

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. IPR2023-01049

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, 3-6, 9-13, and 17-19 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, 3-6, 9-13, and 17-19 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 (“ <i>Yamakita</i> ”)
Ex. 1006	U.S. Patent No. 6,336,073 to Ihara et al. (“ <i>Ihara</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. 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
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> ”)

Exhibit	Description
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 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, 3-6, 9-13, and 17-19 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 and 11;
- detecting, sending, or receiving environmental information as recited in independent claim 17; 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 claim 17 of the '416 patent:

- acquiring, by a communication device, a plurality of items of information representing a current location of the communication device, wherein the plurality of items of information comprises ... environmental information associated with the current location, and wherein the environmental information is acquired by one or more sensory input devices of the communication device;
- communicating, by the communication device ... the environmental information associated with the current location, to a remote server;
- receiving, by the communication device, current position information in response to communicating the plurality of items of information, wherein the current position information comprises data for plotting a course on a map including the current location of the communication device; and
- displaying, by the communication device, the map based on the current position information.

Ex. 1014, 230-45

51. It is my opinion that the signal interference information and indication of signal interference recited in independent claims 1 and 11 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 claim 17 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.

52. 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

53. 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.

54. 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.

55. 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.

56. 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 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

57. 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.

58. 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.

59. I met the criteria for a POSITA at the effective filing date of the ’416 patent.

IX. THE PRIOR ART

60. 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. 1006	U.S. Patent No. 6,336,073 to Ihara et al. (“ <i>Ihara</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. 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> ”)

61. As explained below, in my opinion, claims 1, 3-6, 9-13, and 17-19 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)

62. *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.

63. *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].

64. *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].

65. *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)

66. *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.

67. *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

68. 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.

69. 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.

70. *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. *Ihara* (U.S. Patent No. 6,336,073)

71. *Ihara* was published as U.S. Patent No. 6,336,073 on January 1, 2002, and was filed on July 26, 2000. I understand and have been asked to assume that *Ihara* is prior art to the ’416 patent.

72. *Ihara* teaches a method for providing “route guidance by using a standard communications protocol” such as XML. *Ihara*, 2:64-67, 10:14-18. The information is transmitted in “a tag format indicating attributes and contents of the information in accordance with the communications protocol” including tags for “specify[ing]” “coordinates information on a position” and the “form (type) of content[] ... such as text data, image data, audio data, video data.” *Ihara*, Abstract, 6:11-43, 10:65-11:15, 11:35-44. The format ensures that a “terminal device is

capable of receiving, using the standard communications protocol, various [kinds of] information in the suitable format for the route guidance.” *Ihara*, Abstract, 10:65-11:15, 11:35-42.

73. *Ihara* 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 Ihara*, Abstract, 2:64-67, 10:14-18.

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

74. *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.

75. *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).

76. “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.

77. *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

78. 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, 3-6, 9-13, and 17-19 of the ’416 patent would have been obvious to one of ordinary skill in the art.

79. In particular, it is my opinion that claims 1, 3-6, 9-13, and 17-19 of the '416 patent would have been obvious to a person of ordinary skill in the art based on the combinations shown below:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	1, 3-5 and 9-13	103	<i>Chern and Garceran</i>
2	6	103	<i>Chern, Garceran, and Ihara</i>
3	17-19	103	<i>Yamakita</i>
4	17-19	103	<i>Yamakita and Chern</i>

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

80. In my opinion, claims 1, 3-6, 9-13, and 17-19 would have been obvious to one skilled in the art at the earliest priority date of the '416 patent.

A. Ground 1: Claims 1, 3-5, and 9-13 Are Obvious In View Of *Chern* and *Garceran*.

1. Independent claim 1

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

81. *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;”**

82. *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;”**

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

84. *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].

85. 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.

86. *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.

87. 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.

88. 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).

89. This is consistent with the ’416 patent, which patent 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

90. 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, 12-13¹ (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 solution to problems of accuracy and coverage ... AGPS provides a natural fit for

¹ All references to *Kitching* and *Djuknic* in this declaration are to the PDF page number.

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).

91. 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

92. 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;”**

93. *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].

94. 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].

95. 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" (indication of signal interference), as taught by *Garceran*, to improve location determination and the location-based services of *Chern*. *Kitching*, 9-13; *Djukanic*, 1-3.

96. 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;"**

97. *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].

98. 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].

99. *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].

100. **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.

101. **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.

102. **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.”

103. *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 3: “The method of claim 1, wherein the navigation information comprises additional information about an area around the current location.”

104. *Chern* discloses claim 3 because *Chern* discloses that the directions/route (navigation information) may contain “additional traffic monitoring” information (additional information) corresponding to the route, including the area around the starting point, or detected current locations. *Chern*, [0061], [0067], [0070]. For example, when “traffic monitoring service is selected, handset 130 periodically sends its location to server 136 while in transit according to the driving directions, and server 136 determines whether there are any impediments such as accidents or construction work along the calculated

route.” *Chern*, [0067]. Thus, *Chern*’s navigation information includes traffic information (additional information) about an area around the current location along the route.

3. **Claim 4: “The method of claim 1, wherein the navigation information comprises first mapping information associated with a first time centered around a first local position, and wherein the method comprises receiving, by the mobile communication device, additional navigation information comprising second mapping information associated with a second time centered around a second location different than the first local position.”**

105. *Chern* discloses claim 4 because *Chern* discloses that the computed route (navigation information) includes “a starting point” corresponding to the determined handset location (first mapping information associated with a first time centered around a first local position) and “directions to a destination address,” including an “alternative route” or “backtrack route” (additional navigation information comprising second mapping information) if “a freeway exit or other waypoint in the route” (second location) “has been passed.” *Chern*, [0044], [0054].

106. The “alternative route” or “backtrack route” (second mapping information) is associated with a second time because it is received by the handset *after* the user/handset has left the starting point and *if* the user passes a designated waypoint or freeway. *Chern*, [0054]. This second time is likewise centered around a second location (the waypoint or freeway) that is different from the first local position (the starting point). *Chern*, [0054].

107. Accordingly, “where the user is approaching a freeway exit or other waypoint in the route being computed, server 136 may request a position update,” (second location information at a second time) “to ensure that this waypoint has not been passed.” *Chern*, [0054]. “If it has been passed, an alternative route may be calculated or the user may be directed to backtrack to the passed waypoint[,]” that is, the server calculates and transmits additional navigation information comprising second mapping information (alternative or backtrack route) associated with the second time and location past the waypoint. *Chern*, [0054].

4. **Claim 5: “The method of claim 4, wherein the first mapping information is associated with a first direction of travel from the second local position to the first local position, and wherein the second mapping information is associated with a second direction of travel from the first local position to the second local position.”**

108. The ’416 patent does not describe what entails first mapping information “associated with a first direction of travel from the second local position to the first local position” or second mapping information “associated with a second direction from the first local position to the second local position” but it does explain that a “return path” may be used “to guide the user back to their” previous location. Ex. 1001, 7:43-47.

109. *Chern* discloses claim 5 because, like the ’416 patent, it discloses providing a path for returning, i.e., backtracking to a previous location. *Chern*, [0054].

110. As explained for claim 4, *Chern* discloses a “starting point” corresponding to the determined handset location (first mapping information associated with a first time centered around a first local position). *Chern*, [0044], [0054]. The first mapping information is also *associated* with a first direction of travel from the “waypoint” (second local position) to the “starting point” (first local position). *Chern*, [0054]. Thus, when the user passes the waypoint, the handset receives directions to “backtrack” towards the waypoint (and consequently, the starting point) and the user is “directed to backtrack to the passed waypoint.” *Chern*, [0054].

111. The backtrack route (second mapping information) is similarly *associated* with a second direction of travel from the starting point (first local position) to the waypoint (second local position) because it reflects the opposite traveling direction. *Chern*, [0054].

5. Claim 9: “The method of claim 1, wherein the signal in[ter]ference is indicative of a noise signature associated with the current location.”

112. *Chern* in combination with *Garceran* renders obvious claim 9 because *Garceran*’s interference is associated with (i.e., indicative of) “certain transmit power and frequencies given certain operating conditions or parameters, such as time, weather, traffic load, path loss and/or interference level” and “linked with additional parameters, such as wireless unit type, wireless unit identity, frequency,

operating conditions and/or base station identity.” *Garceran*, 2:25-42. Thus, in combination, *Chern*’s handset would implement *Garceran*’s detection of signal interference as a noise signature.

113. This is consistent with the ’416 patent, which explains that “[e]ach specified type of interference may have a specified different kind of signature. For example, the hum from a power line may be one kind of signature; noise and/or interference from a train, power generating station, or radio transmitter may represent another kind of signature.” Ex. 1001, 5:65-6:3 (emphasis added).

6. Claim 10: “The method of claim 1, wherein the signal interference is indicative of a signal power of one or more signals received by the mobile communication device.”

114. *Chern* in combination with *Garceran* renders obvious claim 10 because, as explained for claim 9, *Garceran*’s interference is associated with, i.e., indicative of, “certain transmit power and frequencies given certain operating conditions or parameters, such as time, weather, traffic load, path loss and/or interference level” and “linked with additional parameters, such as wireless unit type, wireless unit identity, frequency, operating conditions and/or base station identity.” *Garceran*, 2:39-42 (emphasis added). Thus, in combination, *Chern*’s handset would implement *Garceran*’s detection of signal interference as a signal power of the received signal.

7. Independent Claim 11

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

115. *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,”

116. *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;”

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

118. 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].

119. As explained in [1c], *Chern* discloses detecting additional information at the handset to 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].

120. 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

121. 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

122. 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”**

123. *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].

124. *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.”**

125. *Chern* further discloses [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].

8. **Claim 12: “The method of claim 11, further comprising: receiving, by the server, new position information indicating a new position of the mobile communication device; and transmitting, by the server, new navigation information associated with the new position to the mobile communication device responsive to receiving the new position information.”**

126. *Chern* discloses claim 12 because *Chern* discloses a “repetitive prompting process” whereby the handset provides “updated position information ... to server 136” based on “time elapsed and distance traveled” and the server transmits new navigation information based on the updated position and “additional data or information [retrieved] from a database.” *Chern*, [0052]-[0054].

127. For example, “where the user is approaching a freeway exit or other waypoint in the route being computed, server 136 may request a position update,” i.e., new position information indicating a new position of the handset, “to ensure that this waypoint has not been passed.” *Chern*, [0054]. “If it has been passed, an alternative route may be calculated or the user may be directed to backtrack to the passed waypoint[,]” that is, the server calculates and transmits new navigation information (alternate route or reverse route) to handset based on the new position information indicating the handset passed the waypoint. *Chern*, [0054].

9. **Claim 13: “The method of claim 12, wherein transmitting the navigation information comprises transmitting first mapping information at a first time associated with the local position, and wherein transmitting the new navigation information comprises transmitting second mapping information at a second time associated with the new position.”**

128. *Chern* discloses claim 13 because *Chern*’s disclosure of transmitting the route (navigation information) to the handset, as explained for claim 12, includes transmitting a “computed” route “based on the user’s current position” (first mapping information at a first time associated with the local position) and transmitting an “an alternative route” or “backtrack” route (second mapping information) if “a position update” indicates a waypoint on the computed route “has been passed” (at a second time associated with the new position). *Chern*, [0054].

B. Ground 2: Claim 6 is Obvious In View Of *Chern*, *Garceran*, and *Ihara*.

1. **Claim 6: “The method of claim 1, wherein at least a portion of the GPS information is communicated in XML format and comprises one or more different XML tags that indicate a type of the additional information being communicated by the mobile communication device.”**

129. *Chern* in combination with *Ihara* renders obvious claim 6 for reasons set forth below.

130. *Chern* discloses communicating the GPS information in the format illustrated in FIG 6 or “other message formats and field lengths” “[a]s would be

apparent to one of ordinary skill in the art.” *Chern*, [0088]-[0089]. A POSITA would have understood that the XML format, including XML tags, was a common format for such communications at the relevant time. *Brown*, 5:44-48 (“Data exchange across the communications medium is advantageously performed in at least one of multiple available data transmission protocols and is preferably supported by a common data structure format, such as the extensible mark-up language (XML) data structure format.”); *Maeda*, 12:51-58 (guiding information “can be described in the description format of a markup language such as a general-purpose XML (extensible markup language) as a sequence of instructions representable in time series, thereby easily and conveniently processing and outputting the guiding information.”).

131. *Ihara* uses the XML format and tags for communicating GPS and other “route guidance” information. *Ihara*, 2:64-67, 10:14-18. The information is transmitted in “a tag format indicating attributes and contents of the information in accordance with the communications protocol” including tags for “specifying” “coordinates information on a position” and the “form (type) of content[] ... such as text data, image data, audio data, video data.” *Ihara*, Abstract, 6:11-43, 10:65-11:15, 11:35-44. The format ensures that a “terminal device is capable of receiving, using the standard communications protocol, various [kinds of]

information in the suitable format for the route guidance.” *Ihara*, Abstract, 10:65-11:15, 11:35-42.

132. In my opinion, a POSITA would have been motivated and found it obvious to communicate the GPS and noise (additional information) in XML format, whereby tags such as “audio data” are used to indicate the type of the additional information (noise) being communicated, because XML is a “standard communications protocol” known for its suitability for transmitting position information, as expressly disclosed by *Ihara*.

133. A POSITA would have had a reasonable expectation of success in implementing XML formatting, as disclosed by *Ihara*, to transmit the navigation and additional information because XML is a “standard” protocol that would have only required routine skill to implement. *See also Brown*, 5:44-48; *Maeda*, 12:51-58.

C. Ground 3: Claims 17-19 Are Obvious In View of *Yamakita*.

1. Independent Claim 17

a. [17preamble]: “A method comprising:”

134. *Yamakita* discloses [17preamble] because *Yamakita* discloses a 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.

- b. [17a]: “acquiring, by a communication device, a plurality of items of information representing a current location of the communication device, wherein the plurality of items of information comprises global positioning system (GPS) information and environmental information associated with the current location,”

135. *Yamakita* discloses [17a] because the portable terminal, a communication device, acquires “pieces,” i.e., a plurality of items, of information such as GPS, sound, and image information, representing a current location of the portable terminal. *Yamakita*, FIG. 1, Abstract, 2:54-63, 4:21-34.

136. For example, the portable terminal acquires GPS information 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.

137. The portable terminal also uses a microphone 12 to collect “ambient sound data (e.g., noise)” and a camera to “acquire” “image information as ambient information.” *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.” *Yamakita*, 3:3-6, 3:48-51, 4:28-34, 6:26-33. The image information and “unique” train sound information corresponding to the “ambient sound data (e.g., noise)” detected “at the tim[e]” the user is “in a station” are environmental information as described in the ’416 patent. Ex. 1001, 6:11-16, claim 19 (“wherein the environmental information comprises

sound data captured by the microphone”); Yamakita, 3:3-6, 3:48-51, 4:28-34, 4:55-56, 6:26-33.

c. [17b]: “and wherein the environmental information is acquired by one or more sensory input devices of the communication device;”

138. *Yamakita* discloses [17b] because the sound and image information (environmental information) are acquired by a microphone and camera, respectively (one or more sensory input devices). *Yamakita*, 6:26-33.

139. For example, *Yamakita* explains that “[i]n detecting the position information, the portable terminal 1 fetches sound information acquired through the microphone 12.” *Yamakita*, 6:26-33.

140. *Yamakita*’s microphone is a sensory input device within the meaning of the ’416 patent. Ex. 1001, 6:11-16 (describing a microphone for receiving environmental information in the form of sound).

d. [17c]: “communicating, by the communication device, the plurality of items of information, including the GPS information and the environmental information associated with the current location, to a remote server;”

141. *Yamakita* discloses [17c] because the position (GPS) and sound and image (environmental) information (collectively, “plurality of items of information”) are compiled into a “transmission packet” and transmitted, i.e., communicated, to a “host terminal (server machine) 3 accommodated in a public

network 2” (remote server). *Yamakita*, 2:47-52, 3:53-60, FIG. 4 (illustrating the transmission packet).

142. More specifically, *Yamakita*’s portable terminal uses a radio transceiver to transmit (communicate) a transmission packet containing the location estimated by the GPS sensor (GPS information) and sound information (environmental information) to a host terminal (remote server) over a public wireless network. *Yamakita*, 2:47-52, 3:3-9, 3:53-60, FIGS. 1, 3, 4 (illustrating contents of the transmission packet).

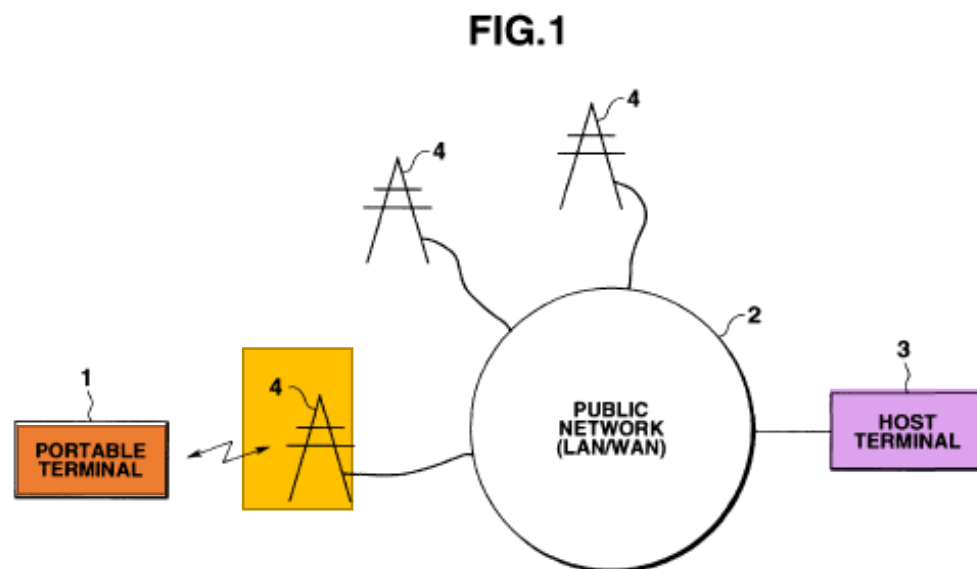
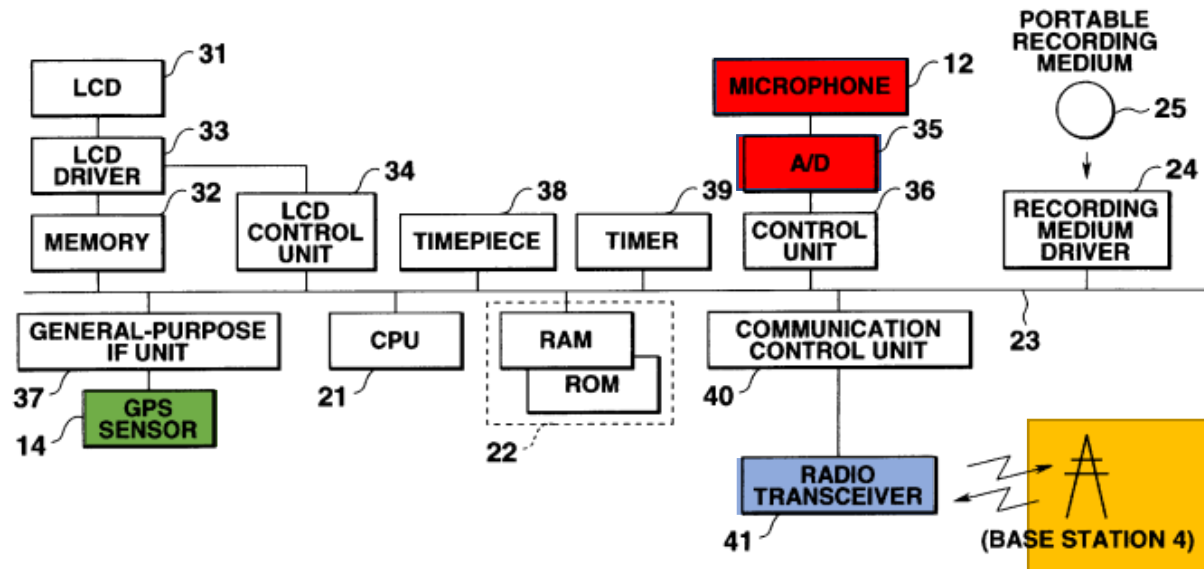
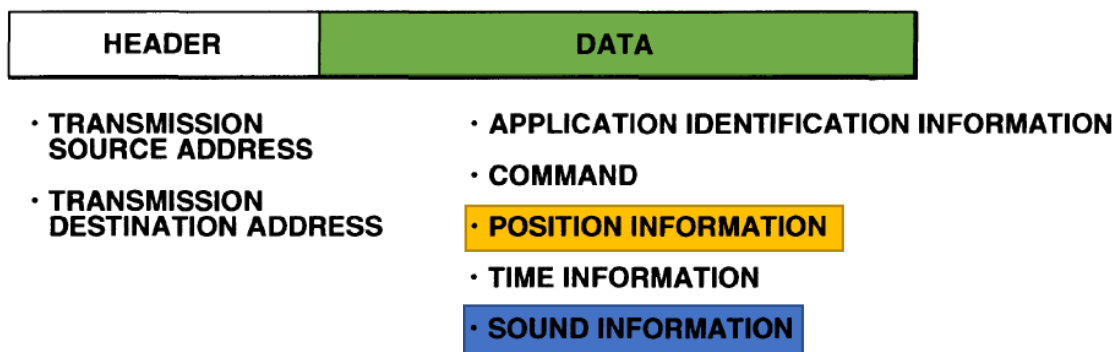


FIG.3**FIG.4**

Yamakita, FIGS. 1, 3, 4.

- e. **[17d]: “receiving, by the communication device, current position information in response to communicating the plurality of items of information, wherein the current position information comprises data for plotting a course on a map including the current location of the communication device;”**

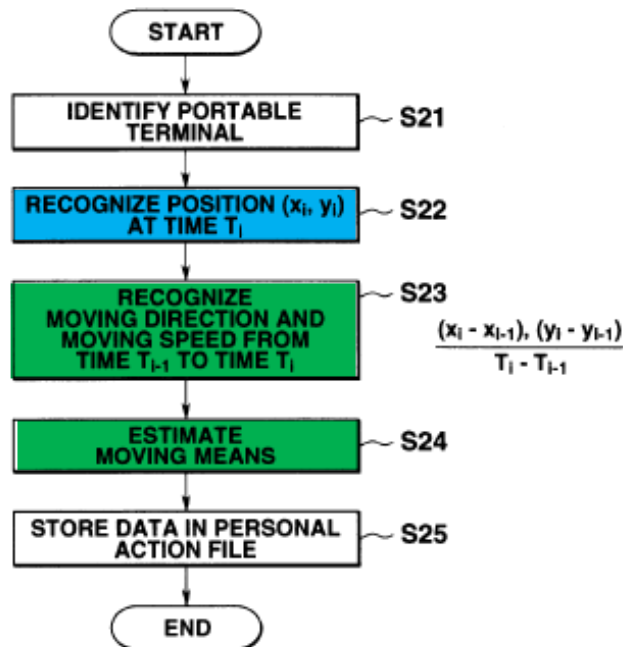
143. *Yamakita* discloses [17d] because the portable terminal receives an action record table including current position information and data for plotting a course on a map that includes the current location of the portable terminal in response to transmitting GPS and environmental information. *Yamakita*, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14.

144. The process corresponding to [17d] can be summarized in three steps: **First**, *Yamakita*'s host terminal processes the GPS and sound (environmental information) received from the portable terminal to determine a location of the portable terminal along a route at a particular time; **then**, *Yamakita*'s host terminal generates an action table (current position information) including the portable terminal's current location (e.g., position (x_1 , y_1) detected at time t_1) and subsequent locations (e.g. position (x_2 , y_2) detected at time t_2) based on the processed information; **finally**, *Yamakita*'s portable terminal receives a transmission packet containing the generated action table from the host terminal. *Yamakita*, 5:64-6:9, 6:37-45, 9:46-51, 9:63-10:4. FIGS. 7, 9, 14, 16, 18.

For step 1, “[u]pon receiving the information transferred from the portable terminal,” the host terminal “extract[s]” and processes the GPS and sound

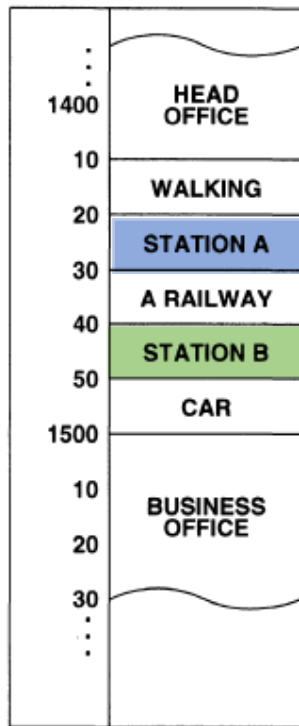
(environmental) data from the transmission packet to estimate “the position of the user who is carrying the portable terminal 1 at a certain time point, and if he/she is moving, [and] the [user’s] moving means.” *Yamakita*, 5:64-6:9, 6:37-45, FIGS. 7, 14, 18.

145. **In step 2**, *Yamakita*’s host terminal uses the processed GPS and sound information to “analyze the moving route” “of the user who is carrying the portable terminal 1” to compile an “action record table” reflecting the user’s current position, route, and mode of transportation, i.e., current position information including data for plotting a course on a map. *Yamakita*, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14 (action table/current position information). Figure 7, annotated below, illustrates a process for analyzing the GPS and environmental information.

FIG. 7*Yamakita, FIG. 7*

146. At [step S22](#) of Figure 7, the host terminal processes the portable terminal's GPS information—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*, 5:65-6:1. At steps [S23-24](#) of Figure 7, the host terminal processes the “sound information stored in the data portion of the received packet,” (environmental information) to determine the portable terminal's “moving means (walking, train, motor vehicle, stop, ...).” *Yamakita*, 6:1-14.

147. *Yamakita*'s host terminal compares the extracted, processed information to "map data" illustrated in Figure 9 and the local information "data table" illustrated in Figure 16 to generate an action record table (current position information) according to the process of Figure 15. *Yamakita*, 6:37-45 (explaining that "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" and "has map data as shown in FIG. 9" and "[f]or the purpose of analyzing the route."), 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. Thus, the action table comprises "data" for plotting a course on a map including the current location of the mobile communication device.

FIG.14**FIG.16**

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
⋮	

USER REGISTRATION DATA {

Yamakita, FIGS. 14, 16 (illustrating action table and corresponding data).

148. **In step 3**, the host terminal transfers the action record table in a data packet to the portable terminal. *Yamakita*, 9:46-51, 9:63-10:4. When the portable terminal receives the packet, it “extracts the action record table from the packet transferred from the host terminal 3 and displays it on the [portable terminal’s] LCD display unit 11.” *Yamakita*, 9:46-51, 9:63-10:4, 11:28-31, FIG. 18.

FIG.18

Yamakita, FIG. 18 (illustration displayed on portable terminal LCD).

- f. [17e]: “and displaying, by the communication device, the map based on the current position information.”

149. *Yamakita* renders obvious [17e] because the received and displayed illustration (as seen in Figure 18) is a map based on the action record table (current position information). *Yamakita*, 9:46-51, 9:63-10:4, 11:28-31, FIG. 18.

150. As explained for [17d], *Yamakita*’s portable terminal extracts the received action record table (current position information including data for plotting a course on a map) and displays it as an illustration on its LCD display unit. *Yamakita*, 9:63-10:4, 11:28-31, FIG. 18.

FIG.18

Yamakita, FIG. 18 (illustration displayed on LCD).

151. A POSITA would have understood that *Yamakita*'s action record table illustration is a map because it provides visual guidance for directing the user from their current location (e.g., Station A) to a destination (e.g., business office), and the illustration corresponds to "various names on the map and corresponding position information" and "map data." *Yamakita*, 6:37-45, 9:4-6.

2. Claim 18: "The method of claim 17, wherein the communication device comprises a camera and wherein the environmental information comprises image data captured by the camera."

152. As explained for claim [17a], the portable terminal acquires environmental information associated with the current location. *Yamakita*, FIG. 1, Abstract, 2:54-63, 4:21-34. The environmental information also includes "image information" (image data) captured by the portable terminal's camera. *Yamakita*, 4:28-34, 4:55-56 ("The sound information is sound data acquired through the microphone 12 at the timing when the position information is detected ... However, a ... camera may be arranged to acquire ... image information as ambient information.").

3. Claim 19: "The method of claim 17, wherein the communication device comprises a microphone and wherein the environmental information comprises sound data captured by the microphone."

153. As explained for claim 17, the environmental information includes "ambient sound data (e.g., noise) collected through the microphone" of the

portable terminal (communication device). *Yamakita*, 4:28-30, 4:55-56. Thus, *Yamakita*'s portable terminal (communication device) includes a microphone 12, and the noise (environmental information includes "ambient sound data" "collected through" (captured by) the microphone. *Yamakita*, 4:28-30, 4:55-56.

D. Ground 4: Claims 17-19 are Obvious In View Of *Yamakita* and *Chern*.

1. Independent Claim 17

a. [17preamble]: "A method comprising:"

154. *Yamakita* discloses [17preamble] because *Yamakita* discloses a 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.

b. [17a]: "acquiring, by a communication device, a plurality of items of information representing a current location of the communication device, wherein the plurality of items of information comprises global positioning system (GPS) information and environmental information associated with the current location,"

155. *Yamakita* discloses [17a] because the portable terminal, a communication device, acquires "pieces," i.e., a plurality of items, of information such as GPS, sound, and image information, representing a current location of the portable terminal. *Yamakita*, FIG. 1, Abstract, 2:54-63, 4:21-34.

156. For example, the portable terminal acquires GPS information 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.

157. The portable terminal also uses a microphone 12 to collect “ambient sound data (e.g., noise)” and a camera to “acquire” “image information as ambient information.” *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.” *Yamakita*, 3:3-6, 3:48-51, 4:28-34, 6:26-33. The image information and “unique” train sound information corresponding to the “ambient sound data (e.g., noise)” detected “at the tim[e]” the user is “in a station” are environmental information as described in the ’416 patent. Ex. 1001, 6:11-16, claim 19 (“wherein the environmental information comprises sound data captured by the microphone”); *Yamakita*, 3:3-6, 3:48-51, 4:28-34, 4:55-56, 6:26-33.

c. [17b]: “and wherein the environmental information is acquired by one or more sensory input devices of the communication device;”

158. *Yamakita* discloses [17b] because the sound and image information (environmental information) are acquired by a microphone and camera, respectively (one or more sensory input devices). *Yamakita*, 6:26-33.

159. For example, *Yamakita* explains that “[i]n detecting the position information, the portable terminal 1 fetches sound information acquired through the microphone 12.” *Yamakita*, 6:26-33.

160. *Yamakita*’s microphone is a sensory input device within the meaning of the ’416 patent. Ex. 1001, 6:11-16 (describing a microphone for receiving environmental information in the form of sound).

d. **[17c]: “communicating, by the communication device, the plurality of items of information, including the GPS information and the environmental information associated with the current location, to a remote server;”**

161. *Yamakita* discloses [17c] because the position (GPS) and sound and image (environmental) information (collectively, “plurality of items of information”) are compiled into a “transmission packet” and transmitted, i.e., communicated, to a “host terminal (server machine) 3 accommodated in a public network 2” (remote server). *Yamakita*, 2:47-52, 3:53-60, FIG. 4 (illustrating the transmission packet).

162. More specifically, *Yamakita*’s portable terminal uses a radio transceiver to transmit (communicate) a transmission packet containing the location estimated by the GPS sensor (GPS information) and sound information (environmental information) to a host terminal (remote server) over a public

wireless network. *Yamakita*, 2:47-52, 3:3-9, 3:53-60, FIGS. 1, 3, 4 (illustrating contents of the transmission packet).

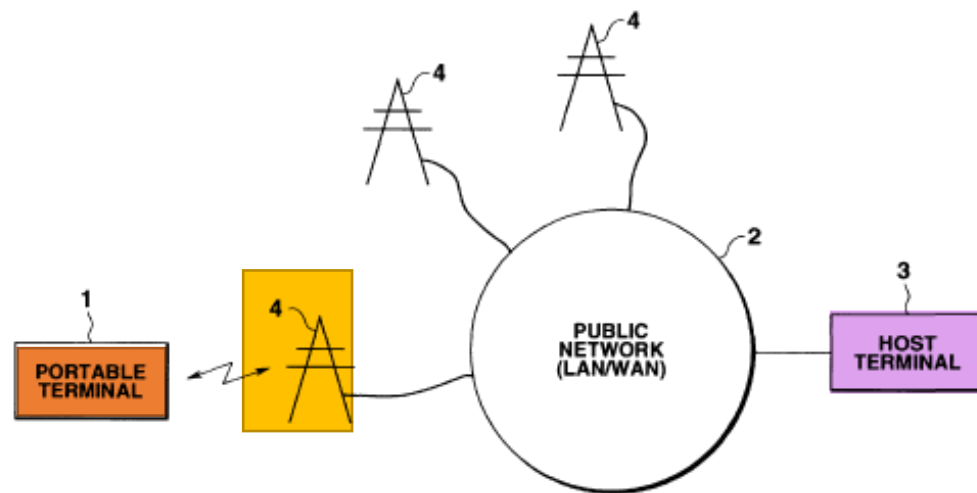
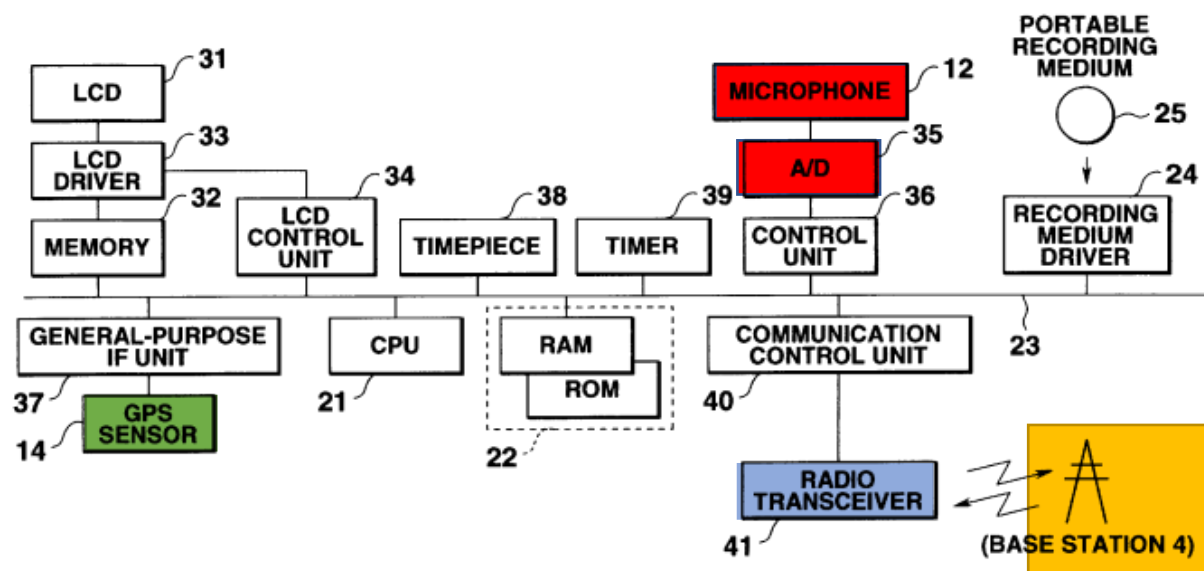
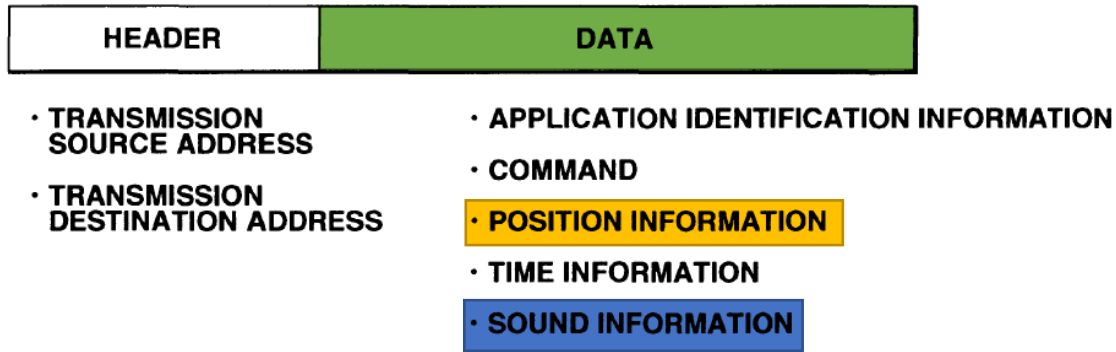
FIG.1**FIG.3**

FIG.4

Yamakita, FIGS. 1, 3, 4.

- e. [17d]: “receiving, by the communication device, current position information in response to communicating the plurality of items of information, wherein the current position information comprises data for plotting a course on a map including the current location of the communication device;”

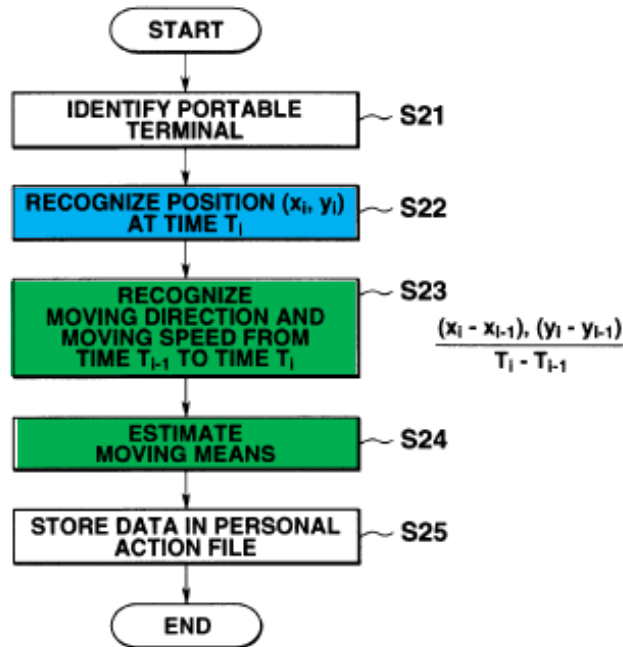
163. *Yamakita* discloses [17d] because the portable terminal receives an action record table including current position information and data for plotting a course on a map that includes the current location of the portable terminal in response to transmitting GPS and environmental information. *Yamakita*, :41-48, 6:37-45, 9:46-48, FIGS. 7, 14.

164. The process corresponding to [17d] can be summarized in three steps: **First**, *Yamakita*’s host terminal processes the GPS and sound (environmental information) received from the portable terminal to determine a location of the

portable terminal along a route at a particular time; **then**, *Yamakita*'s host terminal generates an action table (current position information) including the portable terminal's current location (e.g., position (x_1 , y_1) acquired at time t_1) and subsequent locations (e.g. position (x_2 , y_2) acquired at time t_2) based on the processed information; **finally**, *Yamakita*'s portable terminal receives a transmission packet containing the generated action table from the host terminal. *Yamakita*, 5:65-6:9, 6:38-46, 9:46-51, 9:63-10:4. FIGS. 7, 9, 14, 16, 18.

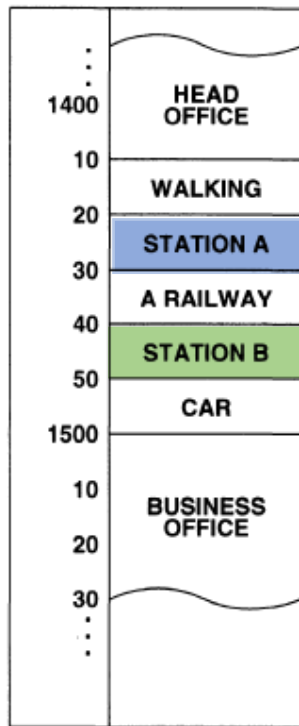
For step 1, “[u]pon receiving the information transferred from the portable terminal,” the host terminal “extract[s]” and processes the GPS and sound (environmental) data from the transmission packet to estimate “the position of the user who is carrying the portable terminal 1 at a certain time point, and if he/she is moving, [and] the [user’s] moving means.” *Yamakita*, 55:65-6:9, 6:37-45, FIGS. 7, 14, 18.

165. **In step 2**, *Yamakita*'s host terminal uses the processed GPS and sound information to “analyze the moving route” “of the user who is carrying the portable terminal 1” to compile an “action record table” reflecting the user's current position, route, and mode of transportation, i.e., current position information including data for plotting a course on a map. *Yamakita*, 1:41-48, 6:37-45, 9:46-48, FIGS. 7, 14 (action table/current position information). Figure 7, annotated below, illustrates a process for analyzing the GPS and environmental information.

FIG.7*Yamakita, FIG. 7*

166. At [step S22](#) of Figure 7, the host terminal processes the portable terminal's GPS information—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*, 5:65-6:1. At steps [S23-24](#) of Figure 7, the host terminal processes the “sound information stored in the data portion of the received packet,” (environmental information) to determine the portable terminal's “moving means (walking, train, motor vehicle, stop, ...).” *Yamakita*, 6:1-14.

167. *Yamakita*'s host terminal compares the extracted, processed information to "map data" illustrated in Figure 9 and the local information "data table" illustrated in Figure 16 to generate an action record table (current position information) according to the process of Figure 15. *Yamakita*, 6:37-45 (explaining that "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" and "has map data as shown in FIG. 9" and "[f]or the purpose of analyzing the route."), 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. Thus, the action table comprises "data" for plotting a course on a map including the current location of the mobile communication device.

FIG.14**FIG.16**

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
⋮	

USER REGISTRATION DATA {

Yamakita, FIGS. 14, 16 (illustrating action table and corresponding data).

168. **In step 3**, the host terminal transfers the action record table in a data packet to the portable terminal. *Yamakita*, 9:46-51, 9:63-10:4. When the portable terminal receives the packet, it “extracts the action record table from the packet transferred from the host terminal 3 and displays it on the [portable terminal’s] LCD display unit 11.” *Yamakita*, 9:46-51, 9:63-10:4, 11:28-31, FIG. 18.

FIG.18

Yamakita, FIG. 18 (illustration displayed on portable terminal LCD).

- f. [17e]: “and displaying, by the communication device, the map based on the current position information.”

169. As explained for [17d], *Yamakita*’s portable terminal extracts the received action record table (current position information including data for plotting a course on a map) and displays it as an illustration on its LCD display unit. *Yamakita*, 9:63-10:4, 11:28-31, FIG. 18.

FIG.18

Yamakita, FIG. 18 (illustration displayed on LCD).

170. As explained for Ground 3, a POSITA would have understood that *Yamakita*’s action record table illustration is a map because it provides visual guidance for directing the user from their current location (e.g., station A) to a destination (e.g., business office), and the illustration corresponds to “various

names on the map and corresponding position information” and “map data.”

Yamakita, 6:37-46, 9:4-6.

171. To the extent Patent Owner disputes that *Yamakita*’s table is a map, it is my opinion that it would have been obvious to use a map to display navigational guidance, as taught by *Chern* (**Ground 4**).

172. *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” for determining the handset’s location using GPS or “[a]lternative position determination systems,” and an LCD display for displaying “textual driving directions” and “a map showing the route.” *Chern*, [0035], [0040], [0044]. The system also includes a server that communicates “driving directions to a destination address ... to a handset user” over a wireless network. *Chern*, [0043]-[0044].

173. Using the handset, a user sends a request for directions to a server (remote source) over a wireless network. *Chern*, [0044]. At the time of the request, the handset provides its location (determined by the handset’s position determination system) to the server. *Chern*, [0044]. Then, “[u]sing the handset location and the destination address, server 136 calculates a route and compiles driving directions.” *Chern*, [0044]. The calculated route and directions include data for plotting a course on a map including the current location of the handset, such

that “[i]n addition to textual driving directions, a map showing the route may be displayed on the handset display.” *Chern*, [0044]. *Chern*’s map is displayed on the handset’s LCD to provide visual guidance for reaching the destination to the user. *Chern*, [0035], [0040].

174. A POSITA would have been motivated and found it obvious to display a map, as taught by *Chern*, graphically representing the information in *Yamakita*’s action record table (information for plotting a course and the current location) to enable the user to visually understand the navigational route from the user’s location to the desired destination. Displaying the map would have improved the user’s experience by allowing them to see their current position relative to their destination and intermediate locations and giving them a sense of direction, thereby reducing the likelihood that the user proceeds in the wrong direction. Displaying navigation information as a map on a GPS-enabled mobile device, like that of *Yamakita*, was a common method for displaying navigation guidance to a user and well-known in the art before the ’416 patent. *Chern*, [0044]; *Drury*, 2:16-20, 6:1-15; *Obradovich*, 1:13-26, 25:1-16, FIG. 43; *Naito*, 2:21-34, 3:39-43.

175. A POSITA would have had a reasonable expectation of success in displaying the map because doing so would have merely required the use of existing components (*Yamakita*’s server and display) to perform routine functions

(transmitting a map illustration and displaying the illustration) as was well-known in the art. *Yamakita*, 9:46-51, 9:63-10:4, 11:28-31; *Chern*, [0044]; *Drury*, 2:16-20, 6:1-15; *Obradovich*, 1:13-26, 25:1-16, FIG. 43; *Naito*, 2:21-34, 3:39-43.

2. Claim 18: “The method of claim 17, wherein the communication device comprises a camera and wherein the environmental information comprises image data captured by the camera.”

176. As explained for claim [17a], the portable terminal acquires environmental information associated with the current location. *Yamakita*, FIG. 1, Abstract, 2:54-63, 4:21-34. The environmental information also includes “image information” (image data) captured by the portable terminal’s camera. *Yamakita*, 4:28-30, 4:32-34, 4:55-56 (“The sound information is sound data acquired through the microphone 12 at the timing when the position information is detected ... However, a ... camera may be arranged to acquire ... image information as ambient information.”).

3. Claim 19: “The method of claim 17, wherein the communication device comprises a microphone and wherein the environmental information comprises sound data captured by the microphone.”

177. As explained for claim 17, the environmental information includes “ambient sound data (e.g., noise) collected through the microphone” of the portable terminal (communication device). *Yamakita*, 4:28-30, 4:55-56. Thus, *Yamakita*’s portable terminal (communication device) includes a microphone 12,

and the noise (environmental information includes “ambient sound data” “collected through” (captured by) the microphone. *Yamakita*, 4:28-30, 4:55-56.

XII. CONCLUSION

178. For the reasons set forth in Section XI, it is my opinion that one skilled in the art would have found claims 1, 3-6, 9-13, and 17-19 of the '416 patent obvious.

179. 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.

180. 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", with a stylized, cursive script.

Samuel P. Pullen, PhD