20 are not substantial, and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 6 to establish that these limitations are met by Lickfelt.

> … ***[21] The computer readable medium 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.***

473. Claim 21 depends on claim 20, therefore I understand that claim 21 includes all of the limitations of claim 20, in addition to the limitations of claim 15.

474. Claim 21 is largely duplicative of claim 7. To illustrate, the table below shows a side-by-side comparison of claims 7 and 21. Claim 21 is "marked up" to show the minor differences.

'697 Patent Claim 7	**'697 Patent Claim 21**
[7] The method of claim 6,	**[21]** The computer readable medium 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.	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.

475. Because the differences between claims 7 and 21 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 7 to establish that these limitations are met by Lickfelt.

D. Ground 4 – The Combination of Lickfelt and Ghabra Teaches all of the Limitations of Claims 3, 5, 10, 12, 17, and 19

1. Rationale to Combine

476. It would have been obvious to a POSA to combine the passive entry system for a vehicle as disclosed in Lickfelt, with the known technique of device discovery and positioning (localization) as disclosed in Ghabra to provide additional functionality and user convenience improvements including passive start functionality and improved security. A POSA would have understood that Lickfelt and Ghabra are complementary technologies that are combinable, for example, Lickfelt discloses that:

> A passive entry system and a method for remotely controlling door locks on a vehicle has been described with particularity. Modifications and alterations will occur to those upon reading and understanding the preceding detailed description.
>
> * * *
>
> It will be appreciated that various of the above-disclosed and other features and functions, or alternatives or varieties thereof, may be desirably combined into many other different systems or applications. Also that various presently unforeseen or unanticipated alternatives,

> modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

(Lickfelt, Ex. 1012, [0033]-[0034])

477. Lickfelt and Ghabra are from the same field – communication between a passive entry vehicle system and one or more portable devices:

> An example of an entry system for a vehicle includes a fob, a transmitter on the vehicle, a receiver on the vehicle, a control unit on the vehicle, and a vehicle lock in communication with the control unit.
>
> The fob…could be combined with or incorporated into other known devices such as a mobile phone or other small electronic device[s].

(Lickfelt, Ex. 1012, [0005], [0012].)

> The present invention relates in general to remote convenience and security systems for automotive vehicles, and, more specifically, to a wireless communication system for integrating functions of a two-way remote keyless entry system and a passive entry system.

(Ghabra, Ex. 1011, 1:16-20.)

478. Lickfelt and Ghabra both disclose vehicle systems that communicate with portable devices to determine the location of the fob and to facilitate control of specific vehicle functions from the portable device to provide for an enhanced user experience making the vehicle more useful and efficient:

> The ECU 16 is configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strength.

(Lickfelt, Ex. 1012, [0013].)

> [D]etermining whether the fob 14 is getting closer to or farther from the vehicle 12 is based on the measured signal strengths as determined in the RSSI circuit 22, which can be associated with the ECU 16 in the vehicle 12 or found in the fob 14. The method could further include keeping the door lock 24 in whichever state, locked or unlocked, that the door lock is currently in in response to signals received from the fob when the fob is in the hysteresis zone 34.

(Lickfelt, Ex. 1012, [0032].)

> The present invention relates in general to remote convenience and security systems for automotive vehicles, and, more specifically, to a wireless communication system for integrating functions of a two-way remote keyless entry system and a passive entry system.

(Ghabra, Ex. 1011, 1:16-20.)

a. Improved User Convenience through Passive Start Functionality

479. Both Lickfelt and Ghabra seek to improve the comfort and user convenience of operating a vehicle. For example, Lickfelt describes automatic locking/unlocking based on fob movement and zone location, improving user convenience and system reliability:

> The vehicle door lock 24 locks or unlocks in response to the ECU 16 determining that the fob 14 is getting closer to or farther from the vehicle 12 and that the fob is not located in the hysteresis Zone 34.

(Lickfelt, Ex. 1012, [0018].)

> The passive entry system 10 can also automatically lock the door locks 24 upon receiving a subsequent fob signal and determining that the fob 14 is within the external Zone 36... Accordingly, the lock 24 can automatically lock when an operator of the vehicle walks away from the vehicle 12.

(Lickfelt, Ex. 1012, [0022])

> The present invention has advantages of added convenience, faster response times, and increased security as results of integrating functionality of a passive entry system with a two-way RKE system having an active display.

(Ghabra, Ex. 1011, 2:13-16.)

480. Lickfelt discloses a vehicle 12 with a passive entry system 10 that includes an electronic control unit (ECU):

> [A] passive entry system 10 for a vehicle 12 includes a fob 14 that is configured to transmit and to receive signals. The entry system 10 further includes an ECU 16 on the vehicle 12.

(Lickfelt, Ex. 1012, [0010].)

481. Lickfelt further discloses that "[t]he ECU 16 is in communication with a transmitter 18 and a receiver 20" on the vehicle that communicates with a fob 14.

(Lickfelt, Ex. 1012, [0010].) The fob 14 may be any known fob or "could be combined with or incorporated into other known devices such as a mobile phone or other small electronic device[s]." (Lickfelt, Ex. 1012, [0012].) Lickfelt further discloses that the ECU 16 is "configured to determine whether the fob 14 is getting closer to or farther from the vehicle 12 based on the measured signal strength;" and based on the location of the fob 14, "unlock [or lock] the door lock 24." (Lickfelt, Ex. 1012, [0013], [0025], Figures 1-2.)

482. Similarly, Ghabra discloses a vehicle system that determines the location of a key fob ("localizing a fob") for passive entry and passive start vehicle functionality:

> [A] first preferred embodiment for **localizing a fob** in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

483. Lickfelt acknowledges prior art systems having passive start functionality in its background section (Lickfelt, Ex. 1012, [0001]), but does not disclose that its passive entry system 10 provides passive start functionality. A POSA would have been motivated to combine the passive entry system disclosed in

Lickfelt with the passive start system disclosed in Ghabra to yield predictable results, e.g., to expand the functionality of Lickfelt's system inside of the vehicle and to be able to interact with their vehicle in a "hands-free" manner within the passenger compartment, thereby eliminating the need for manual actuation for starting the vehicle. A POSA would have understood that the combination of Ghabra and Lickfelt would allow a user to keep their fob in their pocket/bag and would not have to take it out to start the vehicle, thereby increasing user convenience.

b. Improved Security

484. The addition of Ghabra's PEPS system to Lickfelt's passive entry system also provides the added benefit of improved security.

485. Lickfelt describes determining if a fob is authentic before granting access to the vehicle. However, Lickfelt does not describe how it determines such authenticity:

> If a reply signal is received at 102, then at 104, a determination is made as to whether the reply signal is authentic. More than one fob may transmit reply signals in response to the polling signal transmitted from the receiver 20. Only fobs associated with the vehicle 12 can unlock the door lock 24 (and perform other vehicle operations).

(Lickfelt, Ex. 1012, [0025].)

486. Prior art passive entry systems were susceptible to thieves intercepting wireless communication in a "relay attack." (Ghabra, Ex. 1011, 1:64-67.) Ghabra's

system provides improved security, e.g., "resistance to relay attacks" with faster response time by authenticating or authorizing a fob before allowing it to access the vehicle network by using unique identifier numbers or security codes sent using an ultra high frequency (UHF) signal. (Ghabra, Ex, 1011, 3:57-67, 4:8-29, 4:30-40, 6:55-58.)

487. Ghabra discloses that determining whether a fob is authorized or not is based on unique identifier numbers or security codes. Ghabra explains that after the LF wakeup signal is sent "RF transmitter 16 in base station 11 is used to broadcast a UHF challenge signal including [a] random number [to fob 12]." (Ghabra, Ex. 1011, 4:11-13.) Ghabra further explains that the fob 12 "passe[d] the random number through [a] known mathematical transformation. The resulting transformed number is included in [the] response data" sent back to the vehicle. (Ghabra, Ex. 1011, 4:13-19.) Then, the "microcontroller 13 checks the transformed number as received from the fob 12 with its own results of the transformation and determines the UHF response signal to be valid if the transformed numbers match." (Ghabra, Ex. 1011, 4:25-29.)

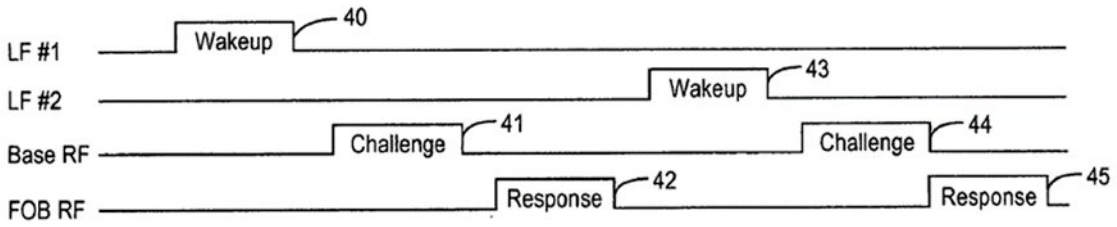


FIG.2

Ghabra, Ex. 1011, Fig. 2

488. A POSA would have understood that Ghabra's security strategy allows the fob or device and vehicle to communicate with one another by enabling the vehicle to send, receive, and verify communicated data (the fob/device may also send, receive, and verify communicated data). Such is an improvement of Lickfelt, which does not describe a specific authentication strategy.

489. A POSA would have also been motivated to combine Lickfelt and Ghabra because a POSA would have understood that using Ghabra's localization technique to restrict functionality based on location and authenticity of the fob provides an additional safety feature to the vehicle system. For example, the vehicle cannot be started using the passive engine start function unless an occupant is properly located in the passenger compartment. This eliminates the chance that the vehicle could be improperly started without an occupant in the passenger compartment or the vehicle altogether.

c. A POSA would have understood how to combine Lickfelt and Ghabra

490. A POSA would have understood how to combine Lickfelt and Ghabra. In terms of hardware modifications, a POSA would have modified Lickfelt's passive entry system to include at least one RF (or UHF) receiver and transmitter to enable the two-way communication model utilized in Ghabra. A POSA would have further modified Lickfelt's system to include sensors that provide a trigger signal in response to a user lifting a door handle or pressing an engine start switch.

491. Lickfelt discloses communicating with transmitters and receivers:

> With reference to FIG. 1, a passive entry system 10 for a vehicle 12 includes a fob 14 that is configured to transmit and to receive signals. The entry system 10 further includes an ECU 16 on the vehicle 12. The ECU 16 is in communication with a transmitter 18 and a receiver 20.

(Lickfelt, Ex. 1012, [0010].)

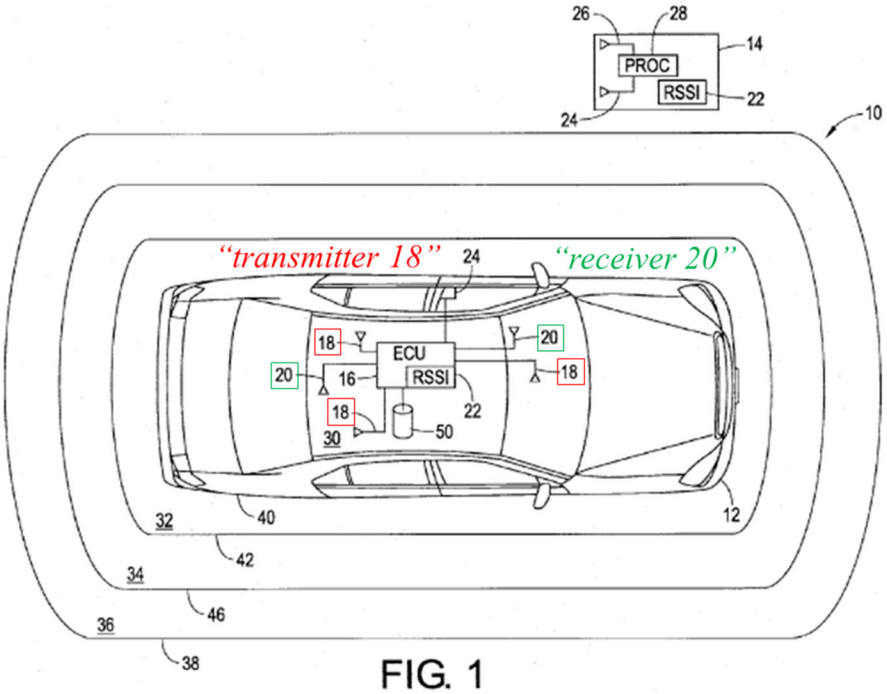


FIG. 1

Lickfelt, Ex. 1012, Fig. 1 (Annotated)

492. However, Lickfelt does not disclose the use of ultra high frequency (UHF) RF receivers and transmitters.

493. Ghabra discloses communicating with RF transmitters and receivers:

> Referring to FIG. 1, a vehicle 10 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.

(Ghabra, Ex. 1011, 2:63-67.)

494. Ghabra further discloses that the "RF transmitter 16 in base station 11 is used broadcast a UHF challenge signal…." (Ghabra, Ex. 1011, 4:11-13.) "The UHF challenge and response signals are sent with a much shorter time delay than if

they were sent at the low frequency" which reduces the time delay in authenticating a fob common with prior art systems utilizing LF signals. (Ghabra, Ex. 1011, 4:19-21, 2:4-10.)

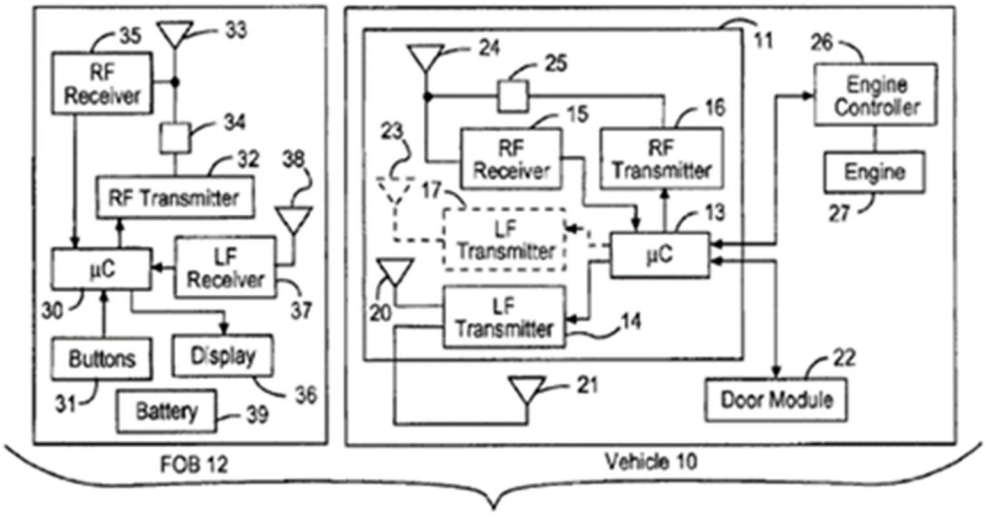


FIG.1

Ghabra, Ex. 1011, Fig. 1

495. The combination of Lickfelt and Ghabra also includes the addition of sensors that provide a trigger signal in response to a trigger event, e.g., lifting a door handle or pressing an engine start switch, such as those disclosed by Ghabra. (Ghabra, Ex. 1011, 3:10-15, 4:57-63.)

496. A POSA would have been motivated to combine Ghabra's additional receivers, transmitters, and vehicle sensors with Lickfelt's system to yield predictable results, e.g., two-way communication and trigger signal generation to optimize passive entry and passive start functionality.

497. Regarding software, a POSA would have been motivated to modify Lickfelt to include Ghabra's device discovery technique, e.g., as shown in the image below:

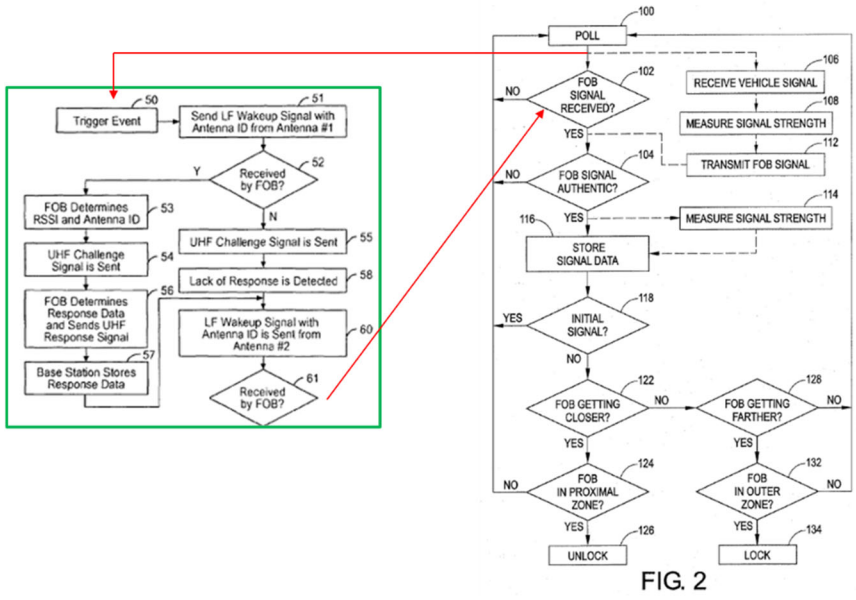


FIG. 2

Lickfelt, Ex. 1012, Fig. 2; Ghabra, Ex. 1011, Fig. 3 (Annotated)

498. The modification to Lickfelt's communication strategy would include the ECU sending out a signal to poll for devices in response to a triggering event and determining if a response signal was received, indicating that a new device is attempting to connect to the vehicle.

499. These modifications would have been a straightforward and well-known combination of known elements in the prior art, e.g., engine start buttons/sensors, yielding the predictable result of determining whether a new device signal was received by the vehicle control system.

500. Accordingly, a POSA would have been motivated to modify Lickfelt to include Ghabra's device discovery technique using two-way communication. This modification would have been a simple combination of known elements in the prior art, e.g., Ghabra's vehicle sensors for providing a trigger signal in response to start button activation, and transmitters/receivers, along with associated software.

2. Dependent Claims 3, 5, 10, 12, 17 and 19

d. Claim 3

501. Claim 3 depends on claim 1, which I understand means that claim 3 requires all of the limitations of claim 1 in addition to its own limitations.

502. Lickfelt discloses all of the limitations of claim 1 as described above. (*See* ¶¶ 363-393.)

… ***3[pre]. The method of claim 1, wherein step (a) comprises the substeps:***

503. As explained for limitation 1[pre], Lickfelt discloses a vehicle and a control unit of the vehicle with reference to Figure 1. Lickfelt further discloses "[a] method for remotely controlling locks on [the] vehicle [in Fig. 1]." (Lickfelt, Ex. 1012, Abstract, [0024], Figure 1.)

… ***[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

504. As explained for limitation [1a], Lickfelt discloses a vehicle 12 that includes an entry system 10 and an ECU 16 ("*device discovery* [computer program]"). (Lickfelt, Ex. 1012, [0010].) Lickfelt further discloses a fob 14 ("*computational device*") that transmits and receives signals from the vehicle 12; and that the fob 14 may be combined or incorporated with other devices, such as a mobile phone. (Lickfelt, Ex. 1012, [0010], [0012].)

505. Ghabra discloses passive entry and passive start systems that involve wireless communication between a vehicle base station 11 and a key fob 12.

> Referring to FIG. 1, a vehicle 10 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.

(Ghabra, Ex. 1011, 2:63-3:15.)

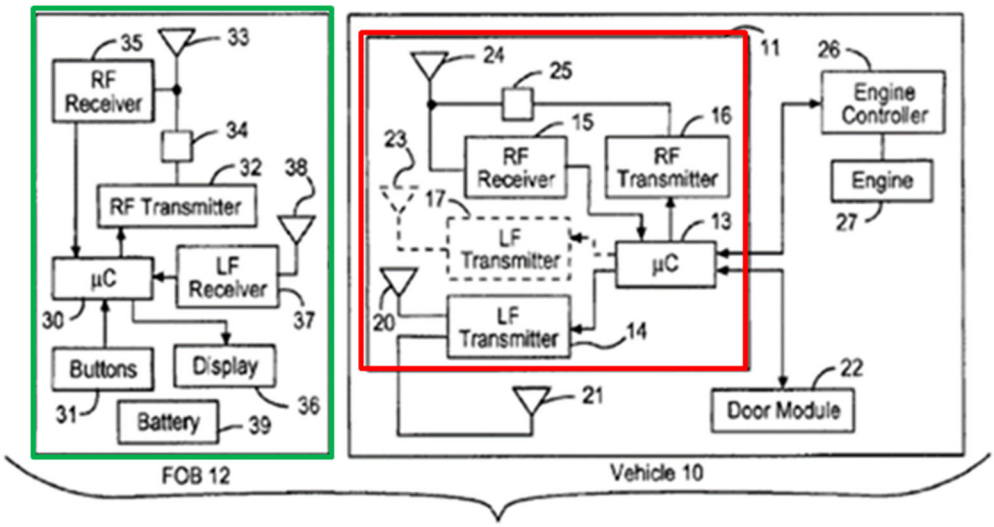


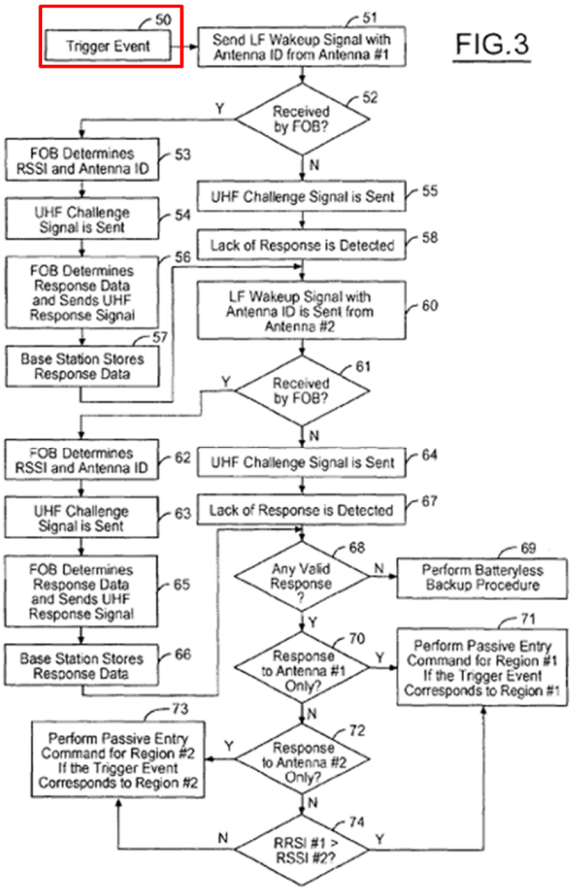
FIG.1

Ghabra, Ex. 1011, Fig. 1 (Annotated)

506. With reference to Figure 3, Ghabra discloses initiating wireless communication in response to a "trigger event":

> In step 50, 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)."

(Ghabra, Ex. 1011, 5:22-25.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

507. Ghabra discloses that the door module 22 includes a sensing switch ("*on board vehicle sensor*") that generates a trigger pulse when the handle is lifted and sends it to microcontroller 13, indicating an attempt to enter the vehicle 101 is being made:

> Referring to FIG. 1, a vehicle 10 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. In certain embodiments of the present invention, additional LF transmitters or LF antennas may be provided such as an LF transmitter 17. The additional

transmitters or antennas may be located in vehicle 10 remotely from base station 11 at an entry zone being monitored by a passive entry system, for example. A single LF transmitter 14 may also use a plurality of LF antennas at respective locations within the vehicle such as an LF antenna 20 deployed in base station 11 and an LF antenna 21 disposed near a door module 22 in vehicle 10 (e.g., in a side view mirror housing). Door module 22 is coupled to microcontroller 13 and may preferably include a sensing switch for detecting the lifting of a door handle and a power lock mechanism for remotely locking and unlocking a corresponding door lock. If a separate LF transmitter 17 is used, an LF antenna 23 is coupled thereto.

(Ghabra, Ex. 1011, 2:63-3:15.)

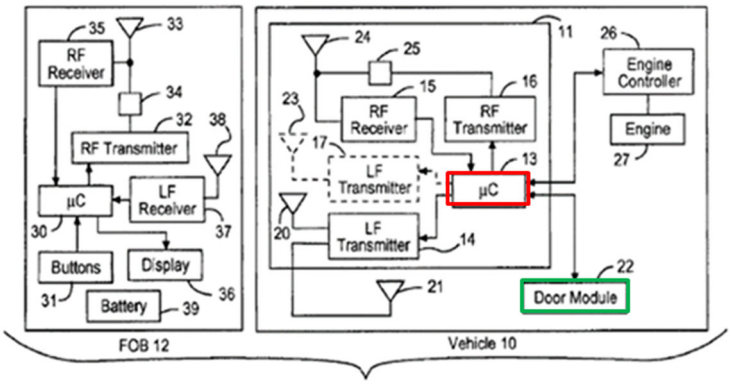


FIG.1

Ghabra, Ex. 1011, Fig. 1 (Annotated)

508. A POSA would have understood that by lifting the door handle, this indicates that a new occupant is entering or attempting to enter the vehicle.

509. Ghabra also discloses an embodiment in which a trigger event occurs in response to a user pressing an engine start switch ("*on board vehicle sensor*") which in turn provides a trigger signal:

> FIG. 2 shows a first preferred embodiment for localizing a fob in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

510. A POSA would have understood that the trigger signal generated by the engine start switch ("*on board vehicle sensor*") also provides an indication, or "*information that a new occupant has entered the vehicle*."

511. As I explained in the rational to combine section, the combination of Lickfelt and Ghabra includes Lickfelt's ECU 16 and Ghabra's sensors that provide a trigger signal in response to a triggering event.

512. Accordingly, the combination of Lickfelt and Ghabra teaches "*receiving, by the device discovery* [computer program]*, information from an on board vehicle sensor that a new occupant has entered the vehicle* [e.g., a trigger signal from the engine start switch, or door module]."

513. Ghabra also discloses determining whether a fob is authorized by using unique identifier numbers or security codes. For example, Ghabra discloses:

> The LF wakeup signal has a known format including an operation code for identifying the signal as a wakeup signal and preferably also including an antenna identifier unique to the antenna being used to transmit each LF wake-up signal. Localization of the fob is necessary to ensure that a person carrying an authorized fob is properly located in the area where the passive function is being requested (e.g., located outside the door with the triggering door handle for a passive entry function and located within the passenger compartment for a passive engine start function).

(Ghabra, Ex, 1011, 3:57-67.)

> For example, microcontroller 13 in base station 11 generates a random number to be used as a seed number in a secret mathematical transformation that is also known to microcontroller 30 in fob 12. RF transmitter 16 in base station 11 is used broadcast a UHF challenge signal including the random number. RF receiver 35 in fob 12 receives the UHF challenge signal and microcontroller 30 passes the random number through the known mathematical transformation. The resulting transformed number is included in response data together with the RSSI signal and a fob identifier for inclusion in a UHF response signal broadcast via RF transmitter 32 and antenna 33. The UHF challenge and response signals are sent with a much shorter time delay than if they were sent at the low frequency. The challenge and response may both be sent at 9.6 k baud, for example. The UHF response signal is

> received by RF receiver 15 via antenna 24 in base station 11 and is processed by microcontroller 13 in a known manner. For instance, microcontroller 13 checks the transformed number as received from fob 12 with its own results of the transformation and determines the UHF response signal to be valid if the transformed numbers match.

(Ghabra, Ex. 1011, 4:8-29.)

> Fob 12 and base station 11 also function to provide remote keyless entry functions in a conventional manner. Thus, when a user presses a manual input key (i.e., push button) 31 for a desired remote control function, a UHF control signal incorporating a remote control message having a corresponding function identifier and a pre-assigned fob ID is broadcast. When base station 11 receives a UHF control signal, it validates the fob ID and any security codes and then initiates the remote control function via a vehicle message sent from base station controller 13 to an actuator such as door module 22 or engine controller 26.

(Ghabra, Ex. 1011, 4:30-40.)

514. A POSA would have understood that an "authorized fob" can include a fob that has been previously connected to the vehicle communication system, thus it is recognizable. A POSA would also have understood that the process of authorizing the fob provides an indication "*that a new occupant*" is attempting to connect to the vehicle or "*has entered the vehicle*."

… ***[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

515. Ghabra discloses transmitting a wakeup signal 40 ("*ping*"), in response to receiving a trigger signal ("*information*") that indicates lifting a door handle of pressing an engine start button, to awaken ("*discover*") the fob, and then sending a challenge signal 41:

> FIG. 2 shows a first preferred embodiment for localizing a fob in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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). A first LF wakeup signal 40 is generated from a first antenna preferentially transmitting to a first area with respect to the vehicle (e.g., outside the vehicle adjacent to a particular door or other closure such as a trunk). After waiting an amount of time sufficient to allow the fob to awaken, the base station sends a challenge signal 41 via the base station RF transmitter and antenna.

(Ghabra, Ex. 1011, 4:57-5:3.)

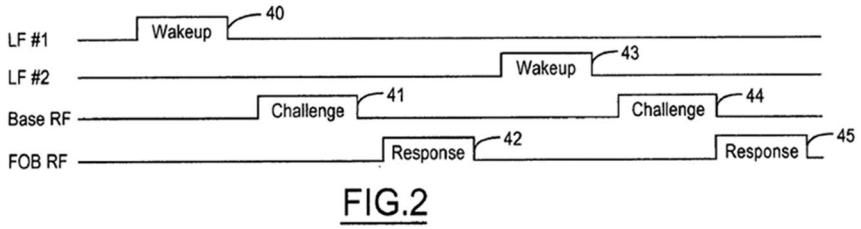
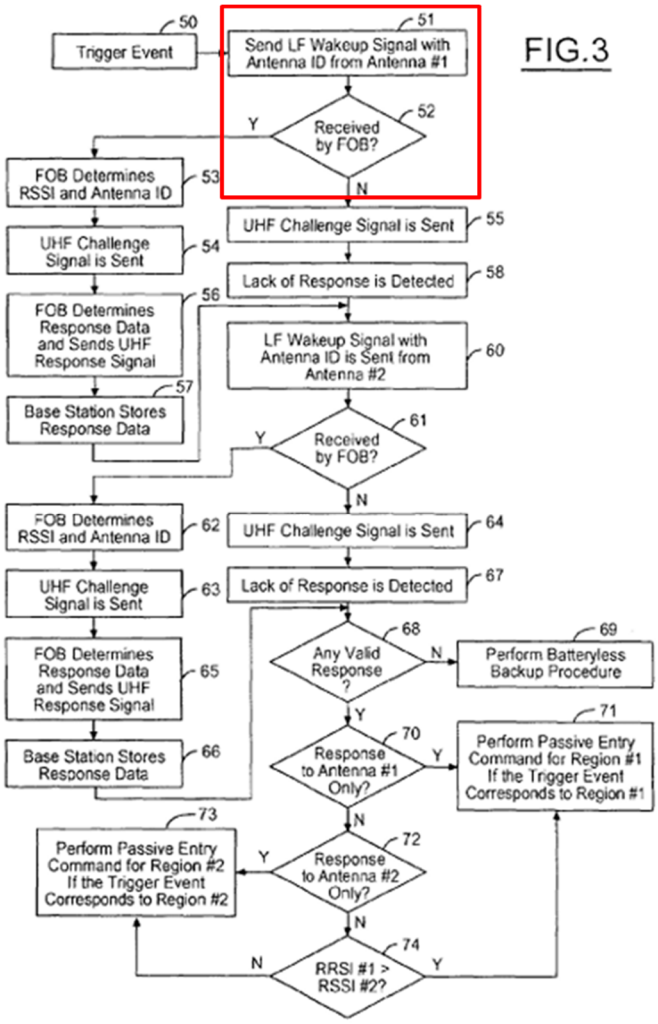


FIG.2

Ghabra, Ex. 1011, Fig. 2

516. Ghabra further discloses, with reference to Figure 3, that "[a]n LF wakeup signal with a corresponding antenna ID is sent in step 51 from the first antenna. At point 52, either a fob is actually present or not in the area being interrogated by the first antenna." (Ghabra, Ex. 1011, 5:25-28.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

517. As I explained above with reference to the rational to combine Lickfelt and Ghabra, a POSA would have been motivated to modify Lickfelt's vehicle control strategy described with reference to Figure 2 to include Ghabra's "*device discovery*" technique in response to a triggering event as shown in the image below, along with corresponding transmitters and receivers to interrogate an area for a fob:

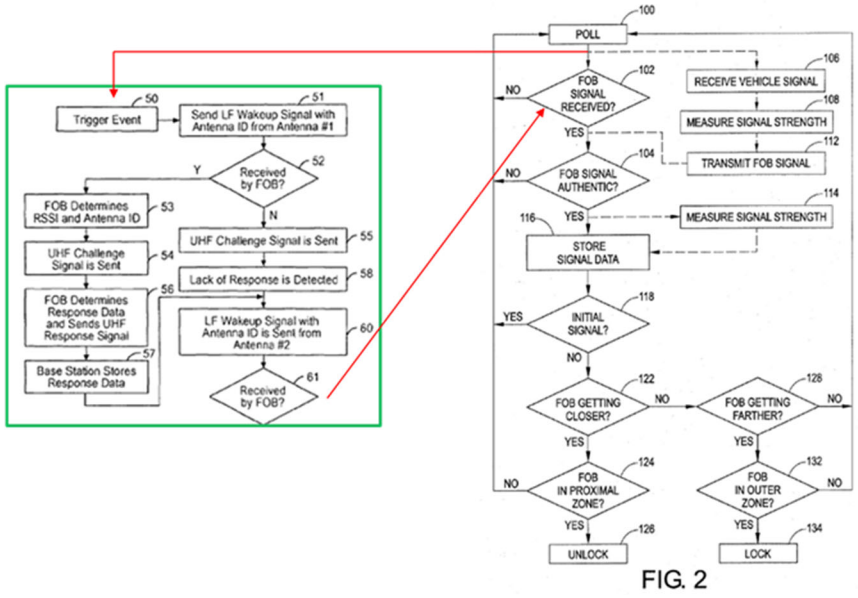


FIG. 2

Lickfelt, Ex. 1012, Fig. 2; Ghabra, Ex. 1011, Fig. 3 (Annotated)

518. Thus, the combination of Lickfelt and Ghabra teaches, "*in response to the receipt of the information* [trigger signal]*, emitting, by the device discovery* [computer program]*, a ping to discover the computational device* [transmitting a wakeup signal from a first antenna and sending a challenge signal from the base station to interrogate an area for a fob]."

> … ***[3c] 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.***

519. Ghabra discloses that once the wakeup signal 40 is sent, the base station waits for a response signal 42 indicating whether the fob is attempting to connect to the vehicle network. (Ghabra, Ex. 1011, 5:31-38.) Ghabra further discloses:

After waiting an amount of time sufficient to allow the fob to awaken, the base station sends a challenge signal 41 via the base station RF transmitter and antenna. If the fob is in fact in the first area being preferentially transmitted to, then after receiving the challenge signal and formulating response data the fob RF transmitter sends a UHF response signal 42. When the fob is located in the area, then the response includes RSSI data showing strong reception. If outside the first area, then the RSSI data will reflect a weak signal. If the fob is not close enough to the target area, the wakeup signal will not have been received and there will no response to the challenge signal at all. In order to poll an additional location, an LF wakeup signal 43 is sent via a second LF antenna preferentially transmitting to a second area (e.g., inside the vehicle). Following sufficient time to allow a fob to awaken, a UHF challenge signal 44 is sent via the RF transmitter in the base station. **If 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**.

(Ghabra, Ex. 1011, 4:67-5:19.)

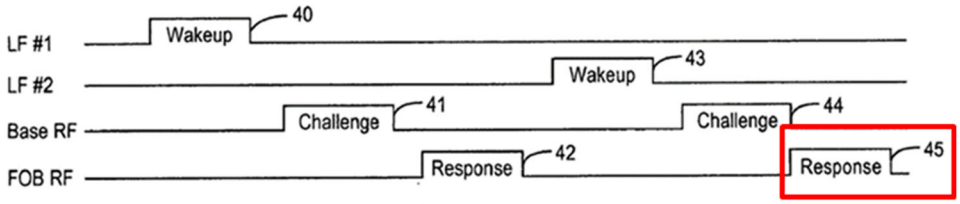


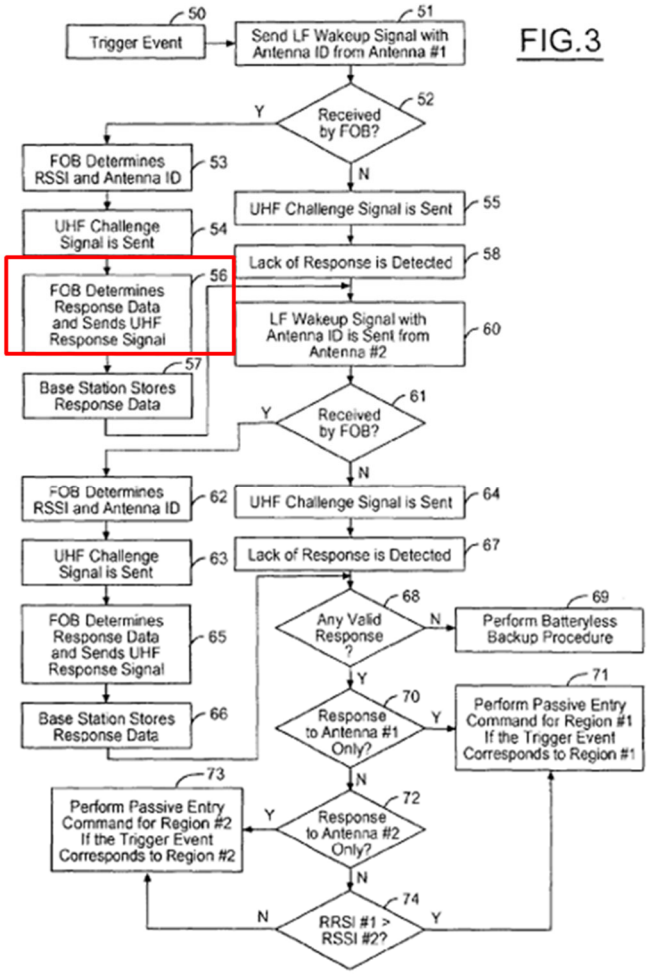
FIG.2

Ghabra, Ex. 1011, Fig. 2 (Annotated)

520. Ghabra further discloses:

If the UHF challenge signal is received by a fob, then the fob determines response data and sends a UHF response signal in step 56. In step 57, the base station stores the response data. If no fob is awakened or an awakened fob fails to send a valid response signal, then the lack of a response is detected in step 58.

(Ghabra, Ex. 1011, 5:33-38.)



Ghabra, Ex. 1011, Fig. 3 (Annotated)

521. 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 connect to the vehicle network. The presence of the response signal 45 confirms that the fob was successfully awakened and is therefore actively engaging in communication with the vehicle. A POSA would have recognized that such response only occurs when the device is within the proper zone, receives the challenge signal and responds within the expected timing window, thereby signaling an attempt to connect with the vehicle, e.g., to unlock a door or start the vehicle.

522. As I explained above regarding the rational to combine Lickfelt and Ghabra, a POSA would have been motivated to modify Lickfelt's vehicle control strategy described with reference to Figure 2 to include Ghabra's device discovery technique including receipt of a response signal from a fob as shown in the image below:

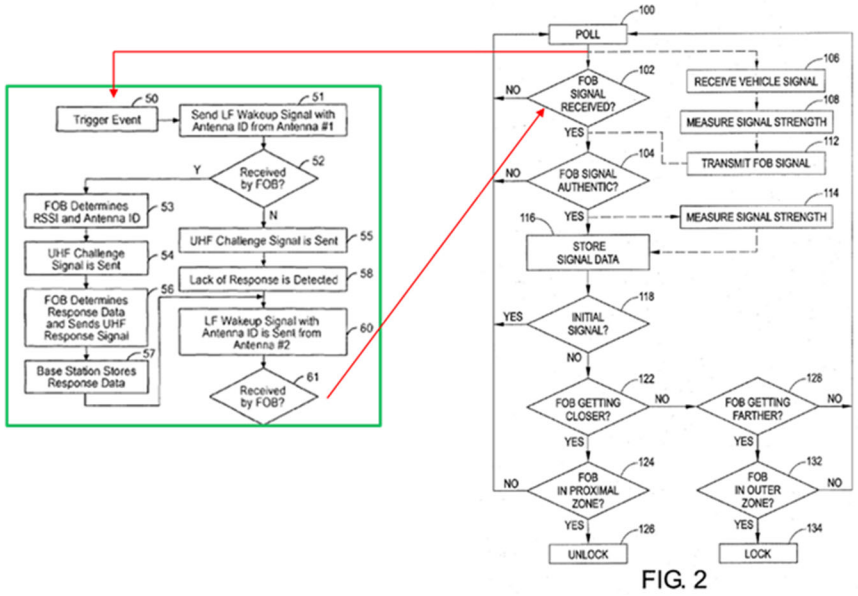


FIG. 2

Lickfelt, Ex. 1012, Fig. 2; Ghabra, Ex. 1011, Fig. 3 (Annotated)

523. Thus, the combination of Lickfelt and Ghabra teaches "*when a responsive signal is received from the computational device* [e.g. response 45]*, determining, by the device discovery* [computer program]*, that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle*."

e. Claim 5

… ***[5a] The method of claim 4, ~~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***

524. Claim 5 depends on claim 4, therefore I understand that claim 5 includes the limitations of claim 4, in addition to the limitations of claim 1.

525. Claim [5a] is largely duplicative of claim [1d]. To illustrate, the table below shows a side-by-side comparison of claims [5a] and [1d].

'697 Patent Claim [5a]	**'697 Patent Claim [1d]**
[5a] The method of claim 4, ~~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	**[1d] (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

526. I understand the additional "*wherein the*" phrase at the beginning of claim 5 to be a typographical error, so I have shown it with strikethrough text above.

527. Due to the similarities in the claims, I refer back to my analysis of this limitation in claim [1d] to establish that it is met by Lickfelt.

… ***[5b] wherein the device discovery daemon determines a <u>set of</u> tasks, functions, and/or <u>operations</u> 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.

528. Lickfelt discloses that the ECU 16 unlocks the lock 24 "[i]f it is determined that both the fob 14 is getting closer to the vehicle, at 122, and that the last signal sent from the fob 14 to the receiver 20 was sent with the fob located within the proximal zone 34 [*sic* 32], at 124." (Lickfelt, Ex. 1012, [0027].)

529. Lickfelt also discloses that the ECU 16 locks the lock 24 if it determines that the fob 14 is "getting farther from the vehicle . . . [and] within the outer zone 36." (Lickfelt, Ex. 1012, [0023].)

530. Lickfelt further discloses "keeping the door lock 24 in whichever state, locked or unlocked, that the door lock is currently in in response to signals received from the fob when the fob is in the hysteresis zone 34." (Lickfelt, Ex. 1012, [0032].)

531. Lickfelt also discloses that the ECU 16 can determine whether to "unlock the door lock 24 (and perform other vehicle operations)" based on authorizing or authenticating the fob 14:

> At 100, the ECU 16 (FIG. 1) polls for fobs, such as the fob 14. At 102, a determination is made as to whether a reply signal is received from a fob. If no reply signal is received, at 102, the algorithm reverts to 100 and continues to poll for fobs. If a reply signal is received at 102, then at 104, a determination is made as to whether the reply signal is authentic. More than one fob may transmit reply signals in response to the polling signal transmitted from the receiver 20. Only fobs associated

> with the vehicle 12 can unlock the door lock 24 (and perform other vehicle operations). Accordingly, if the reply signal received by the receiver 20 is determined to be not authentic, at 104, then the ECU 16 continues to poll for fobs that are associated with the vehicle 12.

(Lickfelt, Ex. 1012, [0025].)

532. Lickfelt does not expressly describe what "other vehicle operations" are referenced in paragraph 25.

533. Ghabra discloses a passive start system, i.e., a vehicle system that determines the location of a key fob ("localizing a fob") for passive entry and passive start vehicle functionality:

> [A] first preferred embodiment for **localizing a fob** in a passive entry sequence wherein it is desired to determine whether the fob is outside the vehicle in the vicinity of a particular door (i.e., when a door unlock request 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).

(Ghabra, Ex. 1011, 4:57-63.)

534. Thus, a POSA would have recognized that the combination of Lickfelt and Ghabra teaches "*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 wherein the device discovery* [computer program] *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 [e.g. door lock/unlock and engine start]."

f. Claim 10

535. Claim 10 depends on claim 8, which I understand means that claim 10 requires all the limitations of claim 8 in addition to its own limitations.

536. Lickfelt teaches all of the limitations of claim 8, as described above. (*See* ¶¶ 429-437.)

537. Claim 10 is largely duplicative of claim 3. To illustrate, the table below shows a side-by-side comparison of claims 3 and 10. Claim 10 is "marked up" to show the minor differences.

'697 Patent Claim 3	**'697 Patent Claim 10**
3[pre]. The method of claim 1, wherein step (a) comprises the substeps:	**10[pre].** The vehicle of claim 8, wherein operation (a) comprises the suboperations:
[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;	**[10a]** receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;

[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and	**[10b]** in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and
[3c] 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.	**[10c]** 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.

… ***10[pre]. The vehicle of claim 8, wherein operation (a) comprises the suboperations:***

538. Limitation 10[pre] is substantially similar to limitation 3[pre]. Claim 10[pre] requires "*the vehicle…wherein operation (a) comprises the suboperations*…." Claim 3[pe] requires "*the method…wherein step (a) comprises the substeps*…." Because claim 10 depends on claim 8, which discloses a "*vehicle*," and the rest of the language is only minimally different from claim 3[pre], I refer

back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[10a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

539. Limitation [10a] is identical to limitation [3a]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[10b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

540. Limitation [10b] is identical to limitation [3b]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[10c] 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.***

541. Limitation [10c] is identical to limitation [3c]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

g. Claim 12

… [12a] The vehicle of claim 11, 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

… [12b] 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.

542. Claim 12 depends on claim 11, therefore I understand that claim 12 includes the limitations of claim 11, in addition to the limitations of claim 8.

543. Claim 12 is largely duplicative of claim 5. To illustrate, the table below shows a side-by-side comparison of claims 5 and 12. Claim 12 is "marked up" to show the minor differences.

'697 Patent Claim 5	**'697 Patent Claim 12**
[5a] The method of claim 4,	**[12a]** The vehicle of claim 11,
wherein the wherein the computational device determined to be located within the predetermined area and/or zone of the vehicle and is	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	permitted to access or attempt to access the vehicle network and/or communication subsystem and
[5b] 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.	**[12b]** 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.

544. Because as shown above the differences between claims 5 and 12 are not substantial and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 5 to establish that these limitations are met by the combination of Lickfelt and Ghabra.

h. Claim 17

545. Claim 17 depends on claim 15, which I understand means that claim 17 requires all the limitations of claim 15 in addition to its own limitations.

546. The combination of Lickfelt and Ghabra teaches all of the limitations of claim 15 as described above. (*See* ¶¶ 452-461.)

547. Claim 17 is largely duplicative of claim 3. To illustrate, the table below shows a side-by-side comparison of claims 3 and 17. Claim 17 is "marked up" to show the minor differences.

'697 Patent Claim 3	**'697 Patent Claim 17**
3[pre]. The method of claim 1, wherein step (a) comprises the substeps:	**17[pre].** The computer readable medium of claim 15, wherein function (a) comprises the subfunctions:
[3a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;	**[17a]** receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;
[3b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and	**[17b]** in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and

[3c] 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, determining, by the device discovery daemon, that the computational device is attempting to connect to a network and/or communication subsystem of a vehicle.

… ***17[pre]. The computer readable medium of claim 15, wherein function (a) comprises the subfunctions:***

548. Limitation 17[pre] is substantially similar to limitation 3[pre]. Claim 17[pre] requires "*the computer readable medium…wherein function (a) comprises the subfunctions . . . .*" Claim 3[pre] requires "*the method…wherein step (a) comprises the substeps. . . . .*" Because claim 17 depends on claim 15 which discloses a "*computer readable medium*," and the rest of the language is only minimally different to claim 3[pre], I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[17a] receiving, by the device discovery daemon, information from an on board vehicle sensor that a new occupant has entered the vehicle;***

549. Limitation [17a] is identical to limitation [3a]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[17b] in response to the receipt of the information, emitting, by the device discovery daemon, a ping to discover the computational device; and***

550. Limitation [17b] is identical to limitation [3b]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

… ***[17c] 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.***

551. Limitation [17c] is identical to limitation [3c]. Therefore, I refer back to my analysis of this limitation in claim 3 to establish that it is met by the combination of Lickfelt and Ghabra.

i. Claim 19

… ***[19a] The computer readable medium of claim 18, 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.***

552. Claim 19 depends on claim 18, therefore I understand that claim 19 includes all the limitations of claim 18, in addition to the limitations of claim 15.

553. Claim 19 is largely duplicative of claim 5. To illustrate, the table below shows a side-by-side comparison of claims 5 and 19. Claim 19 is "marked up" to show the minor differences.

'697 Patent Claim 5	**'697 Patent Claim 19**
[5a] The method of claim 4,	**[19a]** The computer readable medium of claim 18,
~~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	~~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

[5b] 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.

554. Because the differences between claims 5 and 19 are not substantial, and they contain identical language other than the claims they depend from, I refer back to my analysis of claim 5 to establish that these limitations are met by the combination of Lickfelt and Ghabra.

VIII. Objective Indicia Does Not Support Patentability

555. Considering the information that I have reviewed, my general knowledge of the field of vehicle communication systems and limiting access to vehicle systems based on the location of a mobile device, and publications within that and related fields, I am not aware of any objective evidence that might support the patentability of the claims of the ’697 Patent. Further, from my review of the file history (Ex. 1002) of the ’697 Patent, I did not see that the applicant raised any

secondary indicia of non-obviousness during prosecution. I am not otherwise aware of any publicly available evidence of secondary indicia of non-obviousness. Should any alleged secondary indicia of non-obviousness be presented, I reserve the right to provide an opinion thereon.

IX. Conclusion

556. In my opinion, all the elements of the challenged claim limitations are disclosed by the references discussed above and that the claims are unpatentable in view of these prior art references.

557. I reserve the right to supplement my opinions to address any information obtained, or positions taken, based on any new information that comes to light throughout this proceeding.

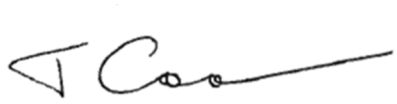
* * *

In signing this declaration, I recognize that the declaration will be filed as evidence in a case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross-examination and that cross-examination will take place within the United States. If cross-examination is required, I will appear for cross-examination during the time allotted.

I hereby declare that all statements made herein of my own knowledge are true and all statements made herein on information and belief were and are believed

by me to be true, and that all statements herein were and are made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code.

Executed on: July 23, 2025



Todor Cooklev, Ph. D.