

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW OF NORTH AMERICA, LLC,

Petitioner,

v.

NORTHSTAR SYSTEMS, LLC,

Patent Owner.

Case No. IPR2023-01191
U.S. Patent No. 8,805,416

DECLARATION OF SAMUEL P. PULLEN, PhD

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I. INTRODUCTION

1. I have been retained by BMW of North America, LLC (“Petitioner”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office.

2. I am over 21 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein.

3. I understand that this proceeding involves U.S. Patent No. 8,805,416 (“the ’416 patent,” Ex. 1001). The application for the ’416 patent was filed February 14, 2008, and is a divisional of U.S. application Ser. No. 09/682,600 filed September 25, 2001, which is a continuation-in-part of U.S. application Ser. No. 09/690,001, filed October 16, 2000.

4. I have been asked by Petitioner to provide my opinion on whether the claims of the ’416 patent would have been obvious to a person of ordinary skill in the art at the time of the earliest possible priority date of the ’416 patent. In performing my analysis, I have been asked to review the earliest claimed priority application, filed October 16, 2000, and to determine whether the claims of the ’416 patent are supported by the earliest claimed priority application or a later-filed application. My opinions are set forth below.

5. Throughout this declaration, I refer to specific pages, figures, and/or line numbers of various exhibits. These citations are illustrative and are not

intended to suggest that they are the only support for the propositions for which they are cited.

II. SUMMARY OF OPINIONS

6. This declaration considers claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the '416 patent. Below, I set forth the opinions I have formed, the conclusions I have reached, and the bases for these opinions and conclusions. I believe the statements contained in this declaration to be true and correct to the best of my knowledge.

7. Based on my experience and knowledge of the art at the time of the applicable priority date, it is my opinion that claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the '416 patent would have been obvious based on the asserted grounds discussed below.

8. I am being compensated for my time at my normal hourly rate. My compensation is in no way contingent upon the nature of my findings, the presentation of my findings in testimony, or the outcome of this proceeding.

III. QUALIFICATIONS AND BACKGROUND

9. I believe that I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below.

10. I am competent to write this declaration.

11. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. A copy of my current Curriculum Vitae (CV) is provided as Exhibit 1004, and it provides a comprehensive description of my academic and employment history.

12. I am a part-time Senior Research Engineer in the Department of Aeronautics and Astronautics at Stanford University, as well as an independent technical consultant. I have worked with navigation system technology, such as GPS and GNSS (Global Navigation Satellite System) navigation systems, inertial navigation systems, and test procedures to support such systems for more than 25 years. My experience includes requirements and specification development, system development, system implementation, and verification testing. I am familiar with the subject matter of this case and consider myself an expert in, among other things, the fundamentals of navigation systems, GNSS (satellite) and related navigation systems, the fusion of GNSS with other navigation technologies, and the application of those technologies to aircraft, ships, and land vehicles.

13. I received two Bachelor of Science degrees in Aeronautics and Astronautics and History from the Massachusetts Institute of Technology (“MIT”) in 1989. I received a Master of Science degree in Aeronautics and Astronautics, with an emphasis on guidance and control systems, from Stanford in 1990, and I received my Ph.D. in Aeronautics and Astronautics from Stanford in 1996. My

Ph.D. thesis is entitled “Probabilistic Engineering Design Optimization: Applications to Spacecraft and Navigation Systems.”

14. From 1996 through the present, I have worked as a consultant (mostly self-employed and also for NavAstro of Los Gatos, California) on many projects involving navigation systems, including the conceptual development of GNSS systems, providing technical support for algorithm design, testing, and validation for Local Area Augmentation System (LAAS) and Ground-based Augmentation System (GBAS), and for system architecture, algorithm design, and requirements assessment of the U.S. Navy’s Joint Precision Approach and Landing System (JPALS). I have also worked on the GPS III Modernization efforts for the DOD GPS Joint Program Office.

15. In 1996, upon completing my Ph.D., I began working at the Hansen Experimental Physics Laboratory (“HEPL”) at Stanford University. While at HEPL, I developed, installed, and validated the first LAAS ground system prototype that included all of the real-time integrity verification algorithms needed to meet the LAAS safety requirements. I also provided research support to several projects, including the Wide Area Augmentation System (WAAS), Satellite-based Augmentation Systems, and JPALS integrity verification. I also taught a graduate-level course called “AA279 – Space Mechanics,” and I am a guest lecturer for the “Global Positioning Systems” course and other courses in the Aero/Astro

department. In 2007, I moved to the Aeronautics and Astronautics Department and continued my work, expanding it to include the integrity of other GNSS and applications such as Precise Point Positioning (PPP) and the combination of GNSS with other sensors. I have been and remain the head of the GBAS/LAAS research project, where I oversee a small team of engineers and graduate students working on algorithm research, safety assurance, prototype development, and test and validation.

16. I have been recognized for my contributions to the technology and development of navigation systems and have served on several professional committees in the industry. For example, I received the Institute of Navigation (ION) Early Achievement Award in 1999 and was honored with the ION GPS/GNSS Conference “Best Paper” Award four times—in 1999, 2000, 2001, and 2009. Also, I currently serve as a reviewer for industry journals such as IEEE, AIAA, and ION, and I was the Associate Editor for Navigation for *IEEE Transactions on Aerospace and Electronic Systems* from 2007-2015. I have also chaired several conferences for ION, IEEE, and others. I was elected as a Fellow of the ION in 2017.

17. In addition to my professional recognition, I am a co-inventor of U.S. Patent No. 6,667,713, entitled “Self-Monitoring Satellite System.” As shown in my CV (Ex. 1004), I have also authored or co-authored more than 100 book chapters,

reports, journal papers, industry magazine articles, and conference papers on various topics related to navigation systems, including GBAS, GNSS, GPS, and have been an invited speaker at more than 30 navigation-related conference and seminars since 2003.

IV. MATERIALS CONSIDERED

18. In forming my opinions, I have reviewed the following documents and any other document cited in this declaration.

Exhibit	Description
Ex. 1001	U.S. Patent No. 8,805,416 (“the ’416 patent”)
Ex. 1002	File History of U.S. Patent No. 8,805,416
Ex. 1005	U.S. Patent No. 6,195,022 to Yamakita (“Yamakita”)
Ex. 1007	U.S. Patent No. 6,427,120 to Garin et al. (“Garin”)
Ex. 1008	U.S. Patent Application Publication No. 2003/0060211 to Chern et al. (“Chern”)
Ex. 1009	U.S. Patent No. 7,822,635 to Brown et al. (“ <i>Brown</i> ”)
Ex. 1010	U.S. Patent No. 6,226,589 to Maeda et al. (“ <i>Maeda</i> ”)
Ex. 1011	WIPO Publication No. WO2000/22593 to Drury et al. (“ <i>Drury</i> ”)
Ex. 1012	WIPO Publication No. WO2000/03364 to Obradovich et al. (“ <i>Obradovich</i> ”)
Ex. 1013	U.S. Patent No. 5,867,110 to Naito et al. (“ <i>Naito</i> ”)
Ex. 1014	File History of U.S. Patent Application No. 09/690,001 (’001 application)
Ex. 1015	Comparison of the ’416 patent and the ’001 application

Exhibit	Description
Ex. 1016	File History of U.S. Patent Application No. 09/682,600
Ex. 1017	U.S. Patent No. 6,522,888 to Garceran et al. (“ <i>Garceran</i> ”)
Ex. 1018	U.S. Patent No. 6,115,611 to Kimoto et al. (“ <i>Kimoto</i> ”)
Ex. 1019	Ian D. Kitching, “GPS and Cellular Radio Measurement Integration,” <i>Journal of Navigation</i> , Vol. 53, No. 3, September 2000, pp. 451-463. (Available at https://www.cambridge.org/core/journals/journal-of-navigation/article/abs/gps-and-cellular-radio-measurement-integration/C563A3AE053461124A4127E6B9B2DD13). (“ <i>Kitching</i> ”)
Ex. 1020	Goran M. Djuknic and Robert E. Richton, “Geolocation and Assisted GPS,” <i>Computer (IEEE)</i> , Vol. 34, No. 2, February 2001, pp. 123-125. (Available at https://doi.org/10.1109/2.901174). (“ <i>Djuknic</i> ”)

19. I have also relied on my education, experience, research, training, and knowledge in the relevant art, and my understanding of any applicable legal principles described in this declaration.

20. All the opinions contained in this declaration are based on the documents I reviewed and my knowledge and professional judgment. My opinions have also been guided by my understanding of how a person of ordinary skill in the art would have understood the claims of the ’416 patent.

21. I reserve the right to supplement and amend any of my opinions in this declaration based on documents, testimony, and other information that becomes available to me after the date of this declaration.

V. LEGAL STANDARDS

22. I am not a lawyer. My understanding of the legal standards to apply in reaching the conclusions in this declaration is based on discussions with counsel for Petitioner, my experience applying similar standards in other patent-related matters, and my reading of the documents submitted in this proceeding. In preparing this declaration, I have tried to faithfully apply these legal standards to the challenged claims.

23. I have been informed that there are two ways in which prior art may render a patent claim unpatentable. First, I have been informed that the prior art can “anticipate” a claim. Second, I have been informed that the prior art can render a claim “obvious” to a person of ordinary skill in the art. I understand that a claim is patentable if it was not anticipated and would not have been obvious in view of the prior art as of the effective filing date of the patent.

24. I have been informed that a dependent claim is a patent claim that refers back to another patent claim. I have been informed that a dependent claim includes all the limitations of the claim to which it refers.

25. I have been asked to provide my opinions as to whether the cited prior art discloses or renders obvious claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the '416 patent from the perspective of a person of ordinary skill in the art at the '416 patent's earliest priority date in 2001, as described in more detail below.

26. I have been informed that in *inter partes* review proceedings, such as this one, the party challenging the patent bears the burden of proving unpatentability by a preponderance of the evidence. I understand that a preponderance of the evidence means "more likely than not."

27. For the purposes of this declaration, I have been asked to provide my opinions on issues regarding unpatentability. I have been informed of the following legal standards, which I have applied in forming my opinions.

A. Level of Ordinary Skill

28. I have been informed that a person of ordinary skill in the art is determined by considering several factors, including the (i) type of problems encountered in the art; (ii) prior art solutions to those problems; (iii) rapidity with which innovations are made; (iv) sophistication of the technology; and (v) educational level of active workers in the field.

29. I have been instructed to assume that a person of ordinary skill in the art is not a specific real individual but rather a hypothetical individual having the qualities reflected by the factors discussed above.

B. Prior Art

30. I have been advised and understand that the information used to evaluate whether an invention was new and not obvious when made is generally referred to as “prior art.” I understand that prior art includes patents and printed publications that existed before the earliest priority date or the earliest filing date of the patent (which I have been informed is also called the “effective filing date”). I have been informed and understand that a patent or published patent application is prior art if it was filed before the earliest filing date of the claimed invention and that a printed publication is prior art if it was publicly available before the earliest filing date.

C. Anticipation

31. I have been informed that under 35 U.S.C. § 102, a patent claim is unpatentable for anticipation if the claimed subject matter was patented or described in a printed publication before the effective filing date of the claimed invention. I have been informed that this is referred to as unpatentability by anticipation. I have been informed that a patent claim is anticipated under § 102 if a single prior art reference discloses all limitations of the claimed invention.

D. Obviousness

32. I have been informed that for obviousness under 35 U.S.C. § 103, a patent claim is unpatentable if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have

been obvious to a person having ordinary skill in the art to which said subject matter pertains at the time the invention was made. I have been informed that this is referred to as unpatentability by obviousness.

33. I have been informed that an obviousness analysis includes the following considerations:

- a. Determining the scope and content of the prior art;
- b. Ascertaining the differences between the prior art and the claims at issue;
- c. Resolving the level of ordinary skill in the pertinent art; and
- d. Considering evidence of secondary indicia of nonobviousness (if available).

34. I have been informed that the relevant time for considering whether a claim would have been obvious to a person of ordinary skill in the art is the time of invention. For my obviousness analysis, counsel for Petitioner instructed me to assume that the date of invention for the challenged claims is September 25, 2001. My opinions would not change if I assumed a later date of invention.

35. I have been informed that a reference may be modified or combined with other references or with a person of ordinary skill in the art's own knowledge if the person would have found the modification or combination obvious. I have also been informed that a person of ordinary skill in the art is presumed to know all

the relevant prior art, and the obviousness analysis may take into account the inferences and creative steps that a person of ordinary skill in the art would employ.

36. I have been informed that whether a prior art reference renders a patent claim obvious is determined from the perspective of a person of ordinary skill in the art. I have also been informed that, while there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, and while a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually and may consider the inferences and creative steps a person of ordinary skill in the art would employ, as filtered through the knowledge of one skilled in the art, obviousness grounds cannot be sustained by mere conclusory statements and must include some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.

37. In determining whether a prior art reference could have been combined with another prior art reference or other information known to a person having ordinary skill in the art, I have been informed that the following principles may be considered:

- a. A combination of familiar elements according to known methods is likely to be obvious if it yields predictable results;

- b. The substitution of one known element for another is likely to be obvious if it yields predictable results;
- c. The use of a known technique to improve similar items or methods in the same way is likely to be obvious if it yields predictable results;
- d. The application of a known technique to a prior art reference that is ready for improvement to yield predictable results;
- e. Any need or problem known in the field and addressed by the reference can provide a reason for combining the elements in the manner claimed;
- f. A person of ordinary skill often will be able to fit the teachings of multiple references together like a puzzle; and
- g. The proper analysis of obviousness requires a determination of whether a person of ordinary skill in the art a “reasonable expectation of success” would have—but not “absolute predictability” of success—in achieving the claimed invention by combining prior art references.

38. I have been informed that, when a work is available in one field, design alternatives and other market forces can prompt variations of it, either in the same field or in another. I have been informed that if a person of ordinary skill in the art could have implemented a predictable variation and would have seen the

benefit of doing so, that variation is likely to have been obvious. I have been informed that, in many fields, there may be little discussion of obvious combinations, and in these fields, market demand—not scientific literature—may drive design trends. I have been informed that, when there was a design need or market pressure and there are a finite number of predictable solutions, a person of ordinary skill in the art would have had a good reason to pursue those known options.

39. I have been informed that the law permits the application of “common sense” in examining whether a claimed invention would have been obvious to a person skilled in the art. For example, I have been informed that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. I understand, however, that a claim is not obvious merely because every claim element is disclosed in the prior art, and that a party asserting obviousness must still provide a specific motivation to combine or modify the references as recited in the claims and explain why one skilled in the art would have reasonably expected to succeed in doing so.

40. I have been informed that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But I also understand that the “teaching, suggestion, or

motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. I have been informed that this test poses the question as to whether there is an express or implied teaching, suggestion, or motivation to combine prior art elements in a way that realizes the claimed invention, and that it seeks to counter impermissible hindsight analysis.

41. I am not aware of any evidence of secondary considerations that would support a determination of nonobviousness of the claimed subject matter in the '416 patent.

42. I have been informed that, in an obviousness analysis, prior art must be analogous to the patent being considered. I have been informed that a prior art reference is considered to be analogous, or in the same field of art, if the reference is either (1) in the same field of endeavor as the challenged patent, regardless of the problems the challenged patent and the prior art address, or (2) reasonably pertinent to the particular problem being solved by the challenged patent.

VI. THE '416 PATENT

A. Overview

43. The '416 patent generally relates to location-based services, including “navigation assistance” systems and methods that use “positioning” information to inform the navigation. Ex. 1001, 4:35-51, 4:62-64, 5:4-5, 5:63-6:15.

44. The positioning information includes information “obtained from GPS satellites,” “a Bluetooth transponder,” “information about the different base stations or receivers/transmitters which are communicating with the client” and/or other “environmental information.” Ex. 1001, 4:35-51, 4:62-64, 5:4-5, 5:63-6:15, 6:5-10. A “thin client”—such as a “cell phone”—detects and transmits the positioning information to a base station and server, which uses the information to provide the thin client with navigation information. Ex. 1001, 1:26-35, 4:32-42, 4:59-64, 5:60-62, 6:1-3, 6:11-15, 7:21-29.

B. The '416 Patent Priority Claim

45. The '416 patent was filed February 14, 2008, and is a divisional of U.S. application Ser. No. 09/682,600 filed September 25, 2001, which is a continuation-in-part (CIP) of U.S. application Ser. No. 09/690,001, filed October 16, 2000 (“the '001 application”).

46. I have been instructed that there is no presumption that the '416 patent is entitled to the filing date of the '001 application because it is a CIP.

47. I have been asked to review the '001 application and have compared the subject matter and claims in that application to the claims of the '416 patent. In my opinion, the '001 application does not disclose, among other things:

- detecting, sending, or receiving signal interference as recited in independent claims 1, 11, 24, and 25;

- detecting, sending, or receiving environmental information as recited in independent claims 20 and 30; or
- receiving, generating, or transmitting mapping/navigation information associated with, based on, or in response to the signal interference/indication of signal interference or the environmental information. *See generally* Ex. 1001; Ex. 1014, 230-45; Ex. 1015.

48. More specifically, it is my opinion that the '001 application does not discuss or otherwise describe the following, as recited in claim 1 of the '416 patent:

- detecting, by the mobile communication device, signal interference;
- generating, by the mobile communication device, an indication of the signal interference;
- sending both the indication of the signal interference and the GPS information from the mobile communication device to the remote source;
- receiving, by the mobile communication device, navigation information from the remote source in response to sending both the indication of the signal interference and the GPS information, wherein the navigation information comprises

data for plotting a course on a map including the current location of the mobile communication device; and

- displaying, by the mobile communication device, the map based on the navigation information.

Ex. 1014, 230-45

49. It is also my opinion that the '001 application does not discuss or otherwise describe the following, as recited in independent claim 11 of the '416 patent:

- receiving, by a server ... additional information about a local position of the mobile communication device other than the GPS information, wherein the additional information comprises an indication of signal interference detected at the mobile communication device;
- determining, by the server, navigation information associated with the local position based on both the GPS information and the indication of signal interference, wherein the navigation information comprises data for plotting a course on a map including the local position of the mobile communication device; and
- transmitting, by the server, the navigation information to the mobile communication device.

Ex. 1014, 230-45

50. It is also my opinion that the '001 application does not discuss or otherwise describe the following, as recited in independent claim 24 of the '416 patent:

- a base station configured to receive wireless communications from the mobile communication device, wherein the wireless communications comprise ... additional information about the current position of the mobile communication device, and wherein the additional information comprises an indication of signal interference detected at the mobile communication device;
- and a remote processor ... further configured to: generate navigation information associated with the current position of the mobile communication device, wherein the navigation information comprises data for plotting a course on a map including the current position of the mobile communication device; and transmit the navigation information for displaying the map on the mobile communication device.

Ex. 1014, 230-45

51. It is also my opinion that the '001 application does not discuss or otherwise describe the following, as recited in independent claim 25 of the '416 patent:

- detecting signal interference at the mobile communication device;
- generating an indication of the detected signal interference;
- transmitting ... the indication of the detected interference to a remote processing device; and
- receiving navigation information associated with the current position, wherein the navigation information comprises data for plotting a course on a map including the current position of the mobile communication device.

Ex. 1014, 230-45

52. It is also my opinion that the '001 application does not discuss or otherwise describe the following, as recited in independent claim 20 of the '416 patent:

- a communication interface configured to receive a communication from a cellular telephone over a cellular telephone network, wherein the communication comprises ... environmental information about a current position of the cellular telephone, and wherein the environmental information is acquired by one or more sensory input devices of the cellular telephone;
- a database configured to store local information associated with the current position;

- and a processing device configured to: process ... the environmental information; retrieve the local information from the database in response to processing ... the environmental information;
- generate mapping information associated with the current position, wherein the mapping information comprises for plotting a course on a map including the current position of the cellular telephone; and
- cause the mapping information to be transmitted to the cellular telephone.

Ex. 1014, 230-45

53. It is also my opinion that the '001 application does not discuss or otherwise describe the following, as recited in independent claim 30 of the '416 patent:

- means for wirelessly communicating information about the current location to a remote processing device, wherein the information about the current location comprises ... environmental information about the current location other than the GPS information, and wherein the environmental information comprises visual or auditory sensory input acquired by the apparatus; and
- means for wirelessly receiving the navigation instructions associated with the current location, wherein the navigation instructions data for

plotting a course on a map including the current location of the apparatus.

Ex. 1014, 230-45

54. It is my opinion that the signal interference information and indication of signal interference recited in independent claims 1, 11, 24, and 25 of the '416 patent is at best described in the specification of later-filed CIP application Ser. No. 09/682,600 filed September 25, 2001. Ex. 1015, 4-9; Ex. 1016, 21-28. It is also my opinion that the environmental information recited in independent claims 20 and 30 of the '416 patent is at best described in the specification of later-filed CIP application Ser. No. 09/682,600 filed September 25, 2001. Ex. 1015, 4-9; Ex. 1016, 21-28.

55. I have been instructed that the date corresponding to the earliest possible disclosure of the claimed subject matter of the '416 patent is the priority date of the '416 patent. I therefore understand based on my comparison of the claimed subject matter to the '001 application and the CIP application that the priority date of the '416 patent is September 25, 2001.

VII. CLAIM CONSTRUCTION

56. I have been instructed that the “intrinsic record” includes the '416 patent itself, including the claims, description, and figures (Ex. 1001), and the '416 patent's prosecution history, which I understand is the record of proceedings at the

U.S. Patent and Trademark Office (“Patent Office”) concerning the patent (Ex. 1002). I understand that, like the claims and written description, the prosecution history provides evidence to a person of ordinary skill in the art of how the inventor intended their patent to be understood and how the Patent Office understood the patent. I understand that the inventor is permitted to apply a special definition to the terms or to limit the scope of claim terms in their patent claims, which may differ from the term’s plain and ordinary meaning. That special definition or limitation on scope may be provided in the patent’s written description, the patent’s prosecution history, or both.

57. I understand that claim interpretation may also be informed by “extrinsic evidence” (that is, evidence outside of the patent record itself). I have been informed that extrinsic evidence may include dictionaries, technical treatises, and other materials evidencing the meaning of a claim term and the understanding held by a person of ordinary skill in the art in the relevant time period.

58. I have been asked for the purposes of this declaration to apply the plain and ordinary meaning of the claim terms as they would have been understood by a person of ordinary skill in the art at the earliest priority date of the ’416 patent.

59. I understand that claims 30, 32 and 33 recite limitations directed to “means for” determining, wirelessly communicating, and displaying. Ex. 1001,

claim 30. I have been instructed that these limitations are presumed to invoke § 112(f).

60. It is my opinion that the various means correspond to certain structures and functions described in the '416 patent as set forth in the following chart:

[30a]: “means for determining a current location of the apparatus;”	Function: “determining a current location of the apparatus” Structure: “[P]rocessor 110 which processes signals from ... GPS device 115.” Ex. 1001, 1:19-25.
[30b]: “means for displaying navigation instructions;”	Function: “displaying navigation instructions” Structure: A display screen 502. Ex. 1001, 3:51-53, FIG. 5.
[30c]: “means for wirelessly communicating information about the current location to a remote processing device;”	Function: “wirelessly communicating information about the current location to a remote processing device” Structure: An “antenna” and “receivers/ transmitters” for communicating (sending and/or receiving) information. Ex. 1001, 3:48-51, 6:5-9.

[30e]: “means for wirelessly receiving the navigation instructions associated with the current location ¹ ...”	Function: “wirelessly receiving the navigation instructions associated with the current location Structure: An “antenna” and “receivers/transmitters” for communicating (sending and/or receiving) information. Ex. 1001, 3:48-51, 6:5-9.
Claim 32: “means for acquiring the [G]PS information.”	Function: “acquiring the [G]PS information” Structure: A “GPS device” or “GPS computer.” Ex. 1001, 1:16-18, 3:17-19, 4:34-37 (describing a “GPS device” or “GPS computer” for determining a thin client’s current location).
Claim 33: “means for acquiring the environmental information”	Function: “acquiring the environmental information” Structure: A camera or microphone. Ex. 1001, 6:11-16 (describing a camera and microphone for receiving images and sound environmental information).

61. I understand that no claim term’s construction is in dispute at this time. Based on my review of these materials and my personal knowledge and experience, I have considered each term of the ’416 patent as it would have been

¹ The ’416 patent does not distinguish between means for communicating information (about current location) and means for receiving information (navigation instructions). *See generally* Ex. 1001.

understood by a person of ordinary skill in the art at the earliest priority date of September 25, 2001.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

62. In rendering the opinions set forth in this declaration, I have been asked to consider the '416 patent's claims and the prior art through the eyes of a person of ordinary skill in the art (which I may also refer to as "one skilled in the art," "skilled artisan," "POSITA," or similar variations). I have considered factors such as the educational level and years of experience of those working in the pertinent art, the types of problems encountered in the art, the teachings of the prior art, patents and publications of other persons or companies, and the sophistication of the technology.

63. Taking the factors described in the Legal Standards – Level of Ordinary Skill section into consideration, it is my opinion that a POSITA at the time of the purported invention would have had at least a bachelor's degree in Computer or Electrical Engineering or an equivalent engineering discipline, and approximately three years of experience in navigation or geolocation systems, along with a background in telecommunications. Additional education could substitute for professional experience, and significant work experience could substitute for formal education.

64. I met the criteria for a POSITA at the effective filing date of the '416 patent.

IX. THE PRIOR ART

65. In forming my opinions, I found the following prior art relevant when considering whether the claims of the '416 patent would have been obvious to a person of ordinary skill in the art.

Exhibit	Description
Ex. 1005	U.S. Patent No. 6,195,022 to Yamakita (“ <i>Yamakita</i> ”)
Ex. 1007	U.S. Patent No. 6,427,120 to Garin et al. (“ <i>Garin</i> ”)
Ex. 1008	U.S. Patent Application Publication No. 2003/0060211 to Chern et al. (“ <i>Chern</i> ”)
Ex. 1009	U.S. Patent No. 7,822,635 to Brown et al. (“ <i>Brown</i> ”)
Ex. 1010	U.S. Patent No. 6,226,589 to Maeda et al. (“ <i>Maeda</i> ”)
Ex. 1011	WIPO Publication No. WO2000/22593 to Drury et al. (“ <i>Drury</i> ”)
Ex. 1012	WIPO Publication No. WO2000/03364 to Obradovich et al. (“ <i>Obradovich</i> ”)
Ex. 1013	U.S. Patent No. 5,867,110 to Naito et al. (“ <i>Naito</i> ”)
Ex. 1017	U.S. Patent No. 6,522,888 to Garceran et al. (“ <i>Garceran</i> ”)
Ex. 1018	U.S. Patent No. 6,115,611 to Kimoto et al. (“ <i>Kimoto</i> ”)
Ex. 1019	Ian D. Kitching, “GPS and Cellular Radio Measurement Integration,” <i>Journal of Navigation</i> , Vol. 53, No. 3, September 2000, pp. 451-463. (Available at https://www.cambridge.org/core/journals/journal-of-navigation/article/abs/gps-and-cellular-radio-measurement-

Exhibit	Description
	integration/C563A3AE053461124A4127E6B9B2DD13). (“ <i>Kitching</i> ”)
Ex. 1020	Goran M. Djuknic and Robert E. Richton, “Geolocation and Assisted GPS,” <i>Computer (IEEE)</i> , Vol. 34, No. 2, February 2001, pp. 123-125. (Available at https://doi.org/10.1109/2.901174). (“ <i>Djuknic</i> ”)

66. As explained below, in my opinion, claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the ’416 patent would have been obvious based on *Chern*, *Garceran*, *Ihara*, and *Yamakita* in the combinations discussed below.

A. *Chern* (U.S. Patent Application Publication No. 2003/0060211)

67. *Chern* was published as U.S. Patent Application Publication No. 2003/0060211 on March 27, 2003, and was filed on August 27, 1999. I understand and have been asked to assume that *Chern* is prior art to the ’416 patent.

68. *Chern* discloses a wireless location-based information retrieval system having navigation applications. *Chern*, Abstract, [0044]. The system includes a wireless handset having a “position determination system” directly incorporated therein and for determining the handset’s location using GPS or “[a]lternative position determination systems.” *Chern*, [0040]. The system also includes a server which communicates with the handset over a wireless network. *Chern*, [0043]. The system may be used to provide “driving directions to a destination address ... to a handset user.” *Chern*, [0044].

69. Chern further discloses detecting additional information that would improve the accuracy of its position determination system, including detecting handset “height, speed of travel, and any other useful location or position parameters” and sending both the GPS and additional information to a server via a wireless network comprised of base stations. Chern, [0040], [0043]-[0044].

70. *Chern* is directed to the same technical field as the ’416 patent: location-based services for wireless communication devices. *Compare* Ex. 1001, 4:34-51, 5:4-5, *with Chern*, Abstract, [0040], [0044].

B. *Garceran* (U.S. Patent No. 6,522,888)

71. *Garceran* was published as U.S. Patent No. 6,522,888 on February 18, 2003, and was filed on August 31, 1999. I understand and have been asked to assume that *Garceran* is prior art to the ’416 patent.

72. *Garceran* teaches “a wireless communications system” that “determines and/or receives location information for the wireless unit along with other information associated with the location information.” *Garceran*, 2:12-15

73. Like *Chern*, and as illustrated in Figure 4, “wireless unit 70 includes GPS receiver circuitry 72 which receives GPS signals from a duplexer 74 which is connected to the antenna 76 of the wireless unit 70.” *Garceran*, 6:31-44. “[T]he GPS receiver circuitry 72 provides a location information which can include time, speed, distance and/or direction for the wireless unit to the processing

circuitry 78 of the wireless unit 70.” *Garceran*, 6:69-44. And like *Chern*, *Garceran*’s communication device is configured to communicate the GPS information with one or more base stations of a wireless network. *Garceran*, 6:59-62.

74. Because “[a] change in operating condition could trigger a dynamic change in the RF coverage provided by the serving base station(s) and/or neighboring base stations to the wireless unit(s) in the location or range of location[,]” the wireless unit also “determines,” the “operating conditions or parameters, such as time, weather, traffic load, path loss and/or interference level” (associated information) affecting communication between the mobile unit and base station. *Garceran*, 2:39-42, 6:31-44, 59-62. The handset then “transmit[s] the [GPS] location information and associated signal quality or other information,” an indication of the signal interference, “to a serving base station 54 (FIG. 2) over a channel on the reverse link.” *Garceran*, 2:39-42, 6:31-44, 59-62.

75. *Garceran* is directed to the same technical field as the ’416 patent: location-based services for wireless communication devices. *Compare* Ex. 1001, 4:34-51, 5:4-5, *with Garceran*, Abstract, 1:8-11.

C. *Garin* (U.S. Patent No. 6,427,120)

76. *Garin* was published as U.S. Patent No. 6,427,120 on July 30, 2002, and was filed on February 28, 2001. I understand and have been asked to assume that *Garin* is prior art to the '416 patent.

77. *Garin* discloses a method of geolocating a wireless communication device and using the location information to track the device and provide navigation. *Garin*, 2:28-33. The wireless handset switches between operational “modes” based on detected GPS signal interference and uses additional “information from outside the wireless communications network as well as outside of the GPS satellite system” to “approximate” the handset’s location. *Garin*, 3:53-62, 4:3-8, 6:55-7:5, 7:33-34, 6:26-31, 7:55-67, 10:34-39.

78. In certain embodiments, the handset uses Bluetooth information acquired from a Bluetooth network via the handset’s Bluetooth sensor to generate “augmented” position information when there is a “lapse” in GPS signals. *Garin*, 7:59-67, 8:49-62. The handset sends the “data ‘fusion’” of Bluetooth and GPS information to a geolocation server, which uses the information to enhance “navigation functions” (e.g., determining the “relative location of the cellular user to other landmarks,” and “directions for the cellular user via internet maps or other GPS mapping techniques, etc.”) *Garin*, 1:52-59, 7:59-65. *Garin* further discloses that the handset’s “GPS acquisition, tracking, and navigation functions can be

enhanced with inputs from the Bluetooth network without using the cellular network.” *Garin*, 7:62-65, 8:49-56, 10:34-39.

79. *Garin* is directed to the same technical field as the ’416 patent: location-based services for wireless communication devices. *Compare* Ex. 1001, 4:34-51, 5:4-5, *with Garin*, Abstract, 1:52-59, 2:28-33, 7:59-65.

D. *Yamakita* (U.S. Patent No. 6,195,022)

80. *Yamakita* was published as U.S. Patent No. 6,195,022 on February 27, 2001, and was filed September 19, 1997. I understand and have been asked to assume that *Yamakita* is prior art to the ’416 patent.

81. *Yamakita* discloses a system and method “for analyzing the action of, e.g., a user who is carrying a portable terminal on the basis of information acquired from the portable terminal.” *Yamakita*, 1:4-6. The portable terminal acquires position information using a GPS sensor and “unique” train sound information corresponding to the “ambient sound data (e.g., noise)” using a microphone. *Yamakita*, 2:54-58, 3:49-50, 4:20-32, FIGS. 2-3. The portable terminal generates and transmits a transmission packet containing the location and noise data to a base station and host terminal (collectively, “remote source”) over a public wireless network. *Yamakita*, 2:47-53, 3:3-9, 3:54-62, FIGS. 1, 3, 4 (illustrating contents of the transmission packet).

82. “Upon receiving the information transferred from the portable terminal,” the host terminal “extract[s]” and processes the GPS and sound (interference) data from the transmission packet to estimate “the position of the user who is carrying the portable terminal 1 at a certain time point, and if he/she is moving, [and] the [user’s] moving means.” *Yamakita*, 5:65-6:9, 6:38-46, FIG. 7. Once processed, the host terminal generates and transmits a data packet containing the user’s current location to the portable terminal. *Yamakita*, 6:38-46, 1:41-48. The data packet also includes an action record table, i.e., navigation information including data for plotting a course on a map including the portable terminal’s current location. *Yamakita*, 6:38-46, 1:41-48, FIGS. 14, 18. The portable terminal extracts the action record table and displays it as a map on its LCD display unit. *Yamakita*, 9:63-10:4, 11:28-31, FIG. 18.

83. *Yamakita* is directed to the same technical field as the ’416 patent: location-based services for wireless communication devices. *Compare* Ex. 1001, 4:34-51, 5:4-5, *with Yamakita*, Abstract, 1:4-6.

X. GROUNDS OF UNPATENTABILITY

84. Based on my review of the materials set forth above, including my application of the knowledge of a person of ordinary skill in the art, it is my opinion that claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the ’416 patent would have been obvious to one of ordinary skill in the art.

85. In particular, it is my opinion that claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the '416 patent would have been obvious to a person of ordinary skill in the art at the earliest priority date of the '416, based on the combinations shown below:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	1, 2, 7, 8, 11, 14, 16, and 24-29	103	<i>Chern and Garceran</i>
2	11 and 15	103	<i>Chern and Garin</i>
3	20-23 and 30-35	103	<i>Yamakita</i>

XI. THE CHALLENGED CLAIMS ARE UNPATENTABLE BASED ON THE PRIOR ART

86. In my opinion, claims 1, 2, 7, 8, 11, 14, 16, and 20-35 would have been obvious to one skilled in the art at the earliest priority date of the '416 patent.

A. Ground 1: Claims 1, 2, 7, 8, 11, 14, 16, and 24-29 Are Obvious In View Of *Chern* and *Garceran*.

1. Independent claim 1

a. [1preamble]: “A method, comprising:”

87. *Chern* discloses [1preamble] because *Chern* discloses a “a location-based information retrieval system and method for wireless communication devices” and a method for requesting and receiving directions over a network. *Chern*, [0027], [0044]-[0054], FIG 3.

- b. **[1a]: “receiving, by a mobile communication device, information about a current location of the mobile communication device, wherein the information about the current location includes global positioning system (GPS) information;”**

88. *Chern* discloses [1a] because *Chern* discloses receiving, at a “wireless handset,” a “user’s current location as determined by [a] position determination system” wherein the position determination system is “implemented using a GPS (global positioning system) or differential GPS.” *Chern*, [0040], [0045]. The handset includes “a GPS receiver 304 that functions as the position determination device” and a handset “[a]ntenna 310 allows GPS receiver 304 to communicate with the constellation of GPS satellite.” *Id.*, [0084].

- c. **[1b]-[1c]: “detecting, by the mobile communication device, signal interference; generating, by the mobile communication device, an indication of the signal interference;”**

89. *Chern* in combination with *Garceran* renders obvious [1b]-[1c].

90. *Chern* discloses detecting additional information that would improve the accuracy of its position determination system and navigation application, including detecting handset “height, speed of travel, and any other useful location or position parameters” and sending both the GPS and additional information to a server via a wireless network comprised of base stations. *Chern*, [0040], [0043]-[0044], [0069]. *Chern* states that “a speed of travel parameter is provided by handset 130 along with the current position” to allow the server to determine

whether it needs to “update the position information” for direction calculation purposes. *Chern*, [0054].

91. Although *Chern* discloses that “any other useful location or position parameters” can also be used to determine the handset’s location or position, *Chern* does not expressly disclose detecting signal interference or generating an indication of the signal interference. *Chern*, [0040]. However, *Garceran* does.

92. *Garceran* teaches “a wireless communications system” that “determines and/or receives [GPS] location information for the wireless unit along with other information associated with the location information.” *Garceran*, 2:12-15, 6:39-44.

93. Like *Chern*, and as illustrated in Figure 4, *Garceran*’s “wireless unit 70 includes GPS receiver circuitry 72 which receives GPS signals from a duplexer 74 which is connected to the antenna 76 of the wireless unit 70.” *Garceran*, 6:31-44. “[T]he GPS receiver circuitry 72 provides a location information which can include time, speed, distance and/or direction for the wireless unit to the processing circuitry 78 of the wireless unit 70.” *Garceran*, 6:39-44. And like *Chern*, *Garceran*’s communication device is configured to communicate the GPS information to one or more base stations of a wireless network. *Garceran*, 6:59-62.

94. Because “[a] change in operating condition could trigger a dynamic change in the RF coverage provided by the serving base station(s) and/or neighboring base stations to the wireless unit(s) in the location or range of location” the wireless unit also (1) “determines” (detects) the “operating conditions or parameters, such as time, weather, traffic load, path loss and/or interference level” (associated information) affecting the communication signal and (2) “transmit[s] the [GPS] location information and associated signal quality or other information” i.e., a generated indication of the signal interference, “to a serving base station 54 (FIG. 2) over a channel on the reverse link.” *Garceran*, 2:39-42, 6:31-44, 59-62 (emphasis added).

95. This is consistent with the ’416 patent, which does not use the term “generating an indication of signal interference” but does explain that “the client may also transmit local ‘raw’ information” including information about “power and/or type of cellular reception...interference from a...radio transmitter” or “cellular or other type[s] of information.” Ex. 1001, 5:42-6:10. Thus, POSITA would have understood that a *transmission* conveying the signal interference information is a *generated* indication of the detected signal interference because the client (mobile communication device) generates the transmission, and the transmission indicates the nature of the signal interference.

i. Motivation to Combine Garceran's Detection of Signal Interference with *Chern*'s System

96. In my opinion, a POSITA would have understood the benefit of sending the associated signal quality (indication of interference) in addition to GPS information to enhance position detection for navigation using a cellular phone. Systems using cellular signal information to enhance position determination for navigation were known in the art. *See e.g., Kitching*, 3, 7, 12-13² (describing systems and methods for enhancing position detection in navigation applications “utilising both GPS and [base station (BS)] cellular measurements” and explaining that “[t]he combination of GPS and cellular technologies ... affords improved positioning capabilities over a range of operating environments that neither system alone can achieve” and “improved transmitter geometry in areas where signal blockage may occur.”); *see also Kitching*, 9 (describing earlier systems “that combine GPS and cellular systems” to “give improved positioning performance.”); *Djuknic*, 1 (“assisted-GPS technology offers superior accuracy, availability, and coverage at a reasonable cost.”), 3 (explaining that “interference” has “noticeable effects” on “the accuracy of geolocation technologies” and using “Hybrid approaches that use multiple geolocation technologies appear to be the most robust

² All references to *Kitching* and *Djuknic* in this declaration are to the PDF page number.

solution to problems of accuracy and coverage ... AGPS provides a natural fit for hybrid solutions because it uses the wireless network to supply assistance data to GPS receivers in handsets” and listing additional advantages of combining base station and GPS location technologies (Assisted GPS or AGPS) for location-based services).

97. Thus, it is my opinion that a POSITA would have been motivated and found it obvious to configure *Chern*’s handset to use multiple sources of position information, including an “associated signal quality or other information,” as taught by *Garceran*, to improve location determination and the location-based services of *Chern*. Such an improvement would have been especially useful where environmental conditions, e.g., weather or building structures, limit, block, or otherwise prevent the GPS receiver from acquiring information from the GPS satellite. *Kitching*, 9-13; *Djuknic*, 1-3.

ii. Expectation of Success

98. It is also my opinion that a POSITA would have had a reasonable expectation of success in configuring *Chern*’s handset to detect signal interference and generate an indication of the signal interference, as evidenced by *Garceran*. *Garceran*, 6:31-44, 59-62, 15:6-12 (“the RF coverage system can be implemented ... in application specific integrated circuits, software-driven processing circuitry, firmware or other arrangements of discrete components as would be understood by

one of ordinary skill in the art with the benefit of this disclosure.”); *see also Chern*, [0082] (explaining that location-based service methods “may be implemented as computer programs, software or hardware” and functions relating to handset “may be coded in processor 104 or could be stored in memory 114.”); *Kitching*, 9-13 (highlighting experimental results demonstrating the utility and benefits of combining GPS and base station position information, and further discussing system modifications that may be required to implement the modification); *Djuknic*, 1-2 (describing ways to implement the combined technologies).

- d. **[1d]: “communicating, by the mobile communication device, with a remote source over a wireless network, wherein said communicating comprises sending both the indication of the signal interference and the GPS information from the mobile communication device to the remote source;”**

99. *Chern* and *Garceran* render obvious [1d] because the combination teaches transmitting the GPS location information and associated signal quality or other information to a base station over a wireless network. *Garceran*, 6:31-44, 59-62; *Chern*, [0043]-[0044].

100. As explained for [1b]-[1c], *Garceran* discloses transmitting (communicating) “the [GPS] location information and associated signal quality or other information” (an indication of the signal interference) “to a serving base station 54 (FIG. 2)[,]” a remote source, over a channel on the reverse link.”

Garceran, 6:31-44, 59-62 (emphasis added). *Chern* likewise discloses transmitting

the handset's "determined" location "to server 136 over wireless network 140" comprised of base stations. *Chern*, [0043]-[0044].

101. As explained for [1b]-[1c], a POSITA would have been motivated and found it obvious to transmit multiple sources of position information, including the GPS information and an "associated signal quality or other information" (an indication of signal interference), as taught by *Garceran*, to improve location determination and the location-based services of *Chern*.

102. A POSITA would have had a reasonable expectation of success in sending both types of information to the server because doing so would have merely required using existing conventional components (*Chern*'s handset transceiver) for its intended conventional use (transmitting the handset's determined location to the server). *Chern*, [0007], [0034], [0044].

- e. **[1e]: "receiving, by the mobile communication device, navigation information from the remote source in response to sending both the indication of the signal interference and the GPS information, wherein the navigation information comprises data for plotting a course on a map including the current location of the mobile communication device;"**

103. *Chern* in combination with *Garceran* renders obvious [1e] because the combination teaches receiving driving directions to a destination (navigation information) from the base station in response to sending the GPS location and

associated signal quality (indication of signal interference) information. *Garceran*, 6:31-44, 59-62; *Chern*, [0043]-[0044].

104. As explained for [1d], *Chern* as modified by *Garceran* teaches sending the GPS information and an “associated signal quality or other information” (indication of signal interference) to a remote source. *Garceran*, 6:31-44, 59-62; *Chern*, [0043]-[0044].

105. *Chern* discloses transmitting from the server and receiving at the handset “driving directions to a destination address” (navigation information) based on the handset’s determined location. *Chern*, [0044]-[0054].

106. **First**, when “[t]he user requests driving directions to [a] destination ... the request is communicated to server 136 over wireless network 140” along with “the [determined] handset location ... to provide a starting point for the directions.” *Chern*, [0044]. The determined handset location, as discussed for [1b], is based on GPS and an indication of signal interference, as taught by the combination.

107. **Next**, “[u]sing the handset location and the destination address” *Chern*’s server “calculates a route and compiles driving directions” to the “destination address.” *Chern*, [0044]. That is, *Chern*’s server generates a “route” and “driving directions” (navigation information comprising data for plotting a course on a map) from a “starting point” corresponding to the “determined”

“handset location” (including the current location of the mobile communication device) to the destination.

108. **Then**, the driving directions (navigation information comprising data for plotting a course on a map) are received by “handset 130 over network 140 and are displayed or audibly rendered to the user” as “textual driving directions[and] a map showing the route.” *Chern*, [0044].

f. [1f]: “and displaying, by the mobile communication device, the map based on the navigation information.”

109. *Chern* in combination with *Garceran* renders obvious [1f] because *Chern* discloses displaying “a map showing the route” (navigation information) calculated and transmitted by the server “on the handset display.” *Chern*, [0044].

2. Claim 2: “The method of claim 1, wherein the navigation information is associated with a direction of travel, and wherein the method comprises deleting or ignoring, by the mobile communication device, information that is not associated with the direction of travel.”

110. The ’416 patent specification does not discuss or describe³ deleting or ignoring by the mobile communication device, information that is not associated

³ The terms “delete” and “ignore” only relate to downloaded “instructions to delete or ignore certain information that is not within the direction of travel” not the affirmative steps of deleting or ignoring the directions once instructions are received. Ex. 1001, 5:18-23 (emphasis added).

with a direction of travel; but it does disclose “continuously” changing or updating information “[a]s the unit moves” to reflect “a new batch of information, centered around the current location,” thus disregarding information associated with a previous location. Ex. 1001, 5:23-30. *Chern* discloses the same and therefore also discloses claim 2.

111. *Chern* discloses “updat[ing] position information” at the handset “depending on time elapsed and distance traveled” “to ensure accurate directions.” *Chern*, [0052], [0054]. The handset/user is also directed to ignore information that is not associated with the original direction of travel and to follow instead an “alternative route ... directed to backtrack to the passed waypoint” when the user passes a way point along the original direction of travel. *Chern*, [0054].

3. Claim 7: “The method of claim 1, wherein the signal interference comprises failure to detect a signal over a time period.”

112. *Chern* in combination with *Garceran* renders obvious claim 7 because, as described for claim 1, *Garceran* discloses that a handset/wireless unit “determines” signal quality measurements using “path loss and/or interference level[s]” “associated with or corresponding to the location of the wireless unit.” *Garceran*, 2:21-42, 11:19-22. Path “loss” and “interference” as the name indicates, includes a failure to detect the communication signal. *Garceran*, 11:47-53 Thus, in

combination, *Chern*'s handset detects signal interference, including a failure to detect a signal overtime due to path loss, as taught by *Garceran*.

4. Claim 8: “The method of claim 7, wherein the signal is an expected signal.”

113. *Chern* in combination with *Garceran* renders obvious claim 8 because, as described for claim 1, *Garceran* discloses that the handset expects to use the base station signal to inform its location, but its capacity to do so is limited based on environmental factors, e.g., “weather, traffic load, path loss and/or interference level.” *Garceran*, 2:39-42. Thus, in combination, *Chern*'s handset also expects to use the base station signal to inform its location, as taught by *Garceran*.

5. Independent Claim 11

a. [11preamble]: “A method, comprising:”

114. *Chern* discloses [11preamble] because *Chern* discloses a “a location-based information retrieval system and method for wireless communication devices” and a method for requesting and receiving directions over a network. *Chern*, [0027], [0044]-[0054], FIG. 3.

b. [11a]: “receiving, by a server, position information from a mobile communication device,”

115. *Chern* discloses [11a] because, as explained for [1d], *Chern* discloses transmitting a handset's (mobile communication device) “determined” location “to server 136 over wireless network 140.” *Chern*, [0044].

- c. **[11b]: “wherein the position information includes global positioning system (GPS) information and additional information about a local position of the mobile communication device other than the GPS information, wherein the additional information comprises an indication of signal interference detected at the mobile communication device;”**

116. *Chern* in combination with *Garceran* renders obvious [11b] for reasons set forth below.

117. As explained for [1b], *Chern* discloses transmitting position information corresponding to GPS information to a server. *Chern*, [0040], [0045], [0084]. For example, when the user requests directions to a destination, “the request is communicated to server 136 over wireless network 140” and “the handset location determined by position determination system 134 is also provided to server 136 to provide a starting point for the directions.” *Chern*, [0044].

118. As explained in [1c], *Chern* discloses detecting additional information at the handset that would improve the accuracy of its position determination system and sending both the GPS and additional information to a server. *Chern*, [0040]. For example, “[i]n one implementation, a speed of travel parameter is provided by handset 130 along with the current position” to allow the server to determine whether it needs to “update the position information” for direction calculation purposes. *Chern*, [0054]. Although *Chern* discloses that “any other useful location or position parameters” detected at the handset can also be used to

determine the handset's location or position, *Chern* does not disclose that the additional information includes an indication of signal interference. *Chern*, [0040].

119. In my opinion, *Garceran* renders obvious additional information comprising an indication of interference, as also explained for [1b]-[1c], because *Garceran*'s handset (1) "determines," i.e., detects, at the wireless unit, "operating conditions or parameters, such as time, weather, traffic load, path loss and/or interference level" (associated information) and (2) "transmit[s] the [GPS] location information and associated signal quality or other information," i.e., an indication of the signal interference, to a serving base station 54 (FIG. 2) so that it is received by a remote source. *Garceran*, 2:39-42, 6:31-44, 59-62.

i. Motivation to Combine Detection of Signal Interference with *Chern*'s System

120. As explained for [1c], a POSITA would have understood the benefit of sending the associated signal quality (indication of interference) in addition to the GPS information and would have been motivated and found it obvious to configure *Chern*'s handset to use multiple sources of position information, including an "associated signal quality or other information," taught by *Garceran*, to improve location determination and the location-based services of *Chern*. *Kitching*, 3, 7, 9, 12-13; *Djuknic*, 1-3. Such an improvement would have been especially useful where environmental conditions, e.g., weather or building

structures, limit, block, or otherwise prevent a GPS receiver from acquiring information from GPS satellites. *Kitching*, 9-13; *Djuknic*, 1-3.

ii. Expectation of Success

121. As explained for [1c], configuring *Chern*'s handset to detect signal interference, and generate/transmit an indication of the signal interference would have only required routine skill to implement. *Garceran*, 6:31-44, 59-62; *see also Chern*, [0082] (explaining that location-based service methods "may be implemented as computer programs, software or hardware" and functions relating to handset "may be coded in processor 104 or could be stored in memory 114."); *Kitching*, 9-13 (highlighting experimental results demonstrating the utility and benefits of combining GPS and base station position information, and further discussing system modifications that may be required to implement the modification); *Djuknic*, 1-2 (describing ways to implement the combined technologies). Thus, it is also my opinion that a POSITA would have had a reasonable expectation of success in modifying the server to receive the position information including GPS and signal quality (indication of interference).

- d. **[11c]-[11d]: “determining, by the server, navigation information associated with the local position based on both the GPS information and the indication of signal interference, wherein the navigation information comprises data for plotting a course on a map including the local position of the mobile communication device”**

122. *Chern* in combination with *Garceran* renders obvious determining, by the server, navigation information associated with the local position based on both the GPS information and the indication of signal interference for the reasons explained for [1e].

123. *Chern*’s server generates a “route” and “driving directions” (navigation information comprising data for plotting a course on a map) from a “starting point” corresponding to the “determined” “handset location” (including the current location of the mobile communication device). *Chern*, [0044].

- e. **[11e]: “and transmitting, by the server, the navigation information to the mobile communication device.”**

124. *Chern* further discloses transmitting, by the server, the navigation information to the mobile communication device, because *Chern* discloses transmitting the driving directions (navigation information) to “handset 130 over network 140” where they are displayed or audibly rendered to the user” as “textual driving directions[and] a map showing the route.” *Chern*, [0044].

6. **Claim 14: “The method of claim 11, wherein the additional information further comprises information about at least one base station which is communicating with the mobile communication device.”**

125. *Chern* in combination with *Garceran* renders obvious claim 14 because the additional information includes the base station’s identity. *Garceran*, Abstract, 2:21-28.

126. Claim [11b] defines the additional information as comprising the indication of signal interference. *Garceran* discloses that its indication of signal interference (additional information) is “linked with additional parameters, such as wireless unit type, wireless unit identity, frequency, operating conditions and/or base station identity.” *Garceran*, Abstract, 2:21-28. (Emphasis added). Thus, as combined, *Chern*’s handset detects additional information including the base station identity (information about at least one base station), as taught by *Garceran*.

7. **Claim 16: “The method of claim 11, wherein determining the navigation information comprises comparing the indication of signal interference with interference signatures in a database of environmental factors.”**

127. *Chern* in combination with *Garceran* renders obvious claim 16 because as explained below, the combination teaches using a database to determine the driving directions (navigation information), including comparing the signal quality location information (indication of signal interference) with RF signal

strengths corresponding to each coverage area (interference signatures) contained in the database. *Garceran*, 3:26-55, 7:66-8:9; *Chern*, [0043], [0051]-[0053].

128. *Chern* discloses using a database to determine the user's route/directions (navigation information) and that "the types of information stored in database 138 are virtually limitless." *Chern*, [0043], [0051]-[0053]. *Chern* does not expressly disclose that its database includes interference signatures to compare with the indication of signal interference, but *Garceran* does.

129. *Garceran* discloses "storing location and associated information" i.e., GPS and signal quality information (an indication of signal interference) sent from the wireless unit to the serving base station, in an RF coverage storage or database. *Garceran*, 7:46-51. "For example, using the location of the wireless unit and collect[ed] associated or corresponding data for the wireless unit at that location, the wireless communications system 50 can produce an RF database or storage 52 to represent or provide an RF coverage map for a geographic region serviced by a serving base station(s) and/or neighboring base stations." *Garceran*, 3:26-33. The database includes, among other things, "radio signal strength (RSSI), bit error rate (BER), frame error rate (FER) or other signal quality measurements, of the base station's transmit signal at a known frequency," i.e., interference signatures. *Garceran*, 3:32-45.

130. In my opinion, a POSITA would have understood that the RF coverage database is a database of environmental factors including interference signatures, as described in the '416 patent, because “environmental information may include the power and/or type of cellular reception[,]” and *Chern*’s RF coverage data is “information about cellular reception in various areas” that represents “characteristics as a function of position[,]” i.e. coverage strength as a function of the mobile unit’s position. Ex. 1001, 5:58-62, 6:42-51.

131. When the wireless unit powers up and “registers with” a local base station, the wireless communications system compares the wireless unit’s location information with the information contained in the database to determine which base station “currently services the particular location [of] the wireless unit.” *Garceran*, 7:66-8:9. Thus, *Garceran* also discloses comparing the indication of signal interference (signal quality location information) with interference signatures (RF signal strengths corresponding to each coverage area) in the database. *Garceran*, 3:26-55, 7:66-8:9.

132. A POSITA would have been motivated and found it obvious to incorporate *Garceran*’s RF coverage information, which informs the signal quality information, in *Chern*’s database to improve the navigation function. *Chern*, [0043]; *Garceran*, 3:26-45. A POSITA would have had a reasonable expectation of success in adding and utilizing the data in the database because the types of

information that can be included in *Chern*'s database are “virtually limitless” and such a modification would have only required routine skill to implement.

8. Independent Claim 24:

a. [24preamble]: “A system, comprising:”

133. *Chern* discloses [24preamble] because *Chern* discloses a “a location-based information retrieval system and method for wireless communication devices” and system for requesting and receiving directions over a network. *Chern*, [0027], [0044]-[0054], Figure 2.

b. [24a]: “a mobile communication device located at a current position;”

134. *Chern* discloses [24a] because the system includes a handset (mobile communication device) located at a current location of a user. *Chern*, [0044]-[0045], Figures 1, 3, 4. The current location may be a starting point along a route. *Chern*, [0054].

c. [24b]: “a base station configured to receive wireless communications from the mobile communication device,”

135. *Chern* discloses [24b] because the system includes base stations 112 for relaying communications from the handset to a server over a “wireless network.” *Chern*, [0032], [0034], [0042], [0043]. Base station 112 “is typically within a geographic area known as a “cell” and handles communications for all wireless devices within the cell” and wireless communication “[n]etwork 140 is

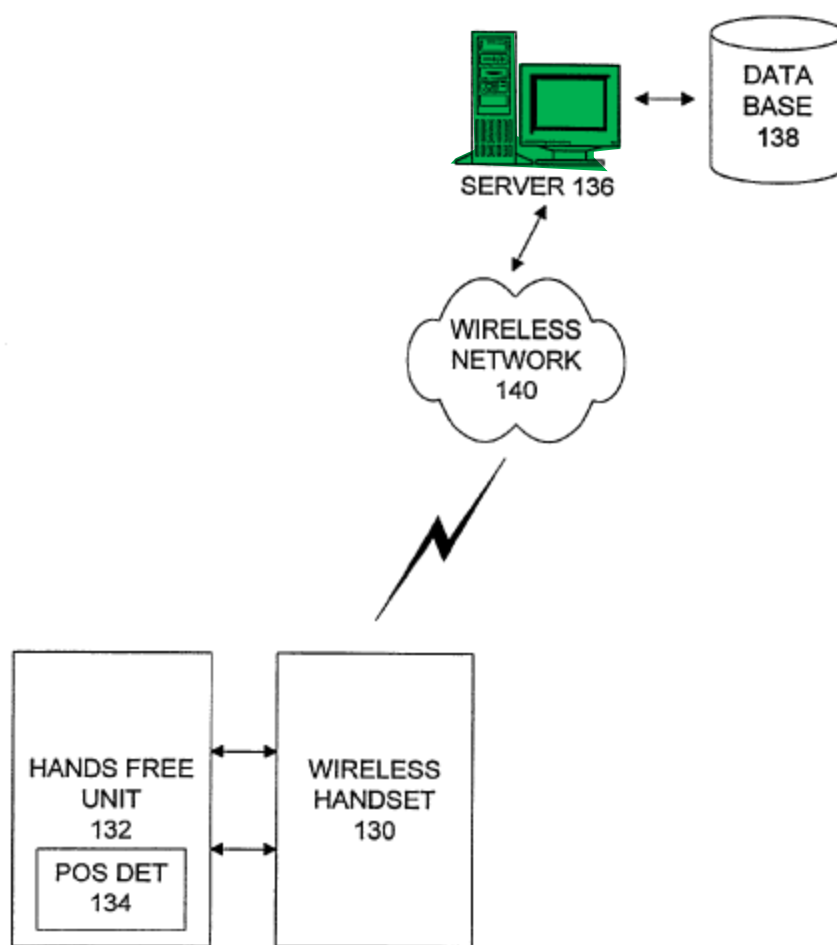
typically comprised of a plurality of base stations that provide relay points for communication.” *Chern*, [0032], [0043], Figure 2.

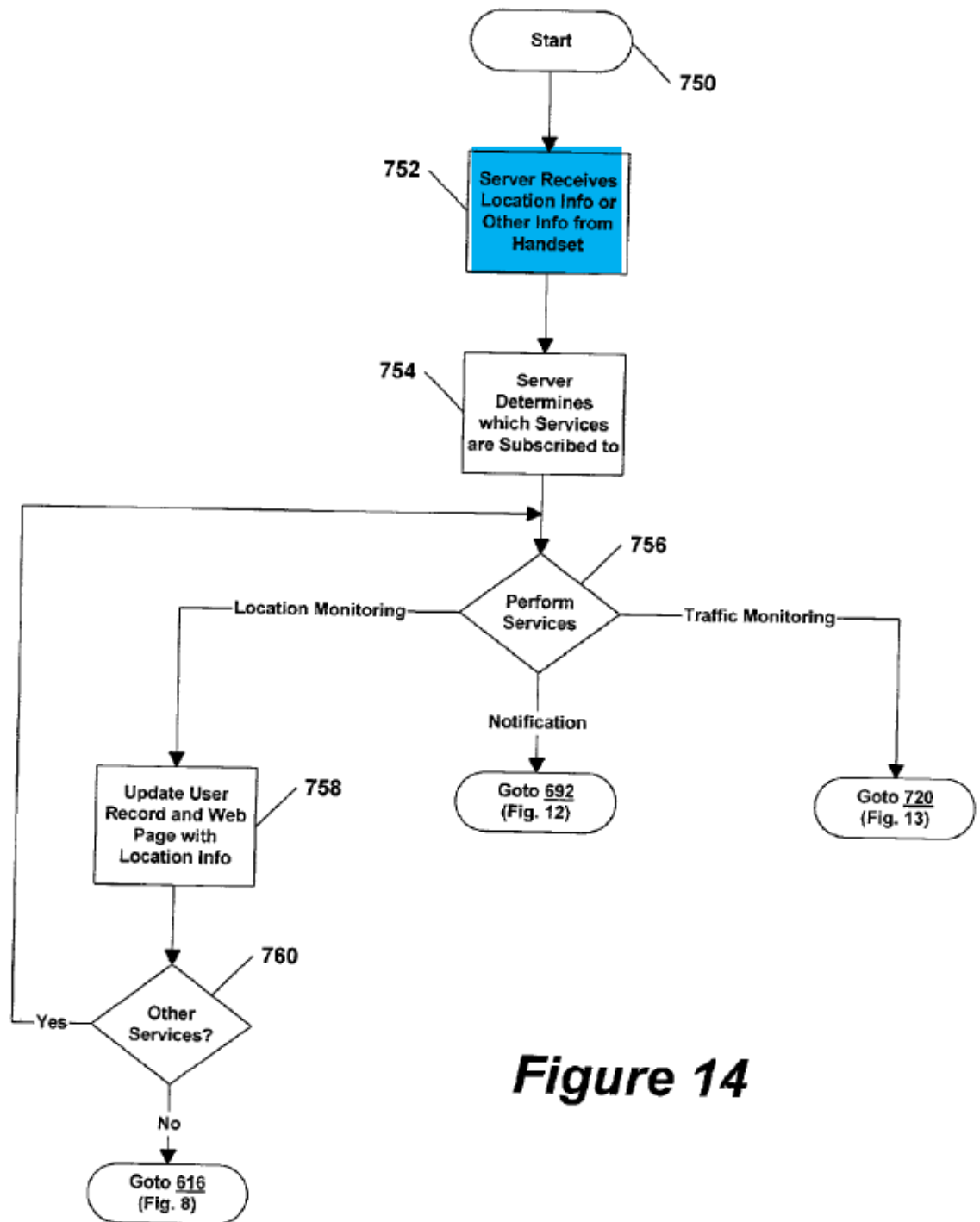
- d. **[24c]: “wherein the wireless communications comprise (GPS) information and additional information about the current position of the mobile communication device, and wherein the additional information comprises an indication of signal interference detected at the mobile communication device;”**

136. *Chern* in combination with *Garceran* renders obvious the wireless communication including GPS information and an indication of signal interference detected at the handset for the reasons explained for [1a]-[1c].

- e. **[24d]: “and a remote processor configured to: communicate with the mobile communication device via the base station,”**

137. *Chern* discloses [24d] because *Chern* discloses a remote **server 136** for **receiving the wireless communication containing the position information** from the handset via the wireless network 140 containing base stations 112. *Chern*, [0043], [0044], [0051]-[0054], FIGS. 2, 14. For example, “the handset location determined by position determination system 134 is also provided to server 136 to provide a starting point for the directions.” *Chern*, [0044]. The remote sever is a remote processor because “[t]he portions relating to the steps carried out by server 136, such as FIG. 14, preferably reside in a processor or memory in server 136.” *Chern*, [0082] (emphasis added), FIGS. 2, 14.

***Fig. 2***

**Figure 14**

Chern, FIGS. 2, 14.

- f. **[24e]: “wherein in response to receiving data from the mobile communication device, the remote processor is further configured to: generate navigation information associated with the current position of the mobile communication device, wherein the navigation information comprises data for plotting a course on a map including the current position of the mobile communication device;”**

138. *Chern* in combination with *Garceran* renders obvious [24e] because, as explained for [11]c-[11d], *Chern*’s server generates a “route” and “driving directions” (navigation information comprising data for plotting a course on a map) from a “starting point” corresponding the “determined” “handset location” (including the current location of the mobile communication device). *Chern*, [0044], [0051]-[0054]. Because the steps “carried out” by the processor “resid[ing]” in the server, as discussed in [24d], the remote processor generates the navigation information. *Chern*, [0082].

- g. **[24f]: “and transmit the navigation information for displaying the map on the mobile communication device.”**

139. *Chern* discloses [24f] because, as explained for [11e], *Chern*’s server transmits the driving directions (navigation information) to “handset 130 over network 140” where they are displayed or audibly rendered to the user” as “textual driving directions[and] a map showing the route.” *Chern*, [0044].

9. Independent Claim 25

140. Claim 25 is directed to a memory device performing the operations of claim 1, and is obvious over *Chern* and *Garceran* for the reasons explained for claim 1.

- a. **[25preamble]: “A memory device having instructions stored thereon that, in response to execution by a processing device, cause the processing device to perform operations comprising:”**

141. *Chern* discloses [25preamble] because *Chern* discloses a “wireless communication device” such as a handset, including “[a] computer program or set of instructions ...coded or otherwise implemented on the [wireless communication device] processor” and memory 114 for “stor[ing] program code and provid[ing] storage space for data useful in executing the program code.” *Chern*, [0031]-[0033]. Executing the coded instructions causes the processor to “direct[s] the overall operation” and “functionality” of the device including operations recited [25a]-[25e] to be performed, as explained below.

- b. **[25a]: “generating location data associated with a current position of a mobile communication device based on one or more global positioning system (GPS) signals;”**

142. *Chern* discloses [25a] because *Chern*’s operations include generating, using a GPS receiver (position determination system) of the handset, location data associated with “user’s current location” and “the handset location.” *Chern*, [0040], [0044], [0045]. As explained for [1a], the GPS receiver generates the data by

“communicat[ing] with the constellation of GPS satellites” and is therefore based one or more GPS signals [0084].

c. [25b]-[25c]: “detecting signal interference at the mobile communication device; generating an indication of the detected signal interference;”

143. *Chern* in combination with *Garceran* renders obvious detecting signal interference at the handset (mobile communication device) and generating an indication of the detected interference, as explained for [1b]. Because *Chern*’s executed instructions “direct the overall operation” and “functionality” of the device, as explained for [25preamble], the combination likewise renders obvious performing the detecting and generating in response to executing the instructions.

d. [25d]: “transmitting the location data and the indication of the detected interference to a remote processing device;”

144. *Chern* in combination with *Garceran* renders obvious transmitting the GPS-based location data and the quality information (an indication of interference) to a remote processor operating on a server, as explained for [24d], because “the handset location determined by position determination system 134 is also provided to server 136 to provide a starting point for the directions.” *Chern*, [0044]; *see also Garceran*, 2:12-28, 6:59-62 (describing “transmit[ing] the location information and associated signal quality or other information” to a remote source to determine the wireless unit’s location).

145. *Chern*'s **remove sever** is a remote processor because "[t]he portions relating to the steps carried out by server 136, such as FIG. 14, preferably reside in a processor or memory in server 136." *Chern*, [0082] (emphasis added), Figure 2, 14.

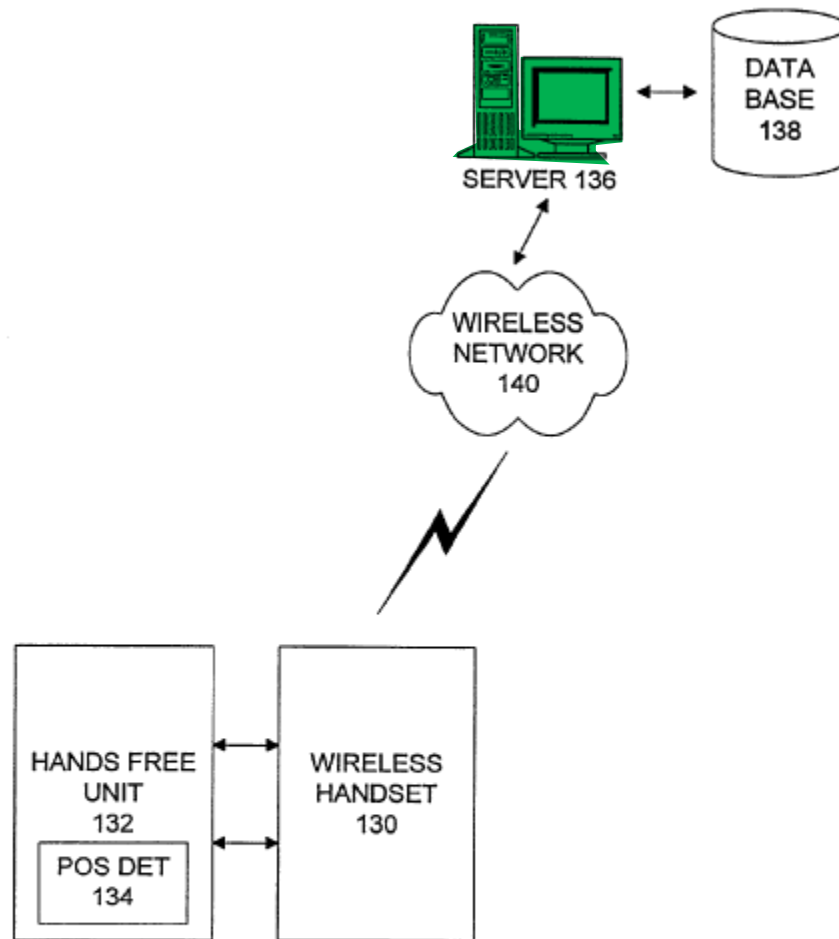
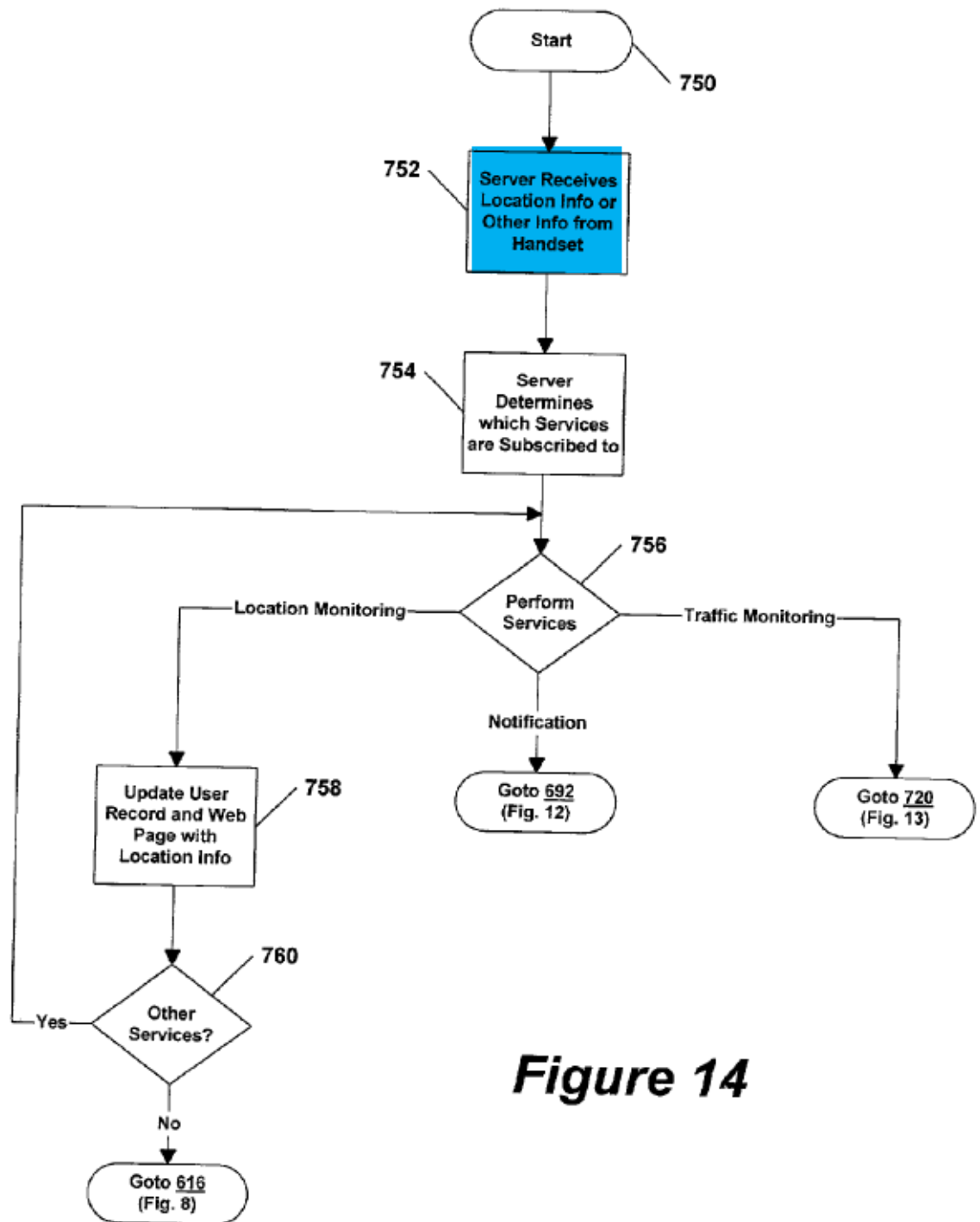


Fig. 2

**Figure 14**

Chern, FIGS. 2, 14.

- e. **[25e]: “receiving navigation information associated with the current position, wherein the navigation information comprises data for plotting a course on a map including the current position of the mobile communication device.”**

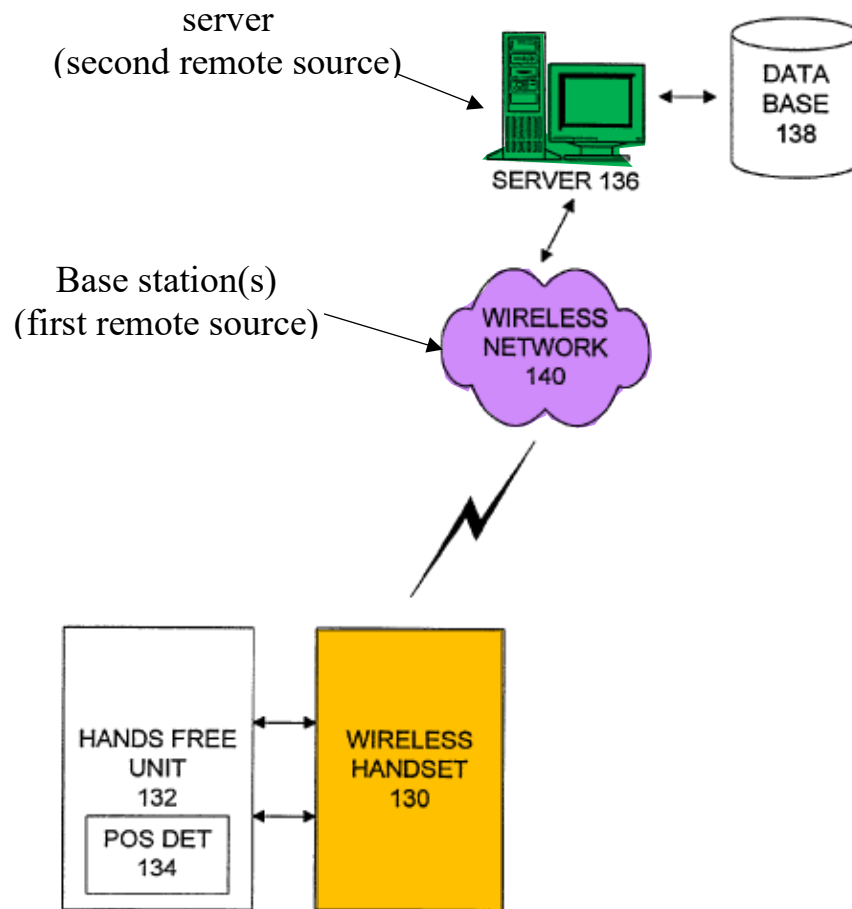
146. *Chern* in combination with *Garceran* renders obvious receiving navigation information, including data for plotting a course on the map, that includes the current position of the handset. As explained in [1e], *Chern* generates a “route” and “driving directions” (navigation information comprising data for plotting a course on a map) from a “starting point” corresponding to the “determined” “handset location” (including the current location of the mobile communication device), and the driving directions (navigation information) are received by the “handset 130 over network 140 and are displayed or audibly rendered to the user” as “textual driving directions[and] a map showing the route.” *Chern*, [0044].

147. Because the executed instructions “direct the overall operation” and “functionality” of the device, as explained for [25preamble], the combination likewise renders obvious performing the receiving in response to executing the instructions.

- f. Claim 26: “The memory device of claim 25, further comprising receiving supplemental information associated with the current position of the mobile communication device, wherein the supplemental information is received from a first remote source, and wherein the navigation information is received from a second remote source.”**

148. *Chern* in combination with *Garceran* renders obvious claim 26 for the reasons set forth below.

149. As explained for [24b]-[24e], the receiving base station is a first remote source (*Chern*, [0032], [0034], [0042, [0043]] (“wireless communication “[n]etwork 140 is typically comprised of a plurality of base stations that provide relay points for communication.”); *Garceran*, Abstract, 2:11-20) and as explained for [25d], the navigation information is received from a remote server—a second remote source. *Chern*, [0043], [0044], [0051]-[0054], FIG. 2; *see also* [24d]-[24e], above

**Fig. 2***Chern*, FIG. 2

150. *Garceran* further discloses receiving supplemental “information associated with or corresponding to the location of the wireless unit” that is “linked with additional parameters, such as wireless unit type, wireless unit identity, frequency, operating conditions and/or base station identity.” *Garceran*, Abstract, 2:21-28. The base station identity helps to identify which base station performed

the position measurement, thereby providing another indication of the communication device's position. *Garceran*, 4:39-44.

151. Accordingly, it would have been obvious to receive a base station's identity (supplemental information) from the base station, as taught by *Garceran*, to identify which base station performed the position measurement, thereby providing another indication of the communication device's position. *Garceran*, 4:39-44.

152. Such a modification would have only required using existing components for their routine purposes (e.g., transmitting existing identifying information from the base station (first remote source) connected to the mobile terminal to the server (second remote source) performing the position determination and navigation calculation) and would have been within the purview of a person skilled in the art. *See e.g., Kimoto* 31:31-36 (when a mobile terminal “enters a communication area of the radio base station 6 under a communicable state (a state in which a power source is ON), the mobile terminal 4 is connected to the radio base station 6 by detecting identification information (a CSID) of the radio base station 6 contained in radio waves from the radio base station 6. If the user makes a demand for information of a map ...the mobile terminal 4 transmits the detected CSID as its own position information to the information center 5 via the radio base station 6 over the public network 7.”) (Emphasis added).

10. Claim 27: “The memory device of claim 26, wherein the first remote source comprises a base station in communication with the mobile communication device.”

153. *Chern* discloses claim 27 because, as explained for claim 26, *Chern* discloses first and second remote sources for communicating with handset. *Chern*, [0034], [0042], [0043], FIG. 2. The first remote source includes the base station 112 for receiving and sending wireless communications. *Chern*, [0032], [0034], [0042], [0043], FIG. 2.

11. Claim 28: “The memory device of claim 27, wherein the supplemental information comprises an identity of the base station.”

154. *Chern* in combination with *Garceran* renders obvious claim 28 for reasons set forth below.

155. As explained for claims 26, *Chern* as modified by *Garceran* renders obvious receiving supplemental information including an identity of the base station because *Garceran* further discloses receiving “information associated with or corresponding to the location of the wireless unit” that is “linked with” additional parameters, such as ...base station identity” to help identify which base station performed the position measurement and provide another indication of the communication device’s position, as was known in the art. *Garceran*, Abstract, 2:21-28, 4:39-44; *Kimoto*, 31:31-36.

12. Claim 29: “The memory device of claim 27, wherein the second remote source comprises a network server associated with the mobile communication device.”

156. *Chern* discloses claim 29 because, as explained for claims 26 and 27, *Chern* discloses first and second remote sources for communicating with the handset. *Chern*, [0034], [0042, [0043], FIG. 2. The first remote source includes a base station 112 for receiving and sending wireless communications, and the second remote source includes remote network server 136. *Chern*, [0032], [0034], [0042, [0043], FIG. 2.

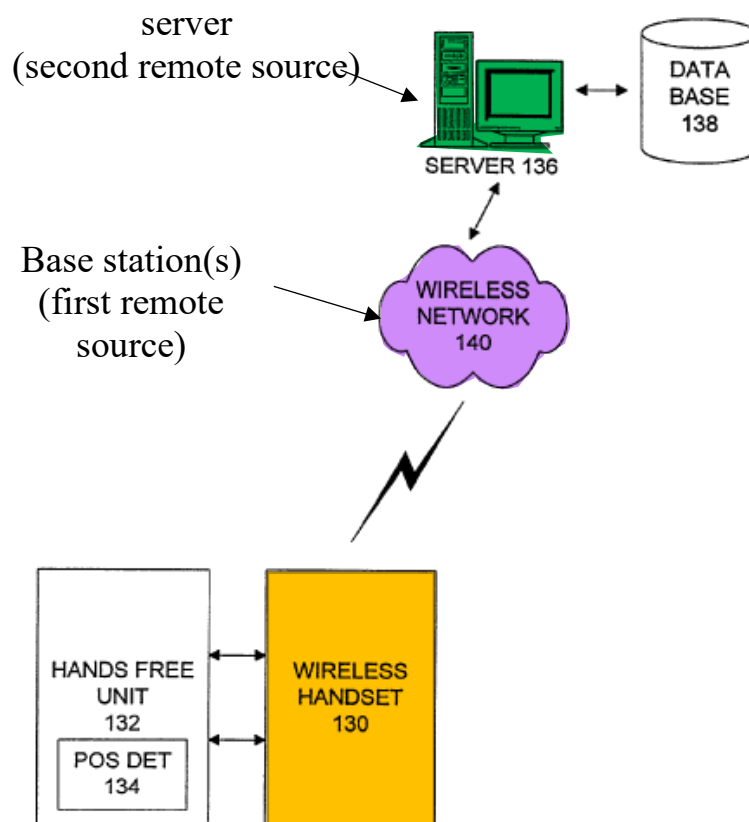


Fig. 2

B. Ground 2: Claims 11 and 15 Are Obvious In View Of *Chern* and *Garin*.

157. The '416 patent arguably covers an alternate embodiment in which the wireless communication device detects GPS signal interference, and the server determines navigation information based on a combination of GPS information and Bluetooth-based location information obtained using a Bluetooth transponder:

The positioning information may include information obtained from GPS satellites, and information obtained from other positioning elements such as repeaters and transponders... The transponder may transmit pseudorange information of the type that would be received by GPS receivers, but at a higher power level than could be received from the actual GPS satellites. Alternatively, it may transmit this information in locations which are otherwise shielded against such satellite communications, such as indoors or under tree cover. The transponder 605 may also include bluetooth transponders which may transmit directly to a bluetooth receiver 607 within the phone 600.”).

Ex. 1001, 4:48-64. Ground 2 addresses this alternative.

1. Claim 11

a. [11preamble]: “A method, comprising:”

158. *Chern* discloses [11preamble] because *Chern* discloses “a location-based information retrieval system and method for wireless communication devices” and method for requesting and receiving directions over a network. *Chern*, [0027], [0044]-[0054], Figure 3.

b. [11a]: “receiving, by a server, position information from a mobile communication device,”

159. *Chern* discloses [11a] because, as explained in Ground 1, element [1d], *Chern* discloses transmitting a handset’s (mobile communication device) “determined” location “to server 136 over wireless network 140.” *Chern*, [0044].

c. [11b]: “wherein the position information includes global positioning system (GPS) information and additional information about a local position of the mobile communication device other than the GPS information, wherein the additional information comprises an indication of signal interference detected at the mobile communication device;”

160. *Chern* in combination with *Garin* renders obvious [11b] for reasons set forth below.

161. As explained for Ground 1, element [1b], *Chern* discloses transmitting position information corresponding to GPS information to a server. *Chern*, [0040], [0045],[0084]. For example, when the user requests directions to a destination, “the request is communicated to server 136 over wireless network 140” and “the handset location determined by position determination system 134 is also provided to server 136 to provide a starting point for the directions.” *Chern*, [0044].

162. As explained for Ground 1, element [1c], *Chern* discloses detecting additional information at the handset that would improve the accuracy of its position determination system and sending both the GPS and additional information to a server. *Chern*, [0040]. For example, [i]n one implementation, a

speed of travel parameter is provided by handset 130 along with the current position” to allow the server to determine whether it needs to “update the position information” for direction calculation purposes. *Chern*, [0054]. Although *Chern* discloses that “any other useful location or position parameters” detected at the handset can also be used to determine the handset’s location or position, *Chern* does not disclose that the additional information includes an indication of signal interference. *Chern*, [0040]. But *Garin* does.

163. *Garin* discloses additional information comprising an indication of interference, teaching using additional positional “information from ... outside of the GPS satellite system” to “approximate” the handset’s location. *Garin*, 3:53-62, 4:3-8, 6:55-7:5, 7:33-34, 6:26-31, 7:55-67, 10:34-39. For example, when the handset detects the “lapse” in GPS signal, the handset’s Bluetooth sensor uses Bluetooth information acquired from a Bluetooth network to generate “augmented” position information—a “data ‘fusion’” of “information from the GPS satellites and a Bluetooth network.” *Garin*, 7:59-67, 8:49-62. The use of received Bluetooth information is an “indication of the signal interference” because, like in the ’416 patent, it signifies a “lapse” in one or more GPS signals, i.e., interference. *Garin*, 8:49-62; Ex. 1001, 3:53-64 (using a Bluetooth transponder to transmit “information in locations which are otherwise shielded against such satellite communications, such as indoors or under tree cover.”)

i. Motivation to Combine *Garin*'s Detection of Signal Interference with *Chern*'s System

164. In my opinion, a POSITA would have been motivated and found it obvious to configure *Chern*'s handset to use multiple sources of position information, including a "data 'fusion'" of Bluetooth and GPS, to improve location determination and the location-based services of *Chern*, as taught by *Garin*. *Garin*, 7:62-65 ("GPS acquisition, tracking, and navigation functions can be enhanced with inputs from the Bluetooth network without using the cellular network.") A POSITA would have likewise been motivated to transmit and receive at the server the GPS and Bluetooth (indication of signal interference) information to improve the location-based services provided by the server. Such an improvement would have been especially useful where environmental conditions, e.g., weather or building structures, limit, block, or otherwise prevent the GPS receiver from acquiring information from the GPS satellite.

ii. Expectation of Success

165. It is also my opinion that configuring *Chern*'s handset to generate and transmit Bluetooth information when GPS signal interference is detected (e.g., GPS signal strength decreases) would have only required routine skill to implement, e.g., integrating conventional Bluetooth sensor hardware and corresponding computer instructions. *Chern*, [0082] (explaining that location-based service methods "may be implemented as computer programs, software or

hardware” and functions relating to handset “may be coded in processor 104 or could be stored in memory 114.”). Configuring the server to receive the GPS and Bluetooth information would have only required routine skill to implement for the same reasons. Thus, a POSITA would have also had a reasonable expectation of success in modifying the server to receive the position information including GPS and Bluetooth information.

- d. **[11c]-[11d]: “determining, by the server, navigation information associated with the local position based on both the GPS information and the indication of signal interference, wherein the navigation information comprises data for plotting a course on a map including the local position of the mobile communication device”**

166. *Chern* in combination with *Garin* renders obvious determining, by the server, navigation information associated with the local position based on both the GPS information and the Bluetooth information (indication of signal interference).

167. As explained for [11b], *Chern* as modified by *Garin* teaches receiving a “data ‘fusion’” of Bluetooth and GPS information (both the indication of the signal interference and the GPS information) at the remote source.

168. *Chern* further discloses using the server to generate a “route” and “driving directions” (navigation information comprising data for plotting a course on a map) from a “starting point” corresponding the “determined” “handset location” (including the current location of the mobile communication device).

Chern, [0044]. *Garin* similarly teaches using the determined position information for “directions,” determining the “relative location of the cellular user to other landmarks,” and “directions for the cellular user via internet maps or other GPS mapping techniques, etc.” *Garin*, 1:52-59, 7:59-65. The “directions” (navigation information) contain data including the current location of the handset (“relative location of the cellular user”) and may be used for plotting a course on a map “via internet maps or other GPS mapping techniques.” *Garin*, 1:52-59.

e. [11e]: “and transmitting, by the server, the navigation information to the mobile communication device.”

169. *Chern* in combination with *Garin* renders obvious [11e] because *Chern* discloses transmitting the driving directions (navigation information) to “handset 130 over network 140[,]” where they are displayed or audibly rendered to the user” as “textual driving directions[and] a map showing the route[.]” *Chern*, [0044].

2. Claim 15: “The method of claim 11, wherein the additional information further comprises information associated with a local transponder.”

170. *Chern* in combination with *Garin* renders obvious claim 15 for the reasons set forth below.

171. Claim [11b] defines the additional information as comprising the indication of signal interference. As explained for [11b], *Garin*’s additional information is acquired by, and associated with, a Bluetooth sensor (local

transponder). *Garin*, 7:59-67, 8:49-62, 10:40-55. The handset's Bluetooth receives location information from nearby Bluetooth transmitters and uses this information when the handset is unable to receive adequate GPS signals. *Garin*, 7:62-65, 8:57-62. The handset then transmits this information as position data. *Garin*, 7:62-65, 8:57-62.

172. In my opinion, a POSITA would have understood that the Bluetooth information is associated with a local Bluetooth transponder because the handset receives transmitted Bluetooth signals from a "Bluetooth Network" and uses the Bluetooth information in response to the received Bluetooth signals when GPS signals are weak or otherwise unavailable. *Garin*, 7:62-65, 8:57-62. This is consistent with the '416 patent. Ex. 1001, 3:53-64 (explaining that Bluetooth transponders transmit "information in locations which are otherwise shielded against such satellite communications, such as indoors or under tree cover.").

C. Ground 3: Claims 20-23 and 30-35 Are Obvious In View Of *Yamakita*.

1. Independent Claim 20

a. [20preamble]: "A system, comprising:"

173. *Yamakita* discloses [20preamble] because *Yamakita* discloses a system "for analyzing the action of, e.g., a user who is carrying a portable terminal on the basis of information acquired from the portable terminal." *Yamakita*, 1:4-6, FIG. 1.

b. [20a]: “a communication interface configured to receive a communication from a cellular telephone over a cellular telephone network,”

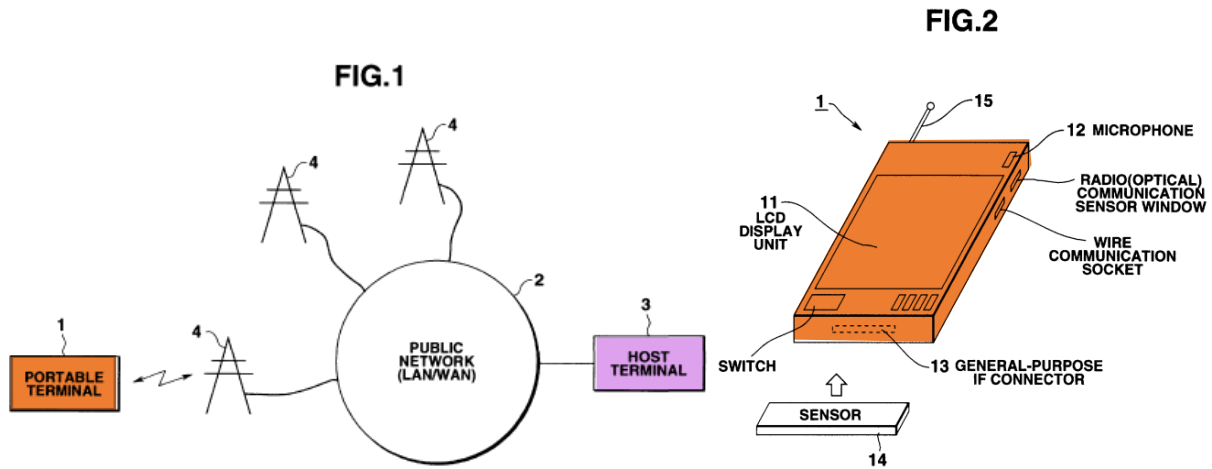
174. In my opinion, *Yamakita* discloses [20a] because the system includes a “host terminal” having a communication interface⁴ operated by a “communication control unit” and for receiving a “transmission packet” (communication) from a “portable terminal” such as a cellular phone, over a public “mobile communication network.” *Yamakita*, 2:47-53, 2:58-66, 3:53-60, 11:24-26, 5:39-42, FIGS. 1-2. The host terminal receives the “packet sent from the portable terminal 1 (packet prepared with processing of the flow chart shown in FIG. 5) ... to analyze the action of the user who is carrying the portable terminal 1.” *Yamakita*, 5:53-56.

175. A POSITA would have understood that *Yamakita*’s network is a cellular network because it has a “cell range” and “a cell...manage[s] the portable terminal.” *Yamakita*, 11:24-26. Furthermore, *Yamakita*’s network, like the network⁵ of the ’416 patent, uses a plurality of base stations (cells) to facilitate wireless communication between the portable terminal and remote server.

⁴ The ’416 patent does not identify a particular structure corresponding to a communication interface. *See generally* Ex. 1001.

⁵ The ’416 patent does not use the term “cellular network.” *See generally* Ex. 1001.

Compare Ex. 1001, 1:29-35, with Yamakita, FIG. 1.



Yamakita, FIGS. 1-2.

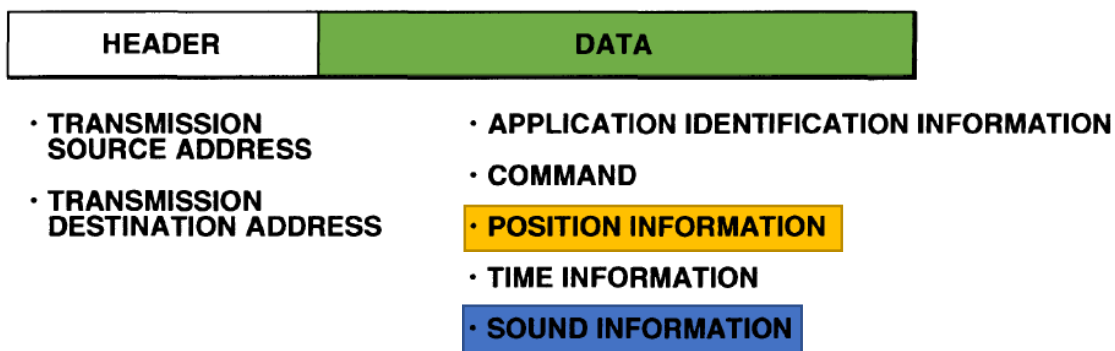
176. A POSITA would have also found it obvious to use a cellular network to facilitate long-range communications between the portable terminal and host terminal (server), as was well known in the art. *See, e.g., Garin*, 2:45-47, 5:45-50 (describing “a method and a system for delivering GPS data to wireless communications systems, including cellular and PCS Subscribers” using a “cellular network.”); *Obradovich*, 1:4-12, 22:4-7 (describing a navigation system and cellular device that communicates using “cellular phone networks” to enable “up-to-date information” during “travel.”); *Naito*, 1:1-9, 5:39-53 (describing a communication network system including a “plurality ... of cellular base stations” for facilitating wireless communication between a “portable terminal” and a remote “host terminal” and explaining that “[t]he portability of the terminal apparatuses is particularly enhanced when high mobility is achieved through

connection for radio communication between the terminals and the host computer.”).

- c. **[20b]: “wherein the communication comprises global positioning system (GPS) information and environmental information about a current position of the cellular telephone, and wherein the environmental information is acquired by one or more sensory input devices of the cellular telephone;”**

177. *Yamakita* discloses [20b] because the transmission packet (communication) includes position (GPS) and sound information (environmental information) about the portable terminal’s current location, wherein the sound information is acquired by a microphone of the portable terminal (sensory input device). *Yamakita*, FIG. 4, Abstract, 2:54-63, 4:21-34.

FIG.4



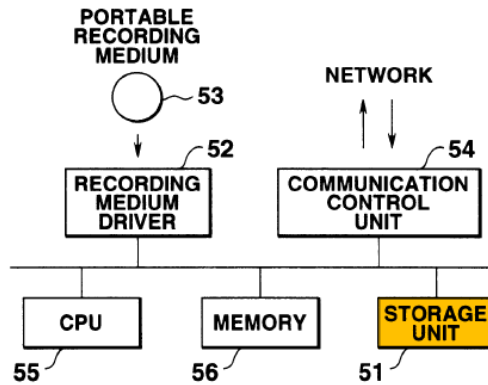
Yamakita, FIG. 4

178. The position information corresponds to GPS information acquired using a “GPS sensor,” that “detects the position (e.g., aa°bb’ north and cc°dd’ east) of the portable terminal 1 at a certain time point” *Yamakita*, 2:54-58, 3:48-51.

179. The sound information corresponds to “ambient sound data (e.g., noise)” acquired using portable terminal microphone 12. *Yamakita*, 4:28-30, 4:32-34, 4:55-56. Thus, when the portable terminal is located at a train station, “sounds unique to the train” are detected “at the timing when the position information is detected” and the sound information communicated in the transmission packet reflects the same. *Yamakita*, 3:3-6, 3:48-51, 4:28-34, 6:26-33.

d. [20c]: “a database configured to store local information associated with the current position;”

180. In my opinion, *Yamakita* discloses [20c] because the host terminal includes storage unit 51 (database) storing “map data” (local information) associated with the user’s current position. *Yamakita*, 2:16-17, 2:34-35, FIG. 6, FIG. 9 (illustrating “map data stored in the host terminal”), FIG. 16 (illustrating “table which stores names on a map and corresponding position information”).

FIG.6*Yamakita*, FIG. 6.

181. *Yamakita*'s host terminal 3 stores "map data as shown in FIG. 9," including "map data associated with all railways" local to portable terminal. *Yamakita*, 6:40-57. "These map data are stored in, e.g., the storage unit 51 and loaded in the memory 56 as a reference, as needed." *Yamakita*, 6:40-42, 6:53-61. FIG. 6 (illustrating host terminal having storage unit 51 for storing map data) and FIG. 9 (illustrating stored map data). The host terminal also utilizes the table shown in Figure 16 which "stores various names on the map and corresponding position information" including **local information**, e.g., "STATION A" associated with the portable terminal's **current position** " x_{101}, y_{101} ." *Yamakita*, 9:2-22, FIG. 16.

FIG.9

A RAILWAY	STATION NAME	SECTION	POSITION	APPROXIMATE CURVE
	STATION A		(x_A, y_A)	
		STATION A - POINT B		$y = f_b(x)$
		POINT B - POINT C		$y = f_c(x)$
		POINT C - POINT D		$y = f_d(x)$
		POINT D - STATION B		$y = f_B(x)$
	STATION B		(x_B, y_B)	
	⋮			
B RAILWAY ⋮ ⋮ ⋮				

FIG.16

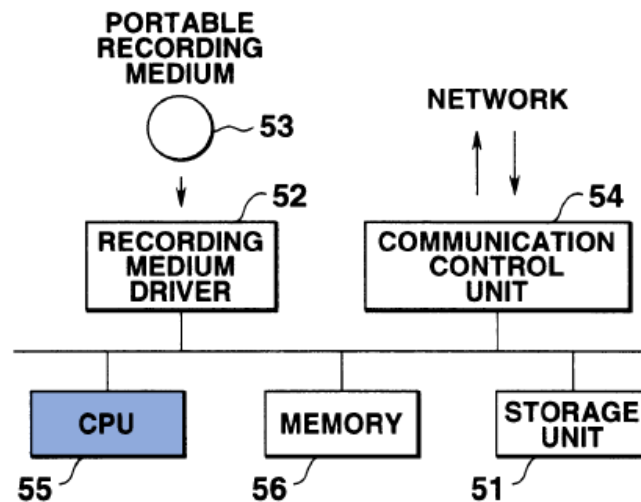
USER REGISTRATION DATA	REGISTRATION POSITION	NAME
	x_{101}, y_{101}	STATION A
	x_{102}, y_{102}	STATION B
	⋮	
	x_{501}, y_{501}	HEAD OFFICE
	x_{502}, y_{502}	BUSINESS OFFICE
	x_{503}, y_{503}	MR. K'S HOME
	⋮	

Yamakita, FIGS. 9, 16.

e. [20d]: “and a processing device configured to:”

182. *Yamakita* discloses [20d] because *Yamakita*’s host terminal includes a CPU (processing device), illustrated in Figure 6, for loading and executing “programs for realizing the functions of the flow charts shown in FIGS. 7, 10, 11, 12, and 15.” *Yamakita*, 5:40-51, 10:5-11.

FIG.6



Yamakita, FIG. 6.

f. [20e]: “process the GPS information and the environmental information;”

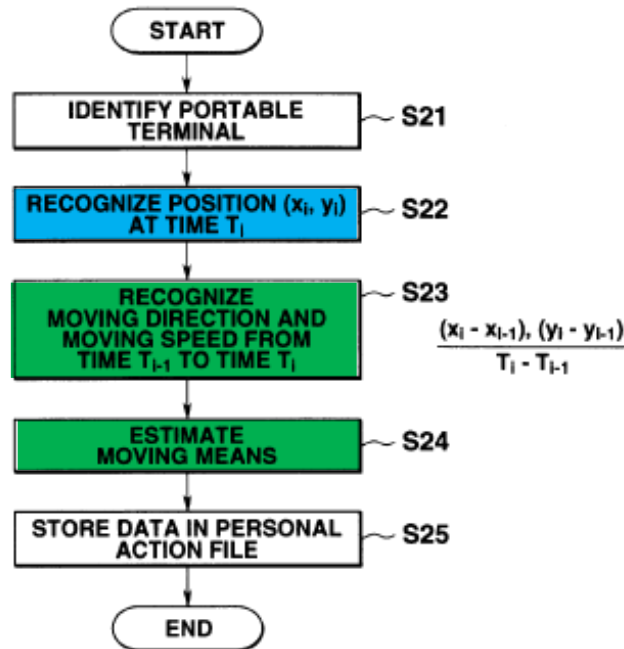
183. *Yamakita* discloses [20e] as explained below.

184. As explained for [20a]-[20b], the host terminal receives location, sound, and image data (GPS and environmental information) from the portable

terminal. *Yamakita*, 2:47-53, 2:58-66, 3:3-6, 3:48-51, 3:53-60, 4:21-34, 6:26-33, 11:24-26, FIG. 4.

185. Upon receiving the data, the host terminal CPU “executes” a program for preparing “a packet from [the] data acquired by the portable terminal and sending the packet” in accordance with the flow chart illustrated in Figures 5 and 7. *Yamakita*, 2:6-8, 4:35-39, 5:43-44, 5:53-56. This program processes both the GPS information and the ambient sound and/or image information (environmental information) because it extracts the necessary data and uses it to compile the relevant navigation information into an action table for later transmission, as explained below for [20f]-[20g].

186. *Yamakita*’s [step S22](#) of Figure 7 shows how the host terminal CPU processes the portable terminal’s GPS information, that is, the “position information and time information, which are stored in the data portion of the received packet, are extracted to recognize the position (x_i, y_i) of the portable terminal 1 at time T_i .” *Yamakita*, 5:64-6:1. Steps [S23-24](#) show how the CPU processes the environmental information, e.g., “sound information stored in the data portion of the received packet” to determine the portable terminal’s “moving means (walking, train, motor vehicle, stop, ...).” *Yamakita*, 6:1-14.

FIG.7

Yamakita, FIG. 7.

- g. [20f]: “retrieve the local information from the database in response to processing the GPS information and the environmental information;”

187. As explained below, *Yamakita* discloses [20f].

188. In response to the processing of [20e], the host terminal retrieves the mapping data associated with the user’s location (local information) from the storage unit 51 (database). *Yamakita*, 5:64-6:9, 6:37-45, FIG. 7.

189. The host terminal compares the extracted, processed GPS and environmental information to the retrieved local information map data illustrated in Figure 9 and the local information data table illustrated in Figure 16 to generate an action record table according to the process of Figure 15, as discussed in [20g] below. *Yamakita*, 6:37-45, 9:2-48, FIGS. 9, 7, 15, 16.

- h. [20g]: “generate mapping information associated with the current position, wherein the mapping information comprises for plotting a course on a map including the current position of the cellular telephone;”**

190. As explained below, *Yamakita* discloses [20g] because the host terminal uses the processed GPS and environmental information to generate an action table (mapping information) for plotting a course on a map that includes the current position of the portable terminal. *Yamakita*, 6:37-45, 9:2-48

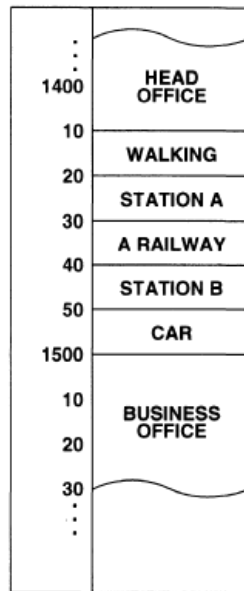
191. The host terminal compares the extracted, processed GPS and environmental information to the retrieved local information map data illustrated in Figure 9 and the local information data table illustrated in Figure 16 to generate an action record table according to the process of Figure 15. *Yamakita*, 6:37-45 (“Upon receiving the information transferred from the portable terminal 1, the host terminal 3 executes the processing of the flow chart shown in FIG. 7 to analyze the moving route of the user who is carrying the portable terminal 1. For the purpose of analyzing the route, the host terminal 3 has map data as shown in FIG. 9.”), 9:2-

48 (explaining that “[t]he table shown in FIG. 16 stores various names on the map and corresponding position information” and the “extracted” position information is “checked” by “refer[ring]” to the table shown in Figure 16), FIGS. 9, 7, 15, 16.

The generated action record table (mapping information) reflects the user’s current position, route, and mode of transportation (data for plotting a course on a map).

Yamakita, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14.

FIG.14



Yamakita, FIG. 14.

- i. **[20h]: “and cause the mapping information to be transmitted to the cellular telephone.”**

192. As explained below, *Yamakita* discloses [20h].

193. As explained for [20g], the host terminal CPU generates an action record table (mapping information) reflecting the user’s current position, route, and

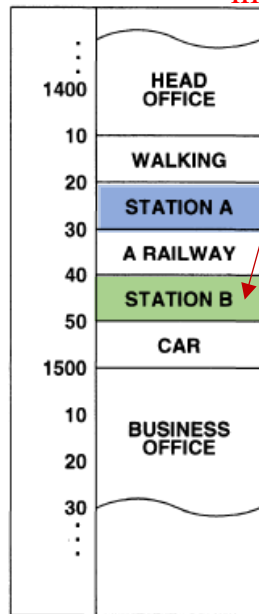
mode of transportation (data for plotting a course on a map). *Yamakita*, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14.

194. The host terminal stores the generated action record table containing the current location and route, and upon receiving “a packet for requesting display of the action record table ... from the portable terminal 1,” transfers it in a data packet to the portable terminal (cellular telephone). *Yamakita*, 9:46-51.

2. Claim 21: “The system of claim 20, wherein the processing device is further configured to generate new mapping information associated with a new position of the cellular telephone.”

195. *Yamakita* discloses claim 21 because the CPU (processing device) is configured to generate new mapping information associated with new position information (P_2) and corresponding to, e.g., the movement of “the user who was carrying the portable terminal 1 [and] moved from station A to station B by A railway.” *Yamakita*, 6:16-42.

196. Navigation information “STATION A” is associated with, e.g., the local position of the portable terminal (acquired at 14:20), while navigation information “STATION B” is associated with the new position (acquired at 14:40). *Yamakita*, FIGS. 14, 16, 18.

FIG.14 New mapping information**FIG.16**

New position

USER
REGISTRATION
DATA

REGISTRATION POSITION	NAME
X ₁₀₁ , Y ₁₀₁	STATION A
X ₁₀₂ , Y ₁₀₂	STATION B
⋮	
X ₅₀₁ , Y ₅₀₁	HEAD OFFICE
X ₅₀₂ , Y ₅₀₂	BUSINESS OFFICE
X ₅₀₃ , Y ₅₀₃	MR. K'S HOME
⋮	

Yamakita, FIGS. 14, 16.

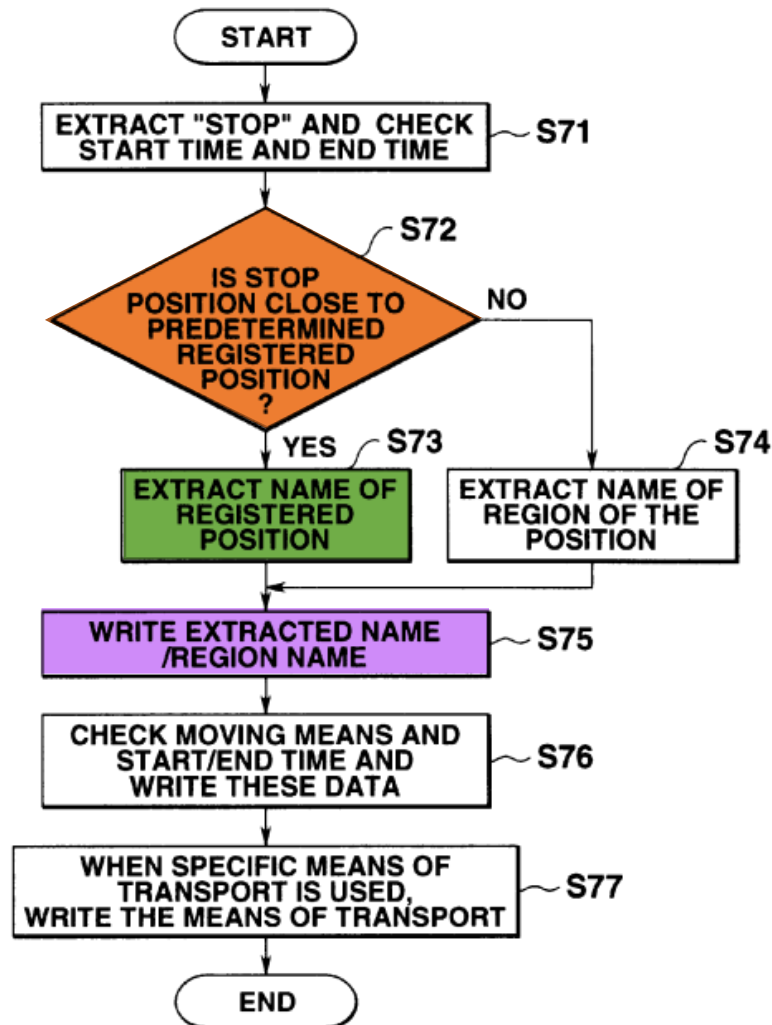
3. **Claim 22:** “The system of claim 21, wherein the mapping information is generated at a first time associated with the current position, and wherein the new mapping information is generated at a second time associated with the new position.”

197. As explained for claim 21, mapping information “STATION A” is associated with the user/portable terminal’s current position (x_{101}, y_{101}), and new mapping information “STATION B” is associated with a new position (x_{102}, y_{102}) of the portable terminal. *Yamakita*, 6:15-19 (describing the “case wherein the user who was carrying the portable terminal 1 moved from station A to station B by A railway”), FIGS. 14, 16, 18.

198. *Yamakita* further discloses that mapping information corresponding to a particular position is generated at a time associated with that position because the host terminal processes the position information associated with the mapping information sequentially. *Yamakita*, 5:61-6:14, 8:61-64, 9:2-6, 15-17. FIGS. 7, 15.

199. For example, as illustrated in Figure 10, the host terminal calculates (estimates) the user/portable terminal's "movement situation" at specific time frames, e.g., from time T_{i-1} to time T_i , corresponding to specific positions, and "sequentially stores the estimation result data at each time (time when the position information and the like are detected by the portable terminal 1)." *Yamakita*, 5:65-6:2, 6:55-7:2, 7:39-42 (emphasis added).

200. Then, as illustrated in Figure 15, the host terminal sequentially determines, for each estimation result, mapping information by (1) comparing, in *S72*, each estimation result to "[t]he table shown in FIG. 16 [which] stores various names on the map and corresponding position information" (2) extracting, in *S73*, the name (e.g., a railway station) corresponding to the position and (3) writing, in *S75*, the mapping information (railway name) into the action record table. *Yamakita*, 8:61-64, 9:2-6, 9:15-17.

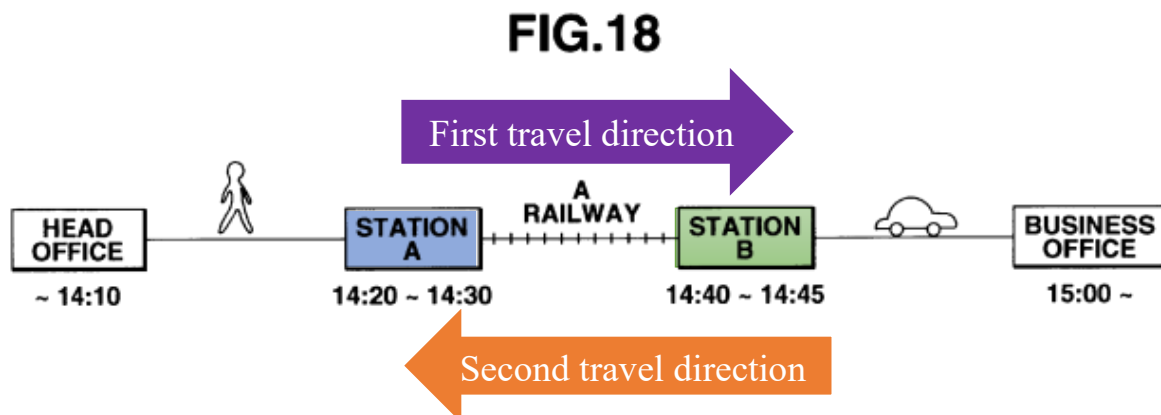
FIG.15*Yamakita, FIG. 15.*

201. Thus, the host terminal generates mapping information (STATION A) corresponding to (x_{101}, y_{101}) at a first time associated with that position and mapping information (STATION B) corresponding to (x_{102}, y_{102}) , at a second time associated with that position.

4. **Claim 23:** “The system of claim 21, wherein the mapping information comprises navigation instructions from the current position to the new position in a first direction of travel, and wherein the new mapping information comprises navigation instructions from the new position to the current position in a second direction of travel.”

202. As explained for claim 21, the mapping information presented in the action table reflects “STATION A” corresponding to a current position (x_{101} , y_{101}) and corresponding time (e.g., 1420), while “STATION B” corresponds to a new detected position (x_{102} , y_{102}) and corresponding time (e.g., 1440). *Yamakita*, 6:16-20, FIGS. 14, 16, 18.

203. The mapping information also provides navigation instructions from, e.g., STATION A (current position) to STATION B (new position) in a first direction of travel because it tells the user how advance towards station B (i.e., to use a railway). *Yamakita*, FIG. 18.



Yamakita, FIG. 18.

204. A POSITA would have understood that the new mapping information corresponding to STATION B also includes instructions from STATION B to STATION A because it tells the user, by way of illustration, that the reverse direction (i.e., second direction of travel) may be used to return to STATION A (the previous current position).

5. Independent Claim 30

a. [30preamble]: “An apparatus, comprising:

205. *Yamakita* discloses [30preamble] because *Yamakita* discloses a portable terminal 1, which is an apparatus. *Yamakita* 3:3-9, FIG. 2.

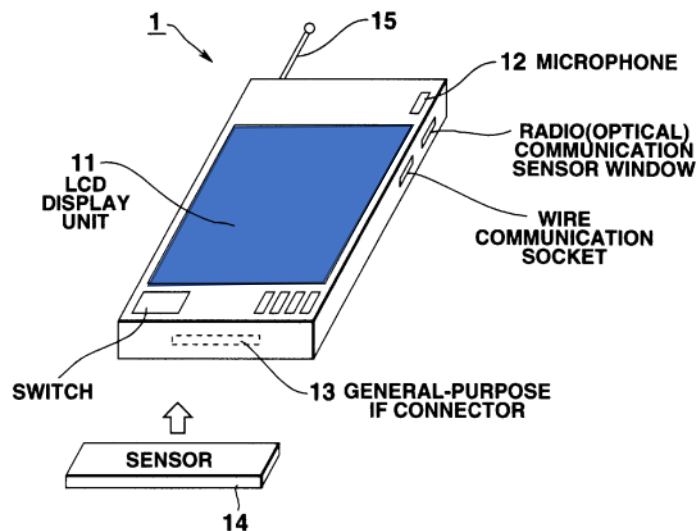
b. [30a]: “means for determining a current location of the apparatus;”

206. *Yamakita* discloses both the function and structure of [30a] because *Yamakita*’s portable terminal includes a “CPU 21 [which] executes a program” that “sequentially prepare[s]” “position information ... on the basis of the output from the GPS sensor 14.” *Yamakita*, 3:10-12, 4:21-25, 4:37-43. The CPU, like the processor of the ’416 patent is a “means for determining a current location.” Ex. 1001, 1:19-25 (describing “processor 110 which processes signals from ... GPS device 115.”).

c. [30b]: “means for displaying navigation instructions;”

207. *Yamakita* discloses both the function and structure of [30b] because the “portable terminal 1 has an LCD display unit 11” comprising a “liquid crystal

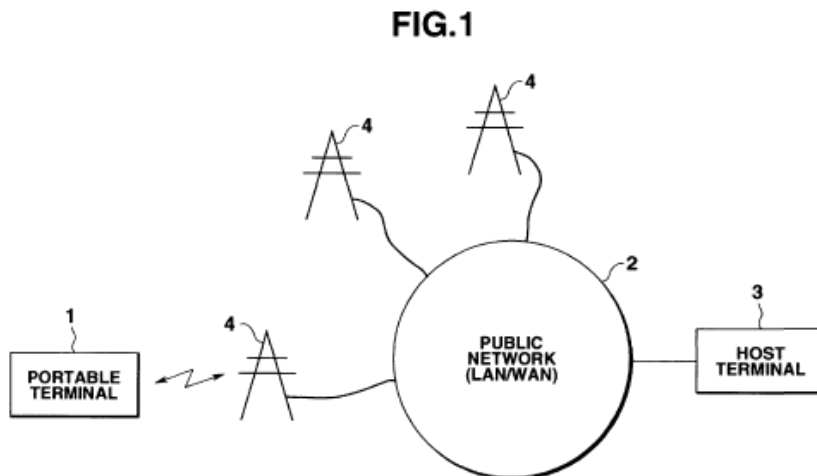
display 31” for displaying information. *Yamakita*, 3:3-6, 3:34-41, FIGS. 2-3. When the portable terminal “extracts” navigation instructions included in an “action record table” from a data packet transferred from a host terminal/server, it “displays it on the LCD display unit 11.” *Yamakita*, 9:63-10:4, 11:28-31, FIGS. 14, 18 (illustrating extracted displayed navigation instructions).

FIG.2*Yamakita*, FIG. 2.

208. In my opinion, the LCD, like the “display” screen 502 of the ’416 patent is a “means for displaying”(Ex. 1001, 3:51-53, FIG. 5) because a POSITA would have understood the screen to be capable of displaying (and, in the case of *Yamakita*, does display) such content.

d. [30c]: “means for wirelessly communicating information about the current location to a remote processing device,”

209. *Yamakita* discloses both the function and structure of [30c] because the portable terminal 1 includes a “radio communication antenna 15” and “radio transceiver 41” for wirelessly communicating the GPS-determined “position of the portable terminal ... correspond[ing] to the position of the user” (current location) to a host terminal (remote processing device) via the base station. *Yamakita*, 3:8-9, 3:53-60, 4:21-28, FIG. 3. *Yamakita*’s “radio transceiver 41 is connected to the radio communication antenna 15 shown in FIG. 2 to transmit/receive data to/from the base station 4” and “host terminal (server machine) 3” via a wireless “public network.” *Yamakita*, 2:47-52, 3:3-9, 3:53-60, FIGS. 1-2.



Yamakita, FIG. 1.

210. In my opinion, *Yamakita*’s antenna and transceiver, like the “antenna” and “receivers/ transmitters” of the ’416 patent, are a “means” for wireless

communication within the meaning of the '416 patent because they are the same or equivalent to the wireless communicating structures disclosed in the '416 patent.

Ex. 1001, 3:48-51, 6:5-9.

- e. **[30d]: “wherein the information about the current location comprises global positioning system (GPS) information and environmental information about the current location other than the GPS information, and wherein the environmental information comprises visual or auditory sensory input acquired by the apparatus;”**

211. As explained below, *Yamakita* discloses [30d].

212. The information about the current location includes “pieces” of information, such as current position information acquired by the portable terminal’s “GPS sensor” (GPS information) and sound and image information (environmental information other than the GPS information) corresponding to the portable terminal’s current position. *Yamakita*, FIG. 1, Abstract, 2:54-63, 3:48-51, 4:21-34.

213. The portable terminal uses a microphone 12 to collect the “ambient sound data (e.g., noise)” and a camera to “acquire” the “image information as ambient information.” *Yamakita*, 4:28-30, 4:32-34, 4:55-56. The image information and noise are environmental information, as described in the '416 patent. Ex. 1001, 6:11-17, claim 18 (“wherein the environmental information comprises image data captured by the camera”), claim 19 (“wherein the

environmental information comprises sound data captured by the microphone”).

The camera and microphone provide visual or auditory sensory inputs, respectively, within the meaning of the ’416 patent. Ex. 1001, 6:11-17 (describing a camera and microphone for receiving images and sound environmental information).

- f. **[30e]: “and means for wirelessly receiving the navigation instructions associated with the current location, wherein the navigation instructions data for plotting a course on a map including the current location of the apparatus.”**

214. *Yamakita* discloses both the function and structure of [30e] because, as explained for [30c], *Yamakita*’s radio transceiver 41 and radio communication antenna 15 “transmit/receive data to/from the base station 4” and “host terminal (server machine) 3” via a wireless public network. *Yamakita*, 2:47-52, 3:3-9, 3:53-60, FIGS. 1-2 (emphasis added).

215. In my opinion, *Yamakita*’s antenna and transceiver are “means for wirelessly receiving” within the meaning of the ’416 patent because they are the same or equivalent to the wireless receiving structures disclosed in the ’416 patent. Ex. 1001, 3:48-51, 6:5-9.

216. The received information received includes an action record table reflecting the user’s current position, route, and mode of transportation, i.e.,

navigation information corresponding to data for plotting a course on a map, as explained in [20g]. *Yamakita*, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14.

6. Claim 31: “The apparatus of claim 30, wherein the data for plotting the course on the map is generated by the remote processing device.”

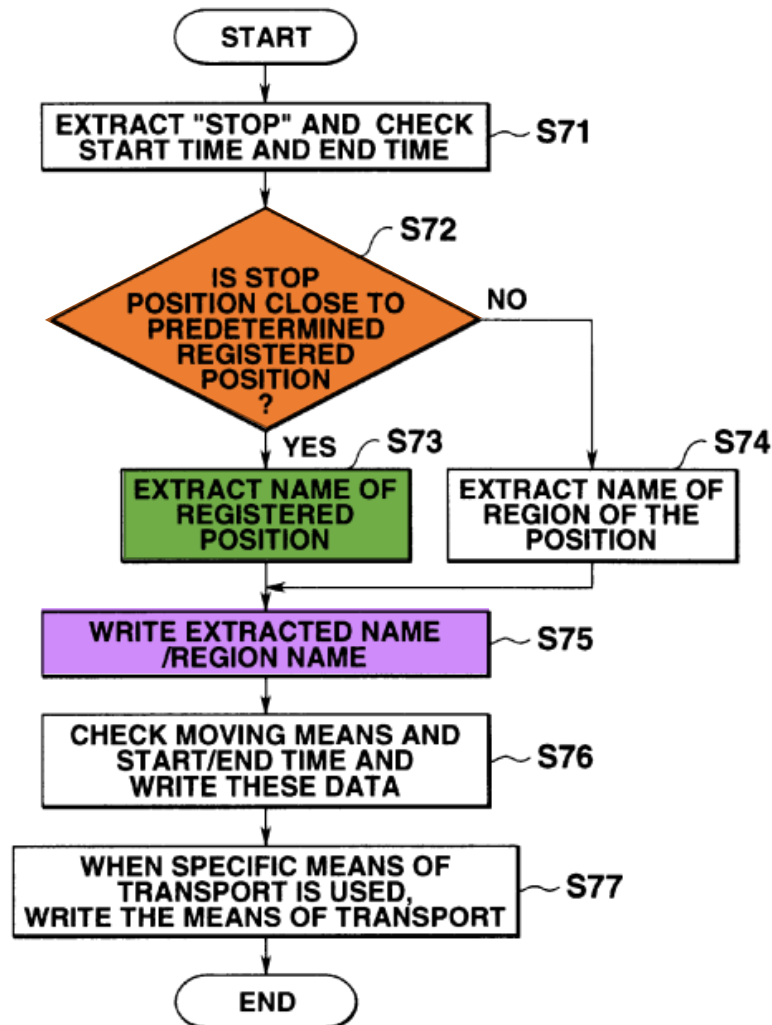
217. As discussed for [30e], the portable terminal receives an action record table reflecting the user’s current position, route, and mode of transportation, i.e., navigation information corresponding to data for plotting a course on a map.

218. *Yamakita* discloses claim 31 because *Yamakita*’s host terminal (remote processing device) generates the data by calculating the user’s position and movement based on the GPS and environmental information, comparing the position and movement to a table of location names and corresponding positions, extracting the names/positions corresponding to the user’s positions, and writing the extracted names to the action table. *Yamakita*, 6:37-45 (“Upon receiving the information transferred from the portable terminal 1, the host terminal 3 executes the processing of the flow chart shown in FIG. 7 to analyze the moving route of the user who is carrying the portable terminal 1. For the purpose of analyzing the route, the host terminal 3 has map data as shown in FIG. 9.”), 7:39-42, 8:61-64, 9:2-48 (explaining that “[t]he table shown in FIG. 16 stores various names on the map and corresponding position information” and the “extracted” position

information is “checked” by “refer[ring]” to the table shown in FIG. 16), FIGS. 7, FIG. 15.

219. More specifically, as illustrated in Figure 10, the host terminal (remote processing device) generates the navigation information by calculating the user/portable terminal’s “movement situation” at specific time frames, e.g. “from time T_{i-1} to time T_i ” corresponding to specific positions, “sequentially stor[ing] the estimation result data at each time (time when the position information and the like are detected by the portable terminal 1).” *Yamakita*, 7:39-42.

220. Then, as illustrated in Figure 15, the host terminal determines for each estimation result, data for plotting a course on a map by (1) comparing, in *S72*, each estimation result to “[t]he table shown in FIG. 16 [which] stores various names on the map and corresponding position information” (2) extracting, in *S73*, the name (e.g. a railway station) corresponding to the position and (3) writing, in *S75*, the mapping information (railway name) into the action record table. *Yamakita*, 8:61-64, 9:2-6, 9:15-17.

FIG.15

Yamakita, FIG. 15.

7. **Claim 32:** “The apparatus of claim 30, further comprising means for acquiring the [G]PS information.”

221. *Yamakita* discloses both the function and structure of claim 32 because as discussed for [30a], the portable terminal includes a GPS sensor 14. *Yamakita*, 3:3-7, FIGS. 2-3. The sensor acquires “the current position by

communicating with, e.g., an artificial satellite” and generates position data output, e.g., “P₀, P₁, P₂, . . . , P₁₀” at times “T₀, T₁, T₂ . . . , T₁₀” using the information communicated by the satellite. *Yamakita*, 2:54-58, 6:21-27.

222. The GPS sensor like the “GPS device” or “GPS computer” of the ’416 patent is a “means for acquiring the [G]PS information.” Ex. 1001, 1:16-18, 3:17-19, 4:33-36 (describing a “GPS device” or “GPS computer” for determining a thin client’s current location).

8. Claim 33: “The apparatus of claim 30, further comprising means for acquiring the environmental information.”

223. *Yamakita* discloses both the function and structure of claim 33 because as explained for [30d], the portable terminal uses microphone 12 to collect the “ambient sound data (e.g., noise)” and a camera to “acquire” the “image information as ambient information.” *Yamakita*, 4:28-30, 4:32-34, 4:55-56. The image information and noise are environmental information, as described in the ’416 patent. Ex. 1001, 6:11-17, claim 18 (“wherein the environmental information comprises image data captured by the camera”), claim 19 (“wherein the environmental information comprises sound data captured by the microphone”).

224. Both the microphone and camera, like the “camera” and “microphone” of the ’416 patent, are “means for acquiring the environmental information” because they acquire sound and image information, respectively. Ex. 1001, 6:11-16.

9. **Claim 34: “The apparatus of claim 30, wherein the means for determining comprises means for determining a new location of the apparatus, wherein the means for wirelessly communicating comprises means for wirelessly communicating updated information about the new location to the remote processing device, and wherein the means for wirelessly receiving comprises means for wirelessly receiving updated navigation instructions associated with the new location.”**

225. As explained for [30a], [30c], and [30e], the portable terminal includes means for determining (CPU), means for wirelessly communicating, and means for wirelessly receiving (transceiver and antenna). *Yamakita*, 2:47-52, 3:3-9, 3:47-48, 3:53-60, FIGS. 1-3.

226. The CPU also determines whether a location is new by determining whether coordinates (locations) acquired at a particular time are different from a location acquired at an earlier time. Thus, when “the user who was carrying the movable terminal 1 was continuously present at position P_0 [at] time T_1 through time T_4 ” the processor determines that the user has not moved to a new location. *Yamakita*, 10:47-11:21, FIG. 17.

227. The transceiver and antenna also constitute means for wirelessly communicating updated information about the new location to the remote processing device and means for wirelessly receiving updated navigation instructions associated with the new location because their capacity to communicate and receive information is independent of the content being

communicated. This is consistent with the '416 patent, which does not identify or otherwise define communicating means based on the timing of the communication (new or otherwise). *See generally* Ex. 1001

10. Claim 35: “The apparatus of claim 34, wherein the means for displaying comprises means for displaying the navigation instructions to find the new location and for displaying the updated navigation instructions for returning to the current location.”

228. As explained for [30b], the apparatus includes means for displaying navigation instructions—LCD display unit 11. *Yamakita*, 9:63-10:4, 11:28-31, FIG. 18.

229. The LCD's capacity to display the navigation information is independent of the content of that navigation information; thus, the LCD further constitutes means for displaying the navigation instructions to find the new location and for displaying the updated navigation instructions for returning to the current location. This is consistent with the '416 patent, which does not identify or otherwise define displays in terms of the content being displayed. *See generally* Ex. 1001.

XII. CONCLUSION

230. For the reasons set forth in Section XI, it is my opinion that one skilled in the art would have found claims 1, 2, 7, 8, 11, 14, 16, and 20-35 of the '416 patent to be obvious.

231. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

232. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful 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.

Date: 8 / 2 / 2023

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Sam Pullen", followed by a long horizontal line.

Samuel P. Pullen, PhD