

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,

Petitioner,

v.

BLUESTONE VENTURES INC.,

Patent Owner.

Case No. IPR2026-00418
U.S. Patent No. 11,473,925

DECLARATION OF DR. PHILIP A. DAFESH

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List of Exhibits

Exhibit	Description
EX1001	U.S. Patent No. 11,473,925 (“the ’925 patent”)
EX1002	Prosecution File History of the ’925 patent
EX1004	<i>Curriculum Vitae</i> of Dr. Philip Dafesh
EX1005	U.S. Patent Application Publication No. 2002/0052689 (“Yamashita”)
EX1006	U.S. Patent No. 6,381,535 (“Durocher”)
EX1007	U.S. Patent No. 6,636,806 (“Irie”)
EX1008	U.S. Patent Application Publication No. 2001/0037174 (“Dickerson”)
EX1010	U.S. Patent No. 5,541,845 (“Klein”)
EX1011	U.S. Patent No. 5,774,824 (“Streit”)
EX1012	Lawrence E. Sweeney, Jr., Ph.D, <i>Comparative Benefits of Various Automotive Navigation and Routing Technologies</i> , PROCEEDINGS OF POSITION, LOCATION AND NAVIGATION SYMPOSIUM - PLANS ’96, 415-421 (1996)
EX1013	Eric Abbott and David Powell, <i>Land-Vehicle Navigation Using GPS</i> , 87 PROCEEDINGS OF IEEE 1, 145-62 (1999)
EX1014	Yilin Zhao, <i>Vehicle Location and Navigation Systems</i> (1997)
EX1015	John Lu et al., <i>Operational Evaluation of Right Turns Followed By U-turns as an Alternative to Direct Left Turns</i> , UNIVERSITY OF SOUTH FLORIDA CENTER FOR URBAN TRANSPORTATION RESEARCH, VOL. 3 (2001)

I. Introduction

1. I have been retained on behalf of Google LLC (“Petitioner”) as an independent expert consultant for the above-captioned inter partes review (IPR) proceeding. I understand that this proceeding involves U.S. Patent No. 11,473,925 (“the ’925 patent”) titled “Method and System for Dynamic Estimation and Predictive Route Generation” by Michael Sheha, Angie Sheha, Stephen Petilli, and Arun Yarlagadda, and that the ’925 patent is currently assigned to Bluestone Ventures, Inc.

2. I am over 18 years of age and, if I am called upon to do so, I would be willing and able to testify as to the matters set forth herein.

3. I am being compensated for my time in connection with this IPR at my standard hourly consulting rate. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of any related proceeding.

4. I have reviewed and am familiar with the specification of the ’925 patent filed on May 17, 2021. I understand that the ’925 patent has been provided as EX1001. I will cite to the specification using the following format: EX1001, ’925 patent, 1:1-10. This example citation points to the ’925 patent specification at column 1, lines 1-10.

5. I have been asked by Petitioner to provide my opinion on whether the claims of the '925 patent would have been obvious to a person of ordinary skill in the art (sometimes referred to as a "POSITA" or "ordinary artisan") at the time of the earliest possible priority date of the '925 patent. In performing my analysis, I have been asked to assume that the priority date is April 10, 2002, the filing date of U.S. Provisional Application 60/371,941 to which the '925 patent purportedly claims priority. I have reviewed and am familiar with the file history of the '925 patent. I understand that the file history has been provided as EX1002.

6. Throughout this declaration, I refer to specific pages, figures, 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. My opinions are set forth below.

II. Summary of Opinions

7. This declaration considers claims 1-7 and 9-15 of the '925 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.

8. Based on my experience and knowledge of the art at the time of the earliest possible priority date of April 10, 2002, it is my opinion that a person of ordinary skill in the art would have found claims 1-7 and 9-15 of the '925 patent

obvious based on the asserted grounds discussed below. A person of ordinary skill in the art would have found it obvious to combine the prior art references I cite and would have been motivated to do so with a reasonable expectation of success before the priority date.

III. Qualifications and Background

9. In formulating my opinions, I have relied upon my training, knowledge, and experience in the relevant art. I believe that I am well qualified to serve as a technical expert in this matter based upon my qualifications, discussed in detail below. A copy of my current *curriculum vitae* is provided as EX1004, and it provides a comprehensive description of my education, experience, publications, and other qualifications over the last thirty-plus years. I am competent to prepare this declaration.

10. I received my Bachelor of Science degrees in electrical engineering and physics from California Polytechnic University, Pomona. I received my Master of Science degree, Engineer, and Ph. D. degrees in electrical engineering from the University of California, Los Angeles.

11. I am a Distinguished Engineer at The Aerospace Corporation, where I have supported the design, development, and implementation of space systems, including sensor technology and wireless transmitter and receiver technologies used in cellular phones and related devices. I have also assessed the design of GPS-

enabled mobile navigation systems, including techniques used in mobile devices, network-assisted GPS technology, and GPS-based location tracking systems over my 38-year career. During that time, I have worked in the development and analysis of navigation and communication systems technology for terrestrial and satellite applications and have done extensive work in satellite positioning and navigation technology since 1995. I have conducted research, development, design and analysis of GPS and wireless receivers, and transmitters, and associated receiver equipment.

12. In my current role, I lead the development of novel satellite navigation technologies and evaluate the performance benefits of integrating these systems with inertial navigation sensors and map matching. I also lead the development of several satellite navigation signal experiments that are being conducted on the Navigation Technology Satellite-3 (NTS-3)—an experimental navigation and positioning satellite that provides more robust, resilient, and responsive positioning, navigation and timing (PNT) functionality. In that work, I lead a team that is developing a next generation Aerospace System Test Receiver Asset (ASTRA) signal receiver using software defined radio technology.

13. I participated in the design of modernized L1C and L2C GPS signals and recently led a team to design the satellite navigation signal that will be used on the moon by the National Aeronautics and Space Administration (NASA), the

European Space Agency (ESA) and the Japan Aerospace Exploration Agency (JAXA) for future lunar navigation systems.

14. I have previously conducted applied research in GPS and wireless communication technology development in the areas of signal design, transmitter and receiver design, hardware implementation, software implementation, reconfigurable electronics, spread-spectrum systems, and signal processing systems used for communications and position/location devices.

15. My research has led to twenty-one patents and over fifty-five papers in GPS and related technologies.

16. I was a panelist in the 2006 GPS and Wireless Communications Panel Discussion, where I discussed the impact of the Federal Communications Commission's July 26, 1996, Report and Order, and subsequent revisions, which mandated enhanced 911 (E911) features in cellular communications that allowed emergency responders to more precisely locate the caller. The mandate motivated significant technology development in server-based GPS tracking of cellular devices.

17. I have been recognized for my contributions in GPS and related technologies including: receiving a GPS JPO's People's Choice Award from The GPS Program Director for my contributions to the Combat Survivor Evader Locator (CSEL) radio program (1996), a predecessor to GPS receivers used in cell phones

today. I wrote the GPS requirements for the CSEL radio, which was ultimately used to track the location of downed pilots using GPS and wireless communications so that a mobile user's location could be tracked on a remote server.

18. I also received an Aerospace Individual Achievement Award for leading the development of a flexible GPS receiver (1999); a GPS Signal Development Team Excellence Award for Contributions to the Development of the Next Generation GPS Signal (1999); a Best Presentation of Session award at the ION GPS 2000 Conference for my paper entitled "Compatibility of the Interplex Modulation Method with C/A and P(Y) code Signals," and a Best Presentation of the session award at the 2009 ION GNSS Conference for my paper entitled, "Phase-Optimized Constant-Envelope Transmission (POCET) Modulation Method for GNSS Signals."

19. More recently, I received the 2025 Aerospace Corporation "Shaping The Future" Award for the design of the navigation signal standard for future lunar missions. In addition to my achievement at The Aerospace Corporation, I was recently named a Fellow of the Institute of Navigation (ION), the highest honor in the GPS industry.

IV. Materials Considered

20. In preparing this Declaration, I have reviewed and am familiar with the following materials:

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EX1001	U.S. Patent No. 11,473,925 (“the ’925 patent”)
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21. I have also relied on my education, experience, research, training, and knowledge in the relevant art and my understanding of legal principles described in this declaration.

22. All of 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 '925 patent at the time of the earliest claimed priority date.

23. 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

24. In forming my opinions and considering the subject matter of the '925 patent and its claims in light of the prior art, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

25. I understand that the claims define the invention. I also understand that an unpatentability analysis is a two-step process. First, the claims of the patent are

construed to determine their meaning and scope. Second, after the claims are construed, the content of the prior art is compared to the construed claims.

26. I understand 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 by the prior art at the effective filing date of the patent.

A. Level of Ordinary Skill

27. I am informed that patentability must be analyzed from the perspective of a person of ordinary skill in the art (“POSITA”) in the same field as the patent-in-suit at the time of the invention. I am also informed that several factors are considered in assessing the level of ordinary skill in the art, including (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the education level of active workers in the field. I have been instructed to assume 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. Claim Construction

28. I understand that the Patent Trial and Appeal Board interprets claim terms in an *inter partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention.

29. I have been informed that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand, however, that claim terms are generally not limited by the embodiments described in the specification.

30. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

C. Prior Art

31. 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 in an IPR proceeding, prior art includes

patents and printed publications that existed before the earliest claimed 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.

D. Anticipation Under 35 U.S.C. § 102

32. I understand that a patent claim is invalid as anticipated if a single piece of prior art teaches every element of the claims, viewed from the perspective of a person of ordinary skill in the art. I also understand that an anticipatory reference does not have to recite word for word what is in the anticipated claims. Anticipation can also occur when a claimed limitation is inherent in the relevant reference. I have been advised that if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it can anticipate even though the limitations are not expressly disclosed.

E. Obviousness Under 35 U.S.C. § 103

33. I understand that a patent claim is invalid as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art at the time the claimed invention was made. This means that even if all of the elements of the claim cannot be found in a single prior art reference that would anticipate the claim,

a person of ordinary skill in the field who knew about all the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all prior art. I understand that whether a claim is obvious is based upon the determination of several factual issues.

34. 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.

35. In considering obviousness, I understand that one must determine the scope and content of the prior art. I also understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

36. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, one may consider whether a reason has been identified that would have prompted a person of ordinary skill in the art to combine the elements or concepts from the prior art in the same way as in the claimed invention. There is no single way to define the

line between true inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand (which is not patentable). For example, market forces or other design incentives may be what produced a change, rather than true inventiveness.

37. I also understand 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. Moreover, I understand that a proper obviousness analysis requires a determination of whether a person of ordinary skill in the art would have a “reasonable expectation of success”—but not “absolute predictability” of success—in achieving the claimed invention by combining prior art references.

38. I understand that one may consider whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements

claimed in the patent; (3) the innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art; (5) the invention merely substituted one known element for another known element in order to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results, or (7) known work in the field may have prompted variations of use of the same inventions in the same or different fields due to market forces or design incentives that would have been predictable to a person of ordinary skill in the art.

39. I understand that one must be careful not to determine obviousness using the benefit of hindsight; many true inventions might seem obvious after the fact. I understand that the determination should be based on the position of a person of ordinary skill in the field at the time the claimed invention was made and should not consider what is known today or what is learned from the teaching of the patent.

F. Secondary Considerations of Non-Obviousness

40. I understand that certain secondary considerations may be considered in evaluating obviousness in order to prevent hindsight bias. These secondary considerations include commercial success of products that practice the patent, long-

felt need for the patented technology, failure by others to solve the problem addressed by the patent, initial skepticism by others in the industry, industry recognition and praise of the patented products, and efforts by others to copy the patented technology. I am not presently aware of any secondary considerations that would apply here.

41. I have been informed that these secondary considerations of non-obviousness must be balanced against the strength of the prima facie case of obviousness. Where the invention represents no more than the predictable use of prior art elements according to their established functions, secondary considerations are inadequate to establish non-obviousness.

42. I have also been informed that the patentee must establish a nexus between any secondary consideration factors and the claimed invention. Where a secondary consideration factor results from something other than what is both claimed and novel in the patent, there is no nexus to the merits of the claimed invention.

43. I have been informed that, for example, the nexus requirement as it applies to the evidence of commercial success requires that the patentee must show that the sales of a product that allegedly practices the claimed invention must be a direct result of the unique characteristics of the claimed invention, as opposed to other economic and commercial factors that are unrelated to the patented invention.

I understand that this means if the commercial success is due to an element that existed in the prior art or that is not claimed by the patent, then no nexus exists.

44. I have been further informed that, for example, the nexus requirement as it applies to the long-felt need element must likewise be supported by evidence. Where the differences between the prior art and the claimed invention are minimal, it cannot be said that any long-felt need was met by the patented invention or that the patent solved any technological problems that were unaddressed by others.

45. I have been informed that the nexus requirement applies to evidence related to failure of others. Evidence of failure of others may include, for example, documents that suggest that even if those skilled in the art would have recognized a persistent, long-felt need, those artisans were unable to create a solution, which was then solved by the claimed invention. If the evidence is unrelated to the claimed invention, then no nexus exists.

46. I have been informed that evidence of industry praise must also show a nexus with the claimed invention, and that self-serving statements by the patentee regarding the merits of the claimed invention are generally not given weight.

47. I have been informed that evidence of industry praise or initial skepticism by others in the industry also requires a showing of a nexus. Evidence of such skepticism may include, for example, doubt from credible sources in the field before the time of invention that relates to the claimed invention.

48. I further have been informed that evidence of copying also requires a proof of a nexus. Evidence of copying may include, for example, documents that demonstrate competitors have attempted to replicate Patent Owner's product that practices the claimed invention.

VI. State of the Art

49. In this section, I provide a broad overview of the relevant technology and state of the technical community at the earliest possible priority date of the '925 patent. This description is not intended to be exhaustive but to provide sufficient background to support and contextualize my analysis below.

A. Navigation Systems & Methods

50. Humans have used navigation systems and methods for thousands of years. EX1014, 2-4. The Global Positioning System (GPS) used today was based on technology studies conducted between 1962 to 1972. These included the Transit satellite system, Program 621B, NTS-1 and NTS-2. The first GPS satellite was launched in 1978.

51. By 1995, GPS was recognized as a dual-use (i.e., for both civilian and military use) global navigation utility capable of determining a user's position anywhere on Earth. When it became fully operational that year, civilian applications for GPS far outnumbered those of military users, and global navigation technology became largely synonymous with GPS. Commercial consumer-grade navigation

systems were present throughout the United States, Europe, and Japan, and the market for GPS-enabled vehicle navigation units was expected to reach three billion dollars worldwide by 2000. EX1014, 9-11, 237, 296-97. At least as early as 1999, there were approximately 200 fleet tracking and autonomous consumer navigation systems produced worldwide. EX1013, 147. Applications that utilized GPS spanned many industries, including telecommunications, navigation of various terrains (road, rail, air, and marine), fleet management, and emergency response systems. EX1013, 147; EX1014, 240-41.

1. Basic Components of a Navigation System

52. Before 2002, it was well understood that modern vehicle location and navigation systems would often include the components depicted in Figure 1.3 of EX1014 below.

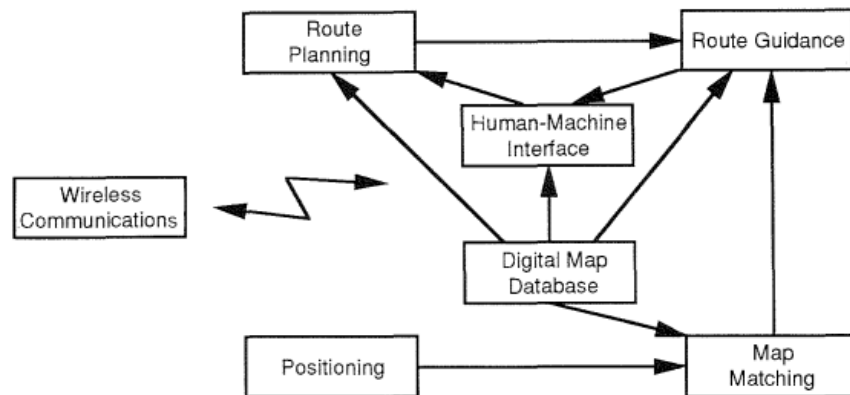


Figure 1.3 Basic modules (building blocks) for a location and navigation system.

EX1014, 7. These basic components include at least a wireless communications module that coordinates data exchange between the device and a server, a

positioning module (typically a GPS receiver) that determines the position of the device, a digital map database that stores map information, a map matching module that matches the position to a location on a map, a human-machine interface (Graphical User Interface (GUI)) that may display this information to a user, a route planning module that calculates a route for the user to travel, and a route guidance module that instructs the user on how to traverse the route. EX1014, 7-10, 146.

2. The Use of Map Data in Navigation Systems

53. At least as early as 1997, multiple forms of data indicating characteristics of a geographical area, sometimes called “map data,” were used in navigation systems. EX1014, 17-20. Digital maps, including vector maps, which consisted of lines (road segments) and nodes (intersections of road segments) along with other information such as latitudes, longitudes, road classifications, connectivity (such as possible maneuvers, e.g., turns) and other related information (such as shapes representing city or zip code boundaries) and map matching algorithms were readily available and commonly used. EX1014, 17-19, 37.

54. Map data was utilized by navigation systems to facilitate automatic routing. EX1014, 17, 20. This included use by the navigation system to find and display the “best” (e.g., fastest or shortest) route to a destination, and to perform map-matching (detailed below) to correct for navigation system errors. EX1014, 17, 20, 30, 41-42, 105-6, 109-11, 116-17, 130, 231, 234-35.

3. Map-Matching in Navigation Systems

55. Map-matching systems and techniques were well known in the art at least as early as 1995, (EX1011), with the earliest map-matching algorithms invented in the 1970s. EX1014, 85. At least as early as 1996, map-matching techniques were used in thousands of vehicles for route guidance, destination finding, and more. EX1012, 415-16 (“Today, map matching software has been refined to a degree whereby dead reckoning with map matching works incredibly well. Literally thousands of in-vehicle navigation units based on the original Etak technology are in operation today. They are used in ambulances, fire trucks, delivery vehicles, and private cars for automatic vehicle location (AVL), computer aided dispatch, navigation, destination finding, and route guidance.”). EX1014, 83-85. Map-matching was commonly used to compensate for errors in vehicle navigation systems that could arise from inaccurate GPS or sensor measurements. EX1013, 148, 152; EX1014, 79, 100, 101. Map-matching allows vehicle navigation systems to identify the road on which the vehicle is most likely to be travelling. EX1013, 148, 152.

4. Dynamic Route Calculation/Recalculation

56. Techniques for automatic computation of optimum routes to a destination were well known at least as early as 1997. EX1014, 107-117, 124-25, 136-41. Similarly, these techniques had been applied to situations where a vehicle

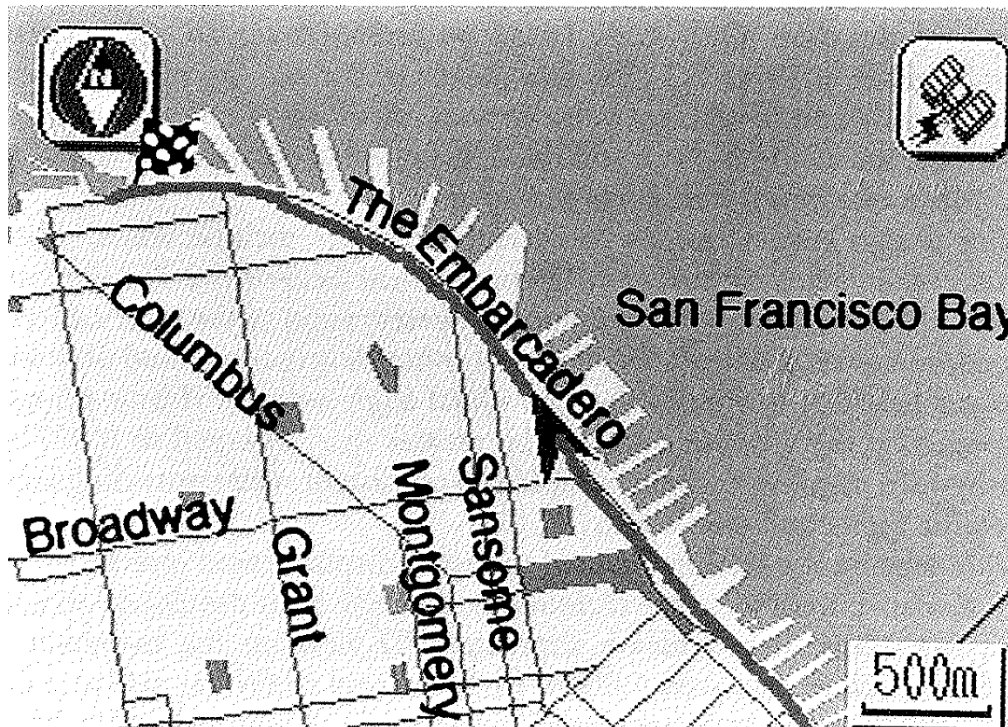
was traveling to a destination and could still compute the shortest or fastest route as the vehicle's position changed, or as traffic or other road information affecting travel distances and times changed. EX1014, 124-25, 136-41. Finding the path with the lowest cost could represent the shortest path in terms of distance, travel time, or other desired characteristics. EX1014, 106.

57. These route calculations may explore the same nodes (intersections) multiple times as the algorithm traverses the search space. EX1014, 116-17. Re-visiting the same nodes represents the reality that different routes to the destination may pass through the same intersection. EX1014, 111, 115-17. Research prior to 2002 indicated that the most time-efficient path to a destination may require twice traversing the same intersection, e.g., instead of including a direct left turn through an intersection, the route could include a right turn, followed by a U-turn, to travel straight through the same intersection. EX1015, 9.

5. Display of Maps and Routes on User Interfaces

58. Navigation systems generally included visual human-machine interfaces to display maps, route planning, and route guidance to the driver of a vehicle. EX1014, 8; *see generally* EX1014, 151-55 (discussing visual-display based interfaces in navigation systems). The use of touchscreens in these human-machine interfaces to display map interfaces with route guidance and current vehicle locations was well-known at least as early as 1997, with touchscreens being

recognized as a “solution ... to simplify the input and output devices used in the vehicle.” EX1014, 151; *see generally* EX1014, 151-55, (discussing touch screen interfaces in navigation devices). Other more advanced navigation systems which could perform pathfinding and route guidance in real-time included displays with visuals denoting the route to a destination and/or indicating upcoming road maneuvers, such as turns. EX1014, 129-130, 156-58, 218; EX1013, 147. Some even continually updated hypothetical 3D images generated from map data (shown below) upon which the vehicle’s current positions and planned route were superimposed: (EX1014, 157-58).



EX1014, 158.

6. Use of Remote Servers in Navigation Systems

59. The use of remote servers in location-based systems was well known in the art at least by 1996. For example, U.S. Patent No. 5,541,845 describes a number of location-based systems where a location from a moving device is transmitted to a central station (remote server). EX1010, 1:38-2:65. Navigation systems, which utilized remote (or “centralized”) servers, could perform part or all of the route planning, store map data, and receive and/or transmit location information, route information, updated routes and guidance to or from a mobile device or in-vehicle navigation system. EX1014, 239-40, 254, 256-61. Additionally, it was a well-recognized problem that receipt of real-time traffic data enabling efficient re-routing would not be possible without a wireless connection to a remote server. EX1014, 233, 240, 244

7. GPS-Enabled Navigation and Monitoring Technologies as Applied to Fleet Management

60. Fleet management systems at least as early as 1997 utilized digital maps, GPS, automotive navigation systems, and other related techniques to track vehicle locations. EX1014, 242-47; EX1013, 147. Examples of fleets managed by such systems included emergency responders (e.g., ambulances and fire trucks), transit vehicles, delivery drivers, and more. EX1014, 240-41; EX1013, 147. Widespread application of the FCC’s wireless enhanced 911 (E911) mandate,

requiring that public safety answering point (PSAP) attendants of wireless communications networks must be able to locate the caller within a radius of 125m, motivated the development of many applications requiring remote location and tracking of vehicle locations, including emergency vehicle dispatch and location tracking. EX1015, 240-41, 259-60.

61. Such applications were useful not only for the fleet managers but also for the fleet. For example, navigation systems wherein digital map displays showing the vehicles' present position and destination to the driver were used to aid quick and efficient navigation. This was especially useful to first responders, delivery vehicles, and shuttle services. EX1014, 240-41. Typical fleet tracking systems included both navigation and communication equipment, along with a monitoring/dispatch station. EX1014, 243.

VII. Person of Ordinary Skill in the Art

62. In my opinion, a person of ordinary skill in the art pertinent to the '925 patent as of its earliest possible priority date would have possessed at least a bachelor's degree in electrical engineering, computer science, or related engineering disciplines, and at least two years of experience in navigation systems, location-based services, map-based technologies, and/or interfaces for their use. A person could also have qualified with more formal education and less technical experience, or vice versa.

63. I meet this definition of one of ordinary skill in the art now and at the priority date of the '925 patent.

VIII. The '925 Patent

A. Overview of the Specification

64. The '925 patent was filed on May 17, 2021, and counsel for Google has informed me that it claims priority to at least fourteen applications, the earliest of which is U.S. Provisional Application 60/371,941, filed on April 10, 2002. EX1001, codes (22), (60).

65. The '925 patent claims “a navigation system for dynamically calculating and displaying multiple travel routes for a mobile device and for tracking the mobile device along the multiple travel routes.” EX1002, 108; EX1001, 1:66-2:1, 4:62-67, 6:30-34, 10:55-57. It is my opinion that the claimed process recites three basic steps:

Step 1: as a mobile device travels to a destination, calculate and display multiple possible routes of travel based on the iteratively updated location of the device ([1c]-[1f]);

Step 2: determine which route and display only the route that the mobile device is on by estimating the route traveled and then comparing the estimated route and the location of the mobile device with the possible routes ([1h]-[1k]); and

Step 3: repeat steps 1 and 2 ([1l]-[1r]).

B. Summary of the Prosecution History

66. The '925 patent was filed May 17, 2021. I have been informed that the '925 patent stems from a series of applications that allegedly originated with a provisional application that was filed on April 10, 2002. EX1001, code (60). The '925 patent issued on October 18, 2022. EX1001, code (45).

67. During prosecution of the '925 patent, I understand that Applicant canceled its first thirty-nine claims to overcome non-prior art based rejections. EX1002, 99-108. Applicant then added sixteen claims that had little-to-no overlap with the canceled claims. EX1002, 99-108. The Office allowed these claims. EX1002, 74-79.

IX. Claim Construction

68. In my opinion, unless otherwise indicated below, none of the claim terms in the '925 patent require an express construction and should all be given their plain and ordinary meaning as they would have been understood by a person of ordinary skill in the art at the earliest possible priority date of the '925 patent.

X. Overview of the Prior Art and Combinations

A. Overview of Ground 1: Yamashita, Durocher, and Irie

69. Yamashita discloses a navigation system, comprising a mobile device with a GUI and servers, that performs the three claimed steps ([1c]-[1f], [1h]-[1k],

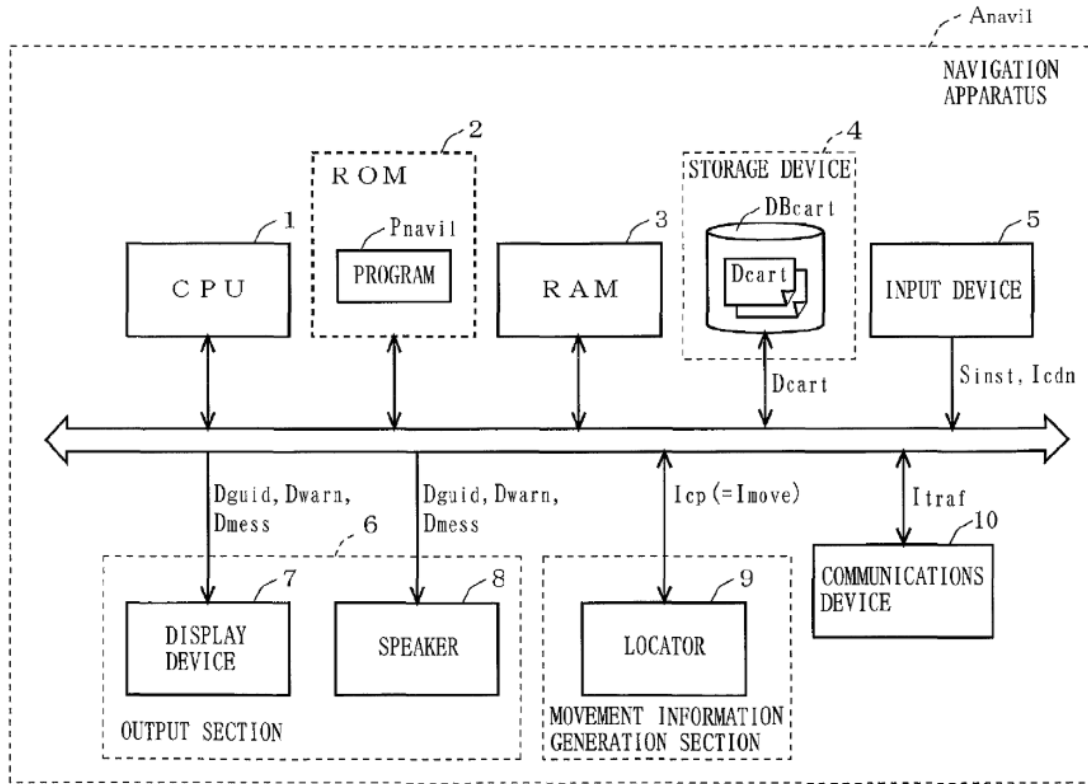
and [1l]-[1r]). Durocher and Irie disclose ancillary claimed features (like calculating routes on a server and rerouting through a previously traversed location).

1. Yamashita

70. Counsel for Petitioner has informed me that U.S. Patent Application Publication No. 2002/0052689 to Atsushi Yamashita et al. (“Yamashita”) (EX1005) qualifies as prior art to the ’925 patent.

71. Like the ’925 patent, Yamashita discloses a navigation system, including a navigation apparatus Anavi, for “guiding a user to a destination” by “search[ing] for a plurality of routes” and “automatically selecting one route from several others derived through route search.” EX1005 (Yamashita), ¶¶1, 15, 18, 74-75, 96, 112, Abstract. Yamashita’s navigation device is named “Anavi.” Throughout Yamashita it is also referred to with a number following the name (e.g., Anavi1, Anavi3, etc.), designating a device using certain additional and optional features implemented on the device in software, but the base components remain the same. EX1005 (Yamashita), ¶¶21, 38, 149-50, 159-60; *see, infra*, [1pre]. For example, Figures 1 and 17 represent Anavi1 and Anavi3, as discussed further below. EX1005 (Yamashita), ¶¶21, 38. *See, infra*, [1pre]-[1d].

FIG. 1

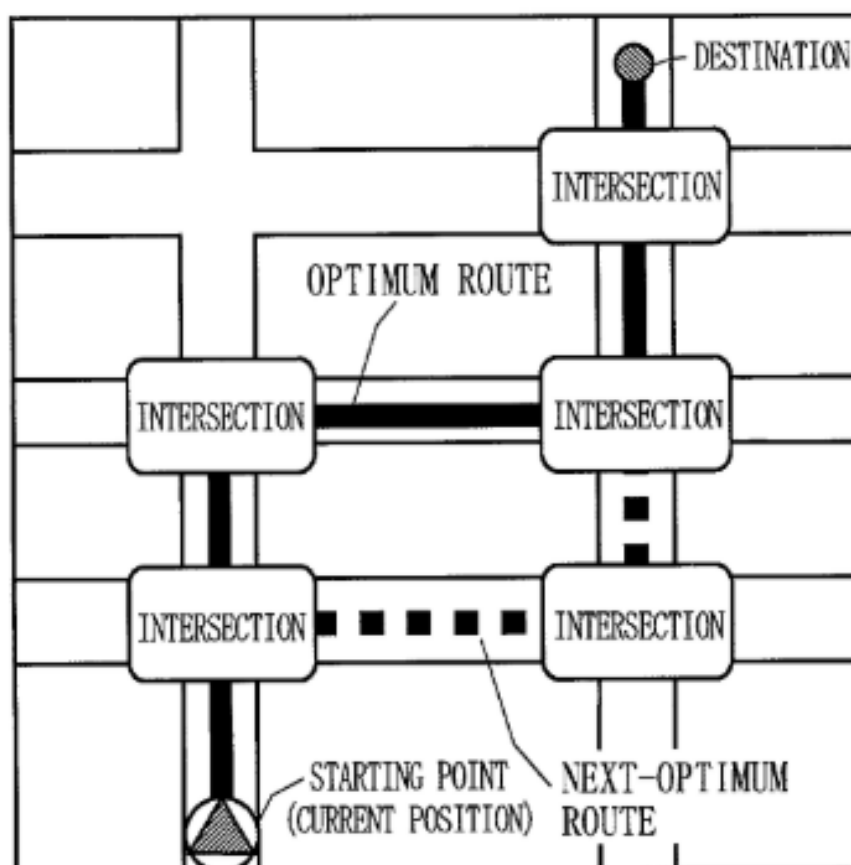


EX1005 (Yamashita), Fig. 1; *see also* Fig. 17.

72. Yamashita's navigation apparatus includes components like a processor (CPU 1), memory (ROM 2, RAM 3, storage device 4), an input device 5, a display device 7 (that displays a map on a GUI), a GPS (locator 9), and a transmitter to communicate over the Internet with servers (communications device 10). *Id.*, ¶58. In my opinion, these components allow for "the departure point and the destination" to be "inputted by the user via the input device 5." *Id.*, ¶¶74-75. I also understand that the locator 9 "corresponds to a movement information generation section" and is "typically composed of a GPS receiver (Global Positioning System)." *Id.*, ¶67. It

“detects the user’s current position, and generates position information I_{cp} which indicates the coordinates of the position.” *Id.* The “output section 6 is typically composed of the display device 7 and a speaker 8,” and it presents “various data generated by the CPU 1” to the user, such as the routing information shown in Figure 9. *Id.*, ¶¶66, 109, Fig. 9.

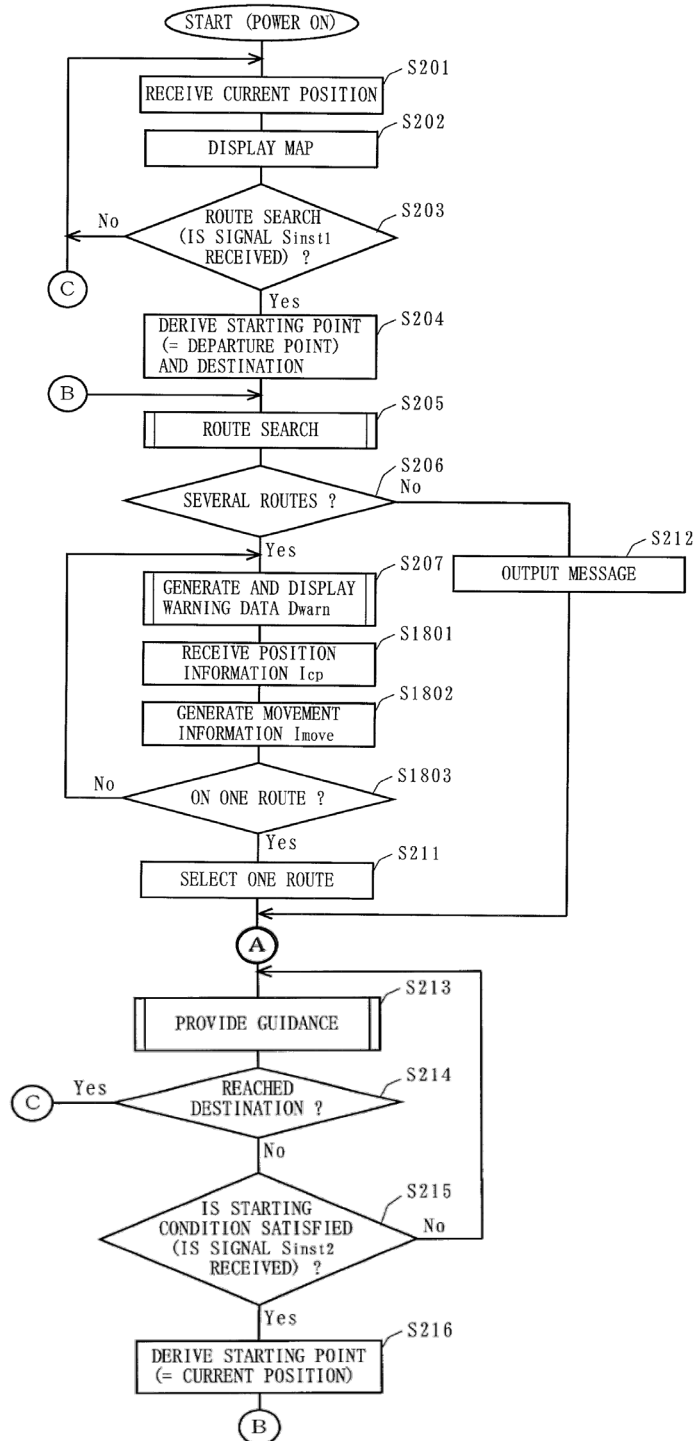
F I G. 9



EX1005 (Yamashita), Fig. 9.

73. It is my opinion that, just as claimed in the '925 patent, Yamashita's system performs an iterative process for generating alternative possible routes to offer to the user as they travel. EX1005 (Yamashita), ¶¶86, 94, 103. Figures 2 and/or 18 combined with Figure 3 (at circle A) depicts this basic process:

FIG. 18



EX1005 (Yamashita), Figs. 3 and 18 (combined).

74. Yamashita explains that “[c]ompared with FIG. 2, FIG.18 includes steps S1801 to S1803 in place of steps S209 to S211. This is the only difference therebetween, and in FIG. 18, *any step identical to that in FIG. 2 is provided with the same step number and is not described again.*” EX1005 (Yamashita), ¶152. Yamashita’s navigation apparatus receives the current position of the device from a GPS server (S201); displays a map of the device’s current location and surrounding area (S202); receives instructions to start the route search process through, for example, a user specifying a desired destination (S203); derives the starting and destination points (S204); and searches for potential routes (S205). EX1005 (Yamashita), ¶¶67, 69-72, 74-77, Figs. 2, 18. If there are several possible routes (e.g., an optimum and a next-optimum route (S206)), Yamashita displays each route on the map (S207). EX1005 (Yamashita), ¶¶78-83, 85-93. As the device continues to travel, it collects movement information about where the device is traveling. *See* for example, EX1005 (Yamashita), ¶¶112-119 (S208-S210), 153-56 (S1801-S1803), Figs 2, 18. In Figure 18, this movement information includes trail data, which Yamashita abbreviates as “Itraj,” about the user’s path as they travel over time along the roadway network being traversed and then compares the user’s traveled path against the routes to determine which route the device is traveling on (S1801-S1803). EX1005 (Yamashita), ¶¶154-56. Anavi then guides the user on a route (S213). EX1005 (Yamashita), ¶¶117, 119-120, 126, 157. Yamashita also receives

traffic data and, based on the user's locations and traffic information, updates and proposes additional routes as necessary (S214-S215). EX1005 (Yamashita), ¶¶68, 133. Yamashita repeats this process until the device reaches the destination (S216). EX1005 (Yamashita), ¶¶124-25. As observed from Figures 2, 3 and 18, the circled letters A, B, and C are continuations of the process that make it iterative. EX1005 (Yamashita) ¶¶125, 146, 157. My summary of Yamashita's Figures 2, 3, and 18, is merely to provide exemplary teachings from Yamashita.

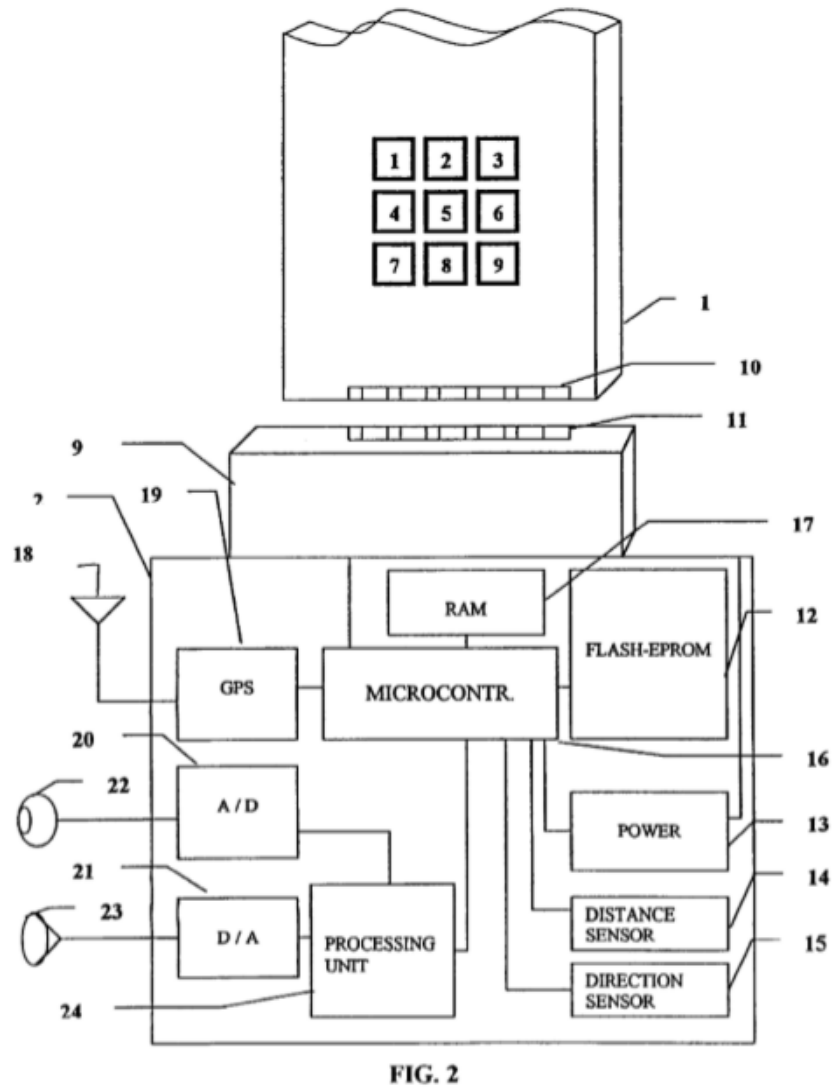
75. It is my opinion that Yamashita is within the same field of endeavor of the '925 patent: facilitating dynamic route-mapping and navigation assistance. EX1001, 1:5-10, 3:42-45; EX1005 (Yamashita), ¶¶2, 6, 15-16, 18-19.

2. Durocher

76. Counsel for Petitioner has informed me that U.S. Patent No. 6,381,535 to Jean-Michel Durocher and Sophie Sommelet ("Durocher") (EX1006) qualifies as prior art to the '925 patent.

77. It is my opinion that, like the '925 patent and Yamashita, Durocher discloses a navigational system that utilizes a centralized server and facilitates real-time guidance for mobile terminals navigating to a destination. EX1006 (Durocher), 1:5-11, 1:14-23. Durocher's system is very similar to Yamashita's, and it also expressly states that a user may enter a destination on a touchscreen (interacting with the GUI), and the route determinations are done at a server.

78. Durocher's mobile terminal allows the user to "choose start and destination points," along with other criteria for the route, like "the fastest, simplest, least expensive, shortest," or "the most pleasant." EX1006 (Durocher), 3:3-10. The user enters their request on the terminal, which may be "a mobile telephone or an electronic organizer" (*id.*, 7:65-67, 8:23-29) using a "keyboard, light pen or touch screen." *Id.*, 9:56-60.



EX1006 (Durocher), Fig. 2.

79. Durocher's centralized "server contains cartographic data and is capable of calculating itineraries," and is linked to mobile terminals through the Internet. EX1006 (Durocher), 2:60-3:2, 6:66-7:4. Not only does it calculate "the best itinerary" based on a user request indicating "start and destination points," but it further "calculates and also transmits to the terminal the best alternative itinerary for

the driver” in the case the driver “deviat[es] from its course and take[s] one or the other of the crossroads.” *Id.*, 3:3-6, 3:59-67. For “one, several, or each of the possible deviations, the centralized service calculates and also transmits [the itinerary] to the terminal.” *Id.*

80. It is my opinion that Durocher is within the same field of endeavor as the '925 patent: facilitating dynamic route-mapping and navigation assistance. EX1001, 1:5-10, 3:42-45; EX1006 (Durocher), 3:38-46, 3:59-4:3.

3. Irie

81. Counsel for Petitioner has informed me that U.S. Patent No. 6,636,806 to Takashi Irie (“Irie”) (EX1007) qualifies as prior art to the '925 patent.

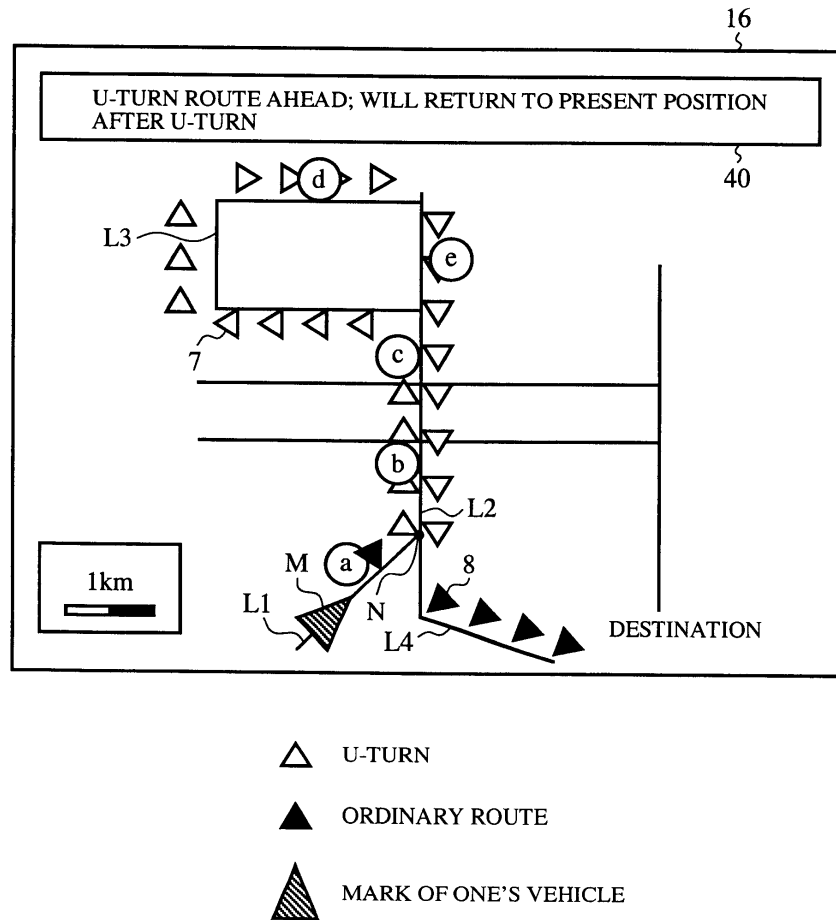
82. I understand Irie to disclose a “guide indication method in an onboard navigator” that specifically addresses the case in which a traveling vehicle needs to make a U-turn or backtrack through an earlier-traversed point or intersection to reach a subsequent location. EX1007 (Irie), 1:10-17, 1:63-2:5, 4:23-43, 5:11-17.

83. It is my opinion that this scenario expressly proposes a solution to a problem recognized by Yamashita (EX1005 (Yamashita), ¶¶68, 133)—if there is a traffic accident or jam and a user needs to reroute, the next optimal route may require backtracking or making a U-turn. *See* EX1014, 111, 116-17; EX1015, 9. As explained by Irie, backtracking or a U-turn may also be necessary when an intersection prohibits a turn in a certain direction, as Figure 2 shows, but

backtracking or U-turning applies equally to the traffic jam problem of Yamashita.

EX1007 (Irie), 4:23-43, 5:11-17.

FIG.2



EX1007, Fig. 2.

84. It is my opinion that Irie is within the field of endeavor as the '925 patent: facilitating dynamic route-mapping and navigation assistance. EX1001, 1:5-10, 3:42-45; EX1007 (Irie), 3:20-23; 4:1-4.

B. Overview of Ground 2: Yamashita, Durocher, Irie, and Dickerson

85. In my opinion, in addition to the navigation system and method recited by the independent claims of the '925 patent, claims 7 and 15 add that the system is used by a service provider, like a ride-share company or taxi service, that assigns drivers to particular riders based on certain criteria.

86. While Yamashita and the other references do not expressly disclose a service provider implementation, Dickerson does, and it is my opinion that it would have been obvious and beneficial to combine the navigation system of Yamashita (modified by Durocher and Irie) with Dickerson's central assignment system for service providers.

1. Dickerson

87. Counsel for Petitioner has informed me that U.S. Patent Application Publication No. 2001/0037174 to Stephen L. Dickerson ("Dickerson") (EX1008) qualifies as prior art to the '925 patent.

88. Dickerson facilitates transportation of passengers to their respective destinations through the use of a central assigning system. EX1008 (Dickerson), Abstract, ¶3, Fig. 1. The centralized assigning system is "capable of matching a passenger's trip request with current transit parameters to determine vehicle assignment and routes that reduce passenger trip and wait times." *Id.*, ¶19. The system designates a driver to a passenger assignment based on factors, including the

“vehicle type,” “the expected time of arrival,” and “the expected total time of travel.”

Id., ¶¶42, 75, 102.

89. It is my opinion that Dickerson is within the field of endeavor as the '925 patent: facilitating dynamic route-mapping and navigation assistance. EX1001, 1:5-10, 3:42-45; EX1008 (Dickerson), ¶¶19, 102. For example, Dickerson discloses a system that facilitates multi-vehicle navigation and route generation, to efficiently transport passengers to their respective destinations. Dickerson, ¶¶19, 102. Dickerson is also pertinent to a problem the '925 patent purports to solve: “designating ... one of a plurality of available service providers ... [to] a customer” based on various metrics. EX1001, cl. 15, 18:44-48; EX1008 (Dickerson), ¶24.

XI. Ground 1: Yamashita, Durocher, and Irie Render Obvious Claims 1-6 and 9-14

A. Independent Claim 1

1. **[1pre] A computer program product of a navigation system for dynamically calculating and displaying multiple travel routes for a mobile device and for tracking the mobile device along the multiple travel routes,**

the navigation system including the mobile device and one or more servers,

the computer program product comprising a non-transitory computer readable medium including computer instructions that when executed by at least one processor of the navigation system cause the navigation system to:

90. It is my opinion that Yamashita discloses [1pre].

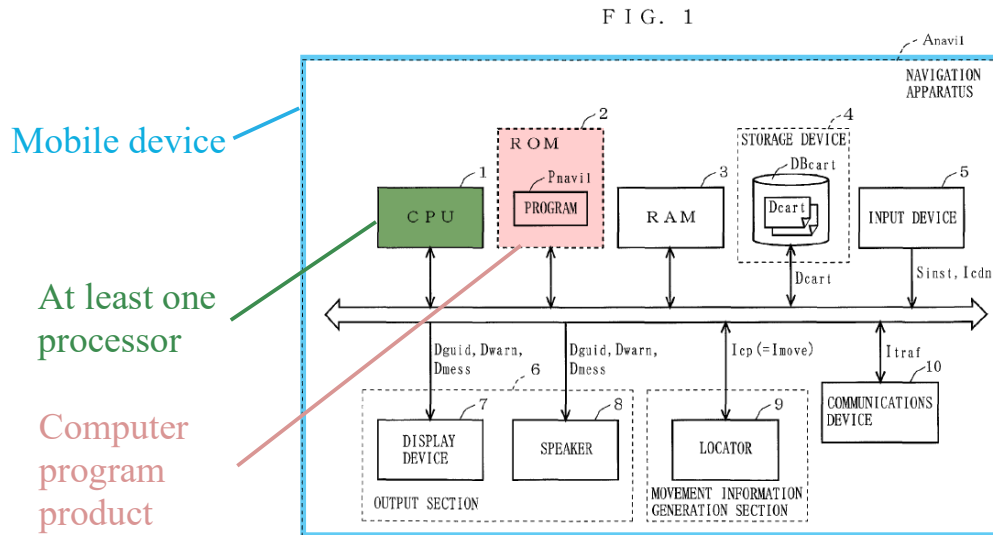
91. Yamashita discloses the claimed computer program because its “navigation apparatus Anavi1” includes “ROM 2 [that] is a program memory on which a program Pnavi1 for the navigation apparatus Anavi1 has been previously” downloaded from a “network server.” EX1005 (Yamashita), ¶¶58-61, 67-69, 159-60. Yamashita’s ROM is a form of non-transitory computer readable medium memory that stores Pnavi1 (computer instructions) for a navigation program executed by the CPU. EX1005 (Yamashita), ¶¶59, 69.

92. For the same reasons, Anavi3 (which shares the structure of Anavi1) constitutes the claimed computer program. Anavi1 and Anavi3 are represented by Figures 1 and 17, respectively. EX1005 (Yamashita), ¶¶21, 38. Anavi1 and Anavi3 share the same structural components, with the exception of Anavi3’s use of ROM 14 in place of ROM 2. EX1005 (Yamashita), ¶¶149-50. Yamashita notes that the only difference between the two ROMs is the Pnavi program stored on them—where Pnavi1 is stored on ROM 2 in Anavi1 and Pnavi3 is stored on ROM 14 in Anavi3. EX1005 (Yamashita), ¶¶149-150. The other components of the navigation apparatus Anavi3 (including the cartographic database, input device, and communications sections) are the same as those in Anavi1. *Id.* Given their shared structure, both Anavi1 and Anavi3 will be referred to as “Anavi” because they are the same device running essentially the same programs. Pnavi1 (Fig. 2) and Pnavi3 (Fig. 18) contain identical steps except for three route-selection-related steps (S208-S210/S1801-

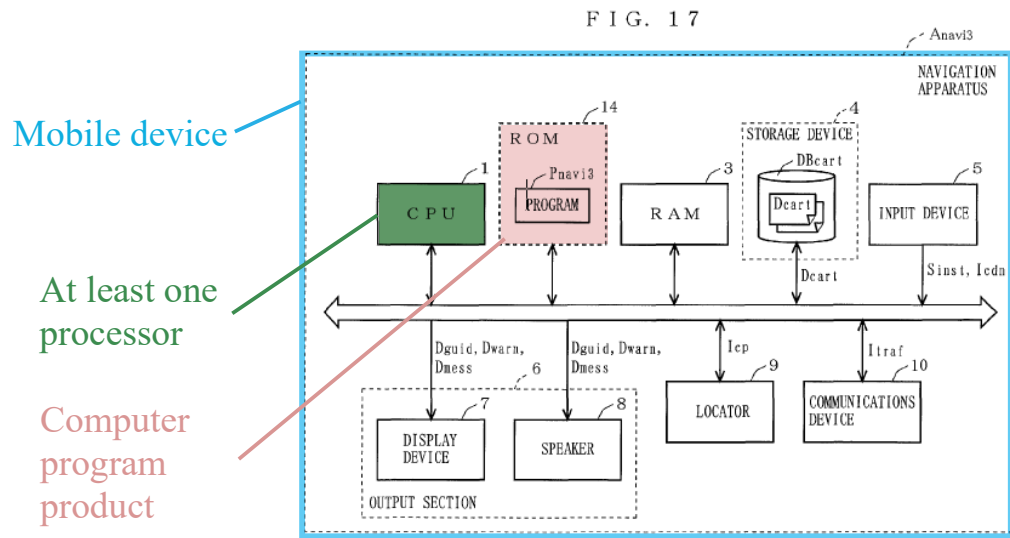
S1803) discussed in detail below (*see, infra*, [1h], [11]), Pnavi3 also constitutes the claimed computer instructions for the reasons above. EX1005 (Yamashita) ¶152.

93. In my opinion, Yamashita discloses the claimed mobile device (part of the navigation system) because its Anavi is a vehicle-mounted mobile device. EX1005 (Yamashita), ¶¶58, 68, 159 (“In the first to third embodiments, the navigation apparatuses Anavi1 to Anavi3 are presumably of a vehicle-mounting type [but] [t]his is not restrictive, and the navigation apparatuses Anavi1 to Anavi3 are easily realized in the portable application. Moreover, the programs Pnavi1 to Pnavi3 can be easily implemented in computer devices such as mobile phones, Personal Digital Assistants (PDAs), and personal computers, and accordingly those computer devices can be easily provided with the navigation function.”), Figs. 1, 17. Yamashita’s Anavi is consistent with the ’925 patent description of a mobile device. For example, the ’925 patent states that “*a mobile device* would send discrete location information in a peer-to-peer connection *to another mobile device, such as an in-vehicle navigation device*, for the display of the remote mobile device’s location.” EX1001, 4:27-33; *see also id.*, 2:22-27, 7:26-34, 11:3-8 (“Furthermore, this invention is not limited to a typical personal computer, but may also be utilized with other computing systems, such as handheld devices, mobile laptop computers, ... [and] in-vehicle navigation systems...”). Yamashita’s Anavi determines which

route the user/vehicle is moving along, making it a mobile device. *See* EX1005 (Yamashita), ¶¶58, 68, 159, Figs. 1, 17.



EX1005 (Yamashita), Fig. 1 (annotated).



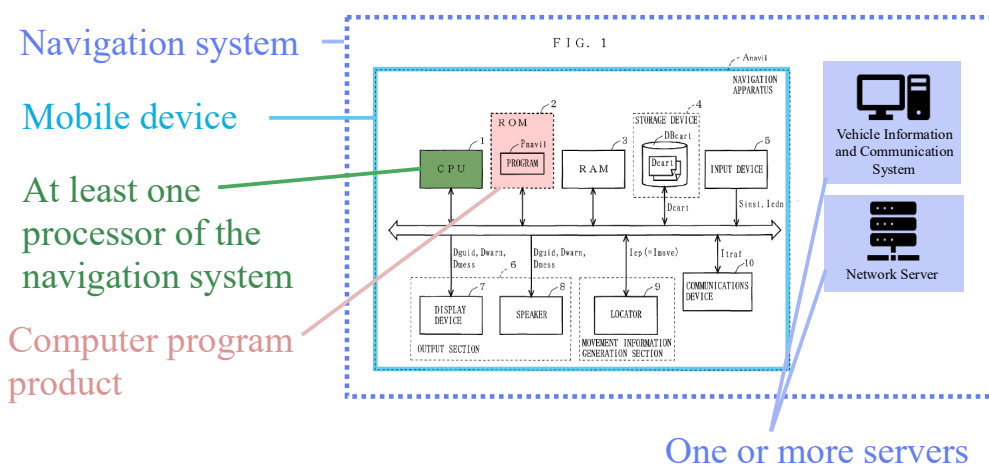
EX1005 (Yamashita), Fig. 17. (annotated).¹

94. It is my opinion that Yamashita discloses the claimed navigation system because Anavi communicates with at least a “network server” and/or a “Vehicle Information and Communication System” (responsible for communicating with Anavi and transmitting updated traffic information to the communication device 10 of Anavi). EX1005 (Yamashita), ¶¶58, 67-68, 133, 160, 254. It is my opinion that Yamashita discloses at least one server since “the programs Pnavi1 to Pnavi3 may

¹ For each of the subsequent limitations, only a depiction of Yamashita’s Figure 1 is shown, because the structure of Anavi1 and Anavi3 does not substantively differ with regard to the subsequent limitations, as explained above.

be stored on the storage device of a network server so that the computer devices can download those programs” from the server when needed. EX1005 (Yamashita), ¶¶160. Yamashita also teaches at least one server because the Anavi may receive “traffic information Itraj from beacons” as part of a “Vehicle Information and Communication System.” EX1005 (Yamashita), ¶¶168, 133, 160. A POSITA would have understood that the Vehicle Information and Communication Systems involve collections of traffic information that is processed on servers and distributed via beacons. *See e.g.*, EX1014, 202-03, 255-56; *see* EX1005 (Yamashita) ¶¶68, 133.

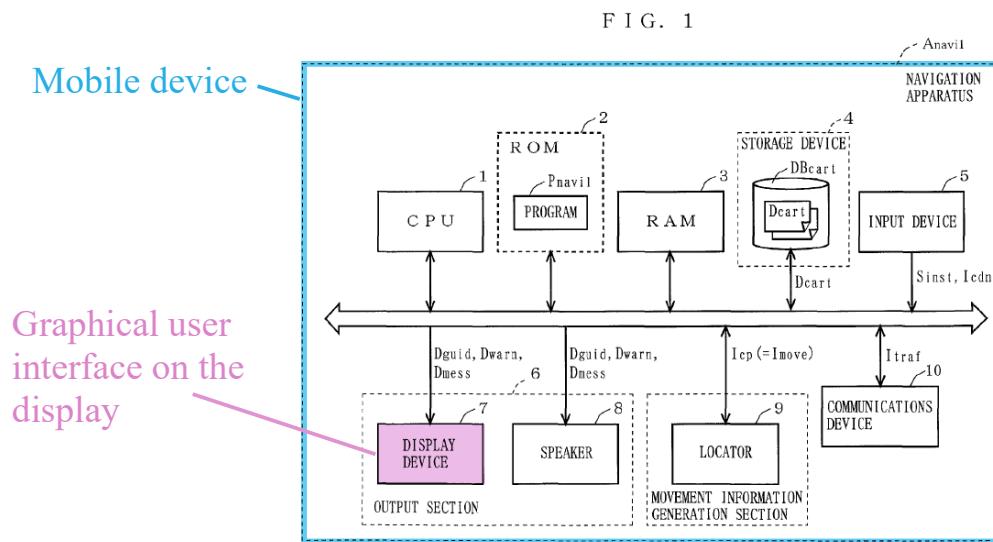
95. Moreover, as discussed in detail below, Yamashita's navigation system uses location data of Anavi to calculate routes, update those routes based on traffic conditions, and displays those routes as Anavi progresses along one of them. EX1005 (Yamashita), ¶¶15-16, 18-19, 133.



EX1005 (Yamashita), Fig. 1 (annotated); *see also* Fig. 17.

2. [1a] provide a graphical user interface (GUI) on a display of the mobile device;

96. In my opinion, Yamashita discloses [1a] because it teaches that Anavi's (mobile device) includes display device 7 (a GUI) that displays a navigation screen that a user interacts with. EX1005 (Yamashita), ¶¶58, 61, 66, 71, 87, 93.



EX1005 (Yamashita), Fig. 1 (annotated); *see also* Fig. 17 (same).

97. Yamashita's display device 7 depicts "display data which is displayed as a map ... and road network data which represents road connections on the map." EX1005 (Yamashita), ¶¶61, 63, 93, Fig. 6A. When Yamashita calculates routes, its display graphically displays "the user's current position, the destination, and the optimum and next-optimum routes overlaid all together on the map." EX1005 (Yamashita), ¶¶89-90. Yamashita's Figures 6A, 6B, 9, and 34A illustrate examples of Yamashita's GUI depicting a graphical interface for the user to interact with.

FIG. 6A

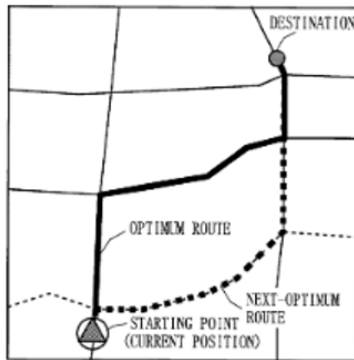


FIG. 9

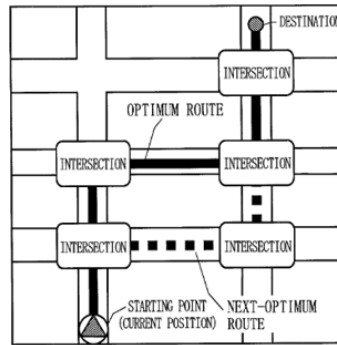


FIG. 6B

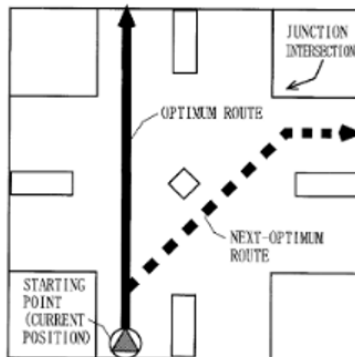
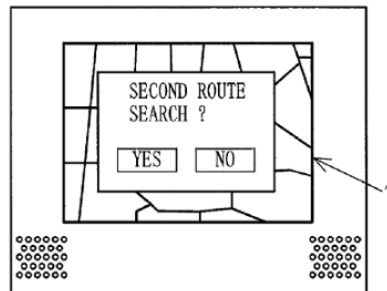


FIG. 34A



EX1005 (Yamashita), Figs. 6A, 6B, 9, 34A; ¶¶26-27, 30, 93, 102, 109, 128.

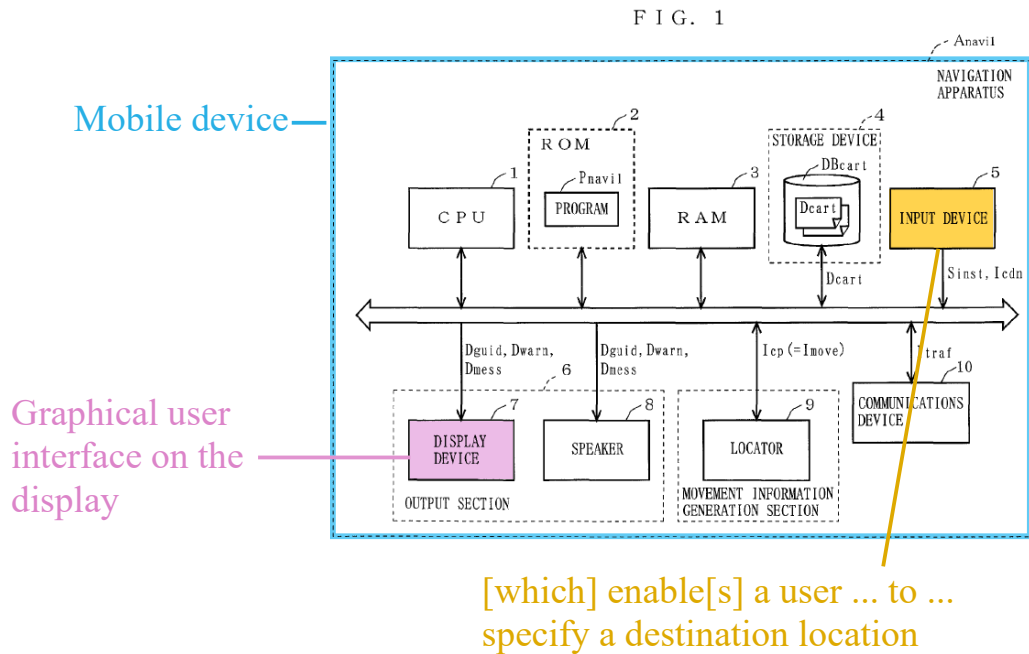
3. [1b] enable a user of the mobile device to, using the GUI, specify a destination location; and

98. In my opinion, Yamashita alone, or Yamashita and Durocher, disclose [1b].

99. Yamashita describes that “in step S204, the user may input only the destination through the input device 5,” which is then displayed on display device 7.

EX1005 (Yamashita), ¶¶75, 87.

100. As depicted in Yamashita's Figure 1, **Anavi** "includes an **input device 5** [and] an output section 6" that includes **display device 7** (GUI). EX1005 (Yamashita), ¶58.



EX1005 (Yamashita), Fig. 1 (annotated).

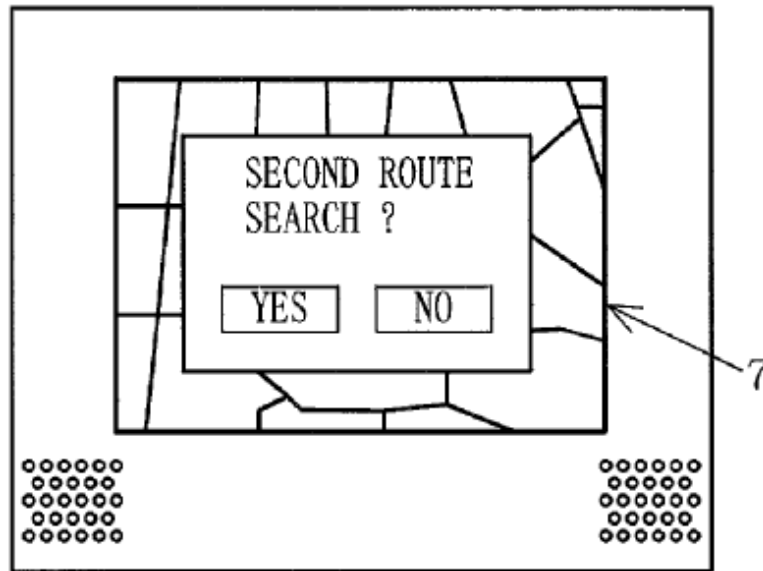
101. Yamashita's "input device 5 is typically composed of a remote controller, a touch sensor, keys, buttons, or a mouse, all of which are user operable." EX1005 (Yamashita), ¶65. In my opinion, a POSITA would have understood that the input device allows user input to control the display. *See* EX1014, 144 (explaining that "[e]very interface needs one or more control devices" and listing "[k]eyboard[s]," "[i]sometric joystick[s]," "[t]ouch screen[s]," and more as examples of such). Yamashita instructs that "the user may input only the destination

through the input device 5,” which is shown on the display device 7. EX1005 (Yamashita), ¶¶75, 89.

102. It is also my opinion that a POSITA would have understood that Yamashita’s display device 7 and input device 5 are integrated, such that a user is entering a destination using the GUI, for two reasons.

103. **First**, a user’s interaction with or input to the input device controls the display. For example, Yamashita notes that “if the user operates a predetermined portion [of input device 5],” such as designating a destination or selecting an option, then the input device generates a signal that initiates a route search. EX1005 (Yamashita), ¶¶72-76. Yamashita’s Figure 34A depicts one example where the display device 7 shows an option to select yes or no on the display. EX1005 (Yamashita), ¶234, Fig. 34A. As the display shows screens with interactive features, it corresponds to a GUI. Accordingly, Yamashita teaches that the input device is how the user interacts with the display, such that when the user inputs a destination on the input device, the user is specifying the destination using the GUI.

F I G. 3 4 A



Yamashita, Fig. 34A.

104. **Second**, Yamashita discloses that its device is a vehicle mounted navigation device or a mobile phone. EX1005 (Yamashita), ¶¶58, 68, 159. Both such devices were known at the time to be configured with buttons and/or touchscreens integrating the display and input device (EX1014, 8, 151-55), and thus, Yamashita at least suggests that its display would include a GUI that is navigated and controlled via the input device which allows a user to enter a destination using the GUI. EX1005 (Yamashita), ¶¶65-66, 74-75, 159.

105. To the extent Patent Owner disputes that Yamashita alone teaches this limitation, it is my opinion that a POSITA would have found it obvious in view of Durocher, which expressly discloses entering a destination on a touchscreen display.

106. Durocher describes a “a mobile telephone or an electronic organizer [that] can function as mobile terminal for the navigational aid system.” EX1006 (Durocher), 7:65-67. Durocher summarizes:

[an] advantage of using a portable telephone is that it comes with an integrated screen and keyboard (or touch screen or light pen) and that it possesses the communications components required for implementing this navigational system. Thus, no other screen is required, nor any other communications module (not for request, nor for answers, nor for differential information).

EX1006 (Durocher), 8:23-29. The “request includes a choice of destinations” and “is entered on the terminal ... with the aid of a ... touch screen.” EX1006 (Durocher), 9:43-46, 9:55-60. Durocher thus discloses a navigation apparatus where a user directly inputs or specifies a destination location using a GUI.

107. In my opinion, a POSITA would have been motivated to implement Yamashita’s input device 5 and display device 7, as a single unit, to the extent they are separate, as disclosed by Durocher, to simplify the navigation apparatus and improve the user’s experience/safety. Yamashita’s navigation apparatus is designed to simplify a user’s navigation experience by “automatically selecting one route from several others derived through route search.” EX1005 (Yamashita), ¶¶15, 158 (“Therefore, the navigation apparatus Anavi3 does not require the user [to perform] cumbersome operation for route selection.”). A POSITA would have found that implementing Yamashita’s input device 5 and display device 7 as one unit further

simplifies the physical navigation apparatus because it removes the need for separate keyboards, buttons, or mice by accepting input on the display. Such an integration would have been beneficial because it would have minimized distractions caused by having to look between multiple locations to make selections. *See* EX1014, 151 (“[r]educing the number of input and output devices has therefore become an important design issue” for navigation equipment on vehicles, “[o]ne solution [being] to use a touch screen...to help simplify the input and output devices used in the vehicle.”). Indeed, by enabling the user to interact with the maps and selection screens on the display (GUI) directly, the user merely would press the screen/display to input any information. *See* EX1014, 151 (“[U]sing touch screens as control devices enables ...features [including]...[t]he ability to control a large number of functions from a small area.”). Not only does this simplify the apparatus itself, but a POSITA would have further understood such a modification would have enhanced the safety of the apparatus because it would require less attention from the user. *See* EX1014, 156 (“The most important design considerations for an in-vehicle display are safety and ease of use.”).

108. A POSITA would have had a reasonable expectation of success in the modification because it merely would have involved combining prior art elements (i.e., input device 5 with its display device 7) according to known methods (i.e., Durocher’s use of a single screen for destination input) to yield the predictable result

of an interface that receives input. *See* EX1014, 144 (“[e]very interface needs one or more control devices.”).

109. Yamashita and Durocher describe similar devices that are used for the same purpose of navigation. Yamashita, ¶¶15-16, 58, 159; Durocher, 2:60-3:15, 3:37-50, 4:19-34. Both references display graphical user interfaces and provide for the use of touch-based input in some capacity. Yamashita, ¶¶65-66, 75; Durocher 8:20-29, 9:56-65. Both also disclose devices that are vehicle mounted navigation devices or mobile phones. EX1005 (Yamashita), ¶¶58, 68, 159; Durocher, 7:65-8:35, 9:5-19. In my opinion, before the time of invention, such devices with an input receiving display, such as a touchscreen display, were known. *See also* EX1014, §7.2.2 (titled “Touch Screens,” discussing the use of touch screens in vehicle navigation systems). Yamashita thus at least suggests that its display would also be the input device in the form of a touchscreen that allows a user to enter a destination using the GUI. EX1005 (Yamashita), ¶¶65-66, 74-75, 159. Thus, a POSITA would have reasonably expected success in modifying Yamashita’s navigation apparatus because it would have merely involved a simple substitution of one known element for another to obtain predictable results.

4. [1c] as the mobile device travels to the destination location,

110. Yamashita discloses [1c] because Yamashita teaches that Anavi is configured to automatically calculate possible routes while in transit. EX1005

(Yamashita), ¶¶18, 64, 67, 86, 94, 96-97, 103-104, 108-110, 112, 153-58, Figs. 2, 5, 8, 18.

111. As explained for [1d]-[1r], Yamashita discloses that, after the user inputs a destination location, “CPU 1 automatically performs route selection by monitoring the user’s (i.e., the vehicle’s) actual movement without the user having to operate the input device 5.” EX1005 (Yamashita), ¶¶15, 67, 70-76, 112, 129, 158, Figs. 6A, 12. It is my opinion that because the navigation apparatus Anavi moves with the user/vehicle, it is also traveling to the destination location and calculating/displaying routes throughout travel.

5. [1d] (i) receive a first location update signal generated by a positioning device of the mobile device, the positioning device including a GPS receiver, and the first location update signal representing a first location of the mobile device at a first time,

112. In my opinion, [1d] requires that the mobile device includes a GPS receiver that generates a first location of the device at a given time. Yamashita discloses [1d] because Yamashita’s Anavi includes a GPS receiver that, as Yamashita’s Anavi travels to the destination ([1c]), detects the current location (first location) of the device, generates position information Icp (first location update signal), and transmits the Icp to other components within the device. EX1005 (Yamashita), ¶¶67, 70-75, Fig.1-2.

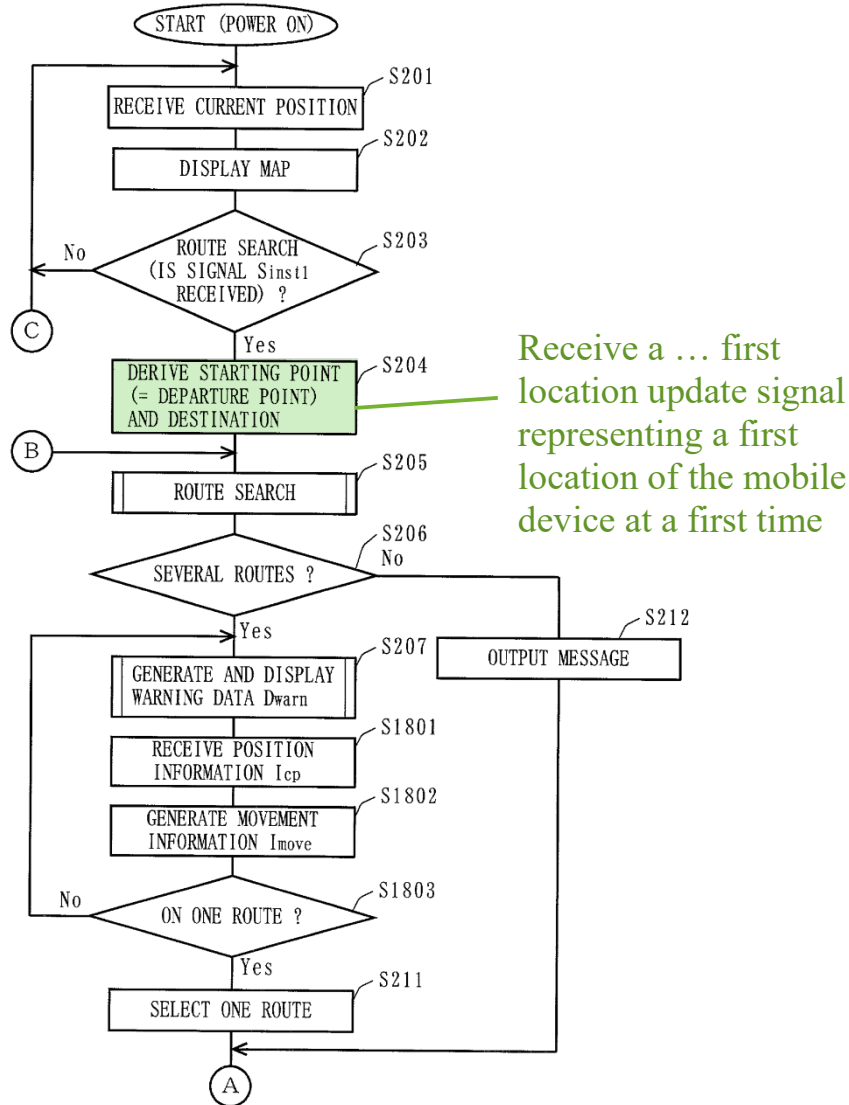
113. Yamashita's Anavi navigation device includes locator 9 that is "typically composed of a GPS receiver (Global Positioning System)." *Id.*, ¶67. It "detects the user's current position and generates position information Icp which indicates the coordinates of the position." *Id.* This is also shown in Figure 18 (incorporating steps described with reference to Fig. 2), Yamashita's "CPU 1 receives from the locator 9 the position information Icp indicating where the user currently is (step S201)." EX1005 (Yamashita), ¶¶70, 152, Fig. 17-18.

114. With reference to step 202, "CPU 1 then reads the cartographic data Dcart representing the map of a predetermined area" that "covers the area around the user's current position indicated by the position information," and uses the cartographic data and user's location to "generate display data Ddis, indicating the user's current position by a mark appropriately disposed on any corresponding road in the predetermined area [of the map]" such that display device 7 displays the location on the map. EX1005 (Yamashita), ¶71.

115. With reference to steps 203-204, depicted below in Fig. 18 (which is the identical step in Fig. 2), if the user does not specify a different starting point but inputs "only the destination" (discussed in [1b] above)," then the CPU 1 uses the "position information Icp," provided by locator 9, to derive the user's current position. EX1005 (Yamashita), ¶¶74-75. In that case, the "derived coordinates of the

user's position are used as those of the departure point.” EX1005 (Yamashita), ¶¶74-75, 152.

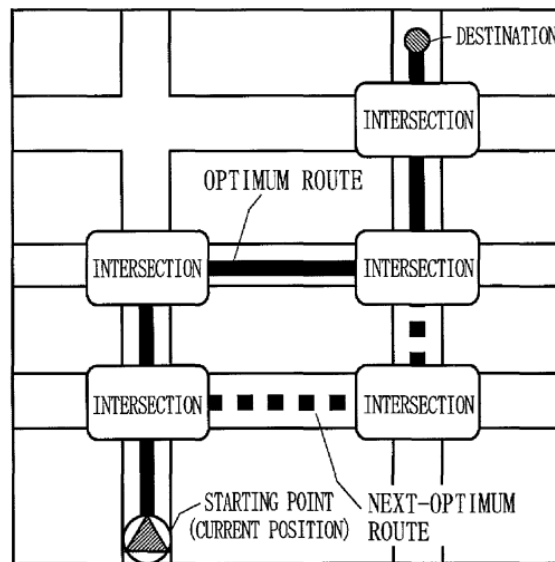
FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated); *see also* Fig. 2.

116. Yamashita's Figure 9 shows the graphical display of the user's current position determined in step 204 (first location update) with reference to the roadway network map.

F I G . 9



EX1005 (Yamashita), Fig. 9.

117. As discussed in greater detail below, Yamashita further discloses a method of iteratively calculating routes to a destination based on the current position of the Anavi. *See infra* [1e]-[1r]; Yamashita, ¶¶126-28, 153-58. For example, in each iteration of Yamashita's position determination and route calculation, similar to step 204, Yamashita also discloses receiving a current position in repeated step 216 that is used to perform rerouting. EX1005 (Yamashita), ¶¶126-28, Figs. 3, 18. Thus, even if Patent Owner disputes whether step 204 corresponds to the first location update

signal, Yamashita discloses [1d] because the generation of Icp for rerouting alternatively corresponds to a first location update signal. EX1005 (Yamashita), ¶¶152-57. Both the procedures in Fig. 2 and Fig. 18 share the same latter half of the procedure (depicted in Fig. 3) and therefore both use its procedure to determine whether the Anavi has reached its destination, or whether re-routing is required, which uses a current position derived at step 216 as a new starting point for another iteration. EX1005 (Yamashita), ¶¶125-27.

118. Figure A(1) is an illustration of Yamashita's process for this limitation.²

² Throughout the Petition, Figures A(1)-(8) and B(1)-(7) are used as visual representations of Yamashita's process based on Yamashita's teachings, not an annotated figure from Yamashita.

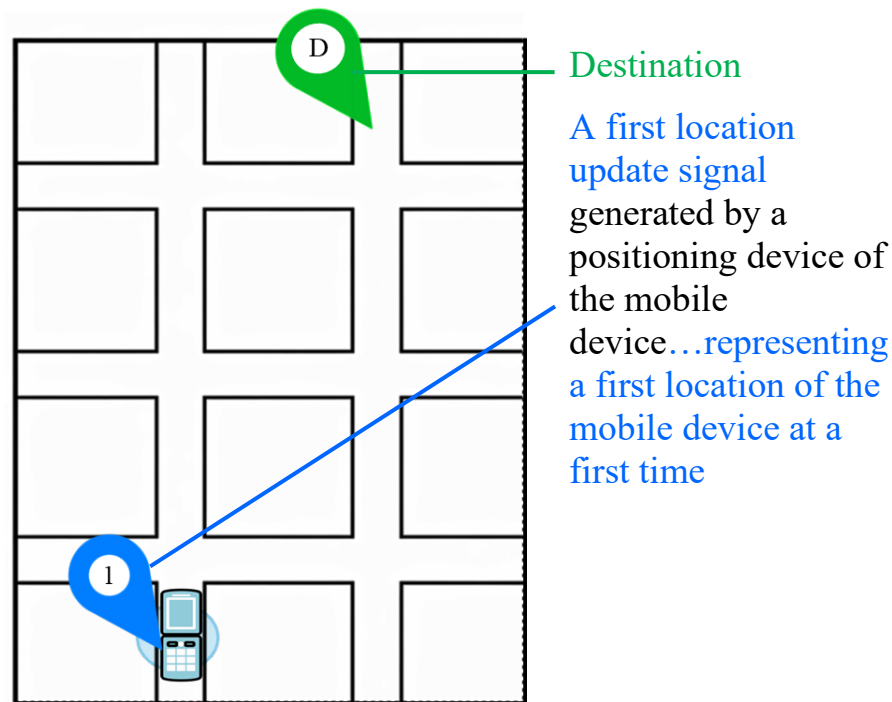


Fig. A(1).

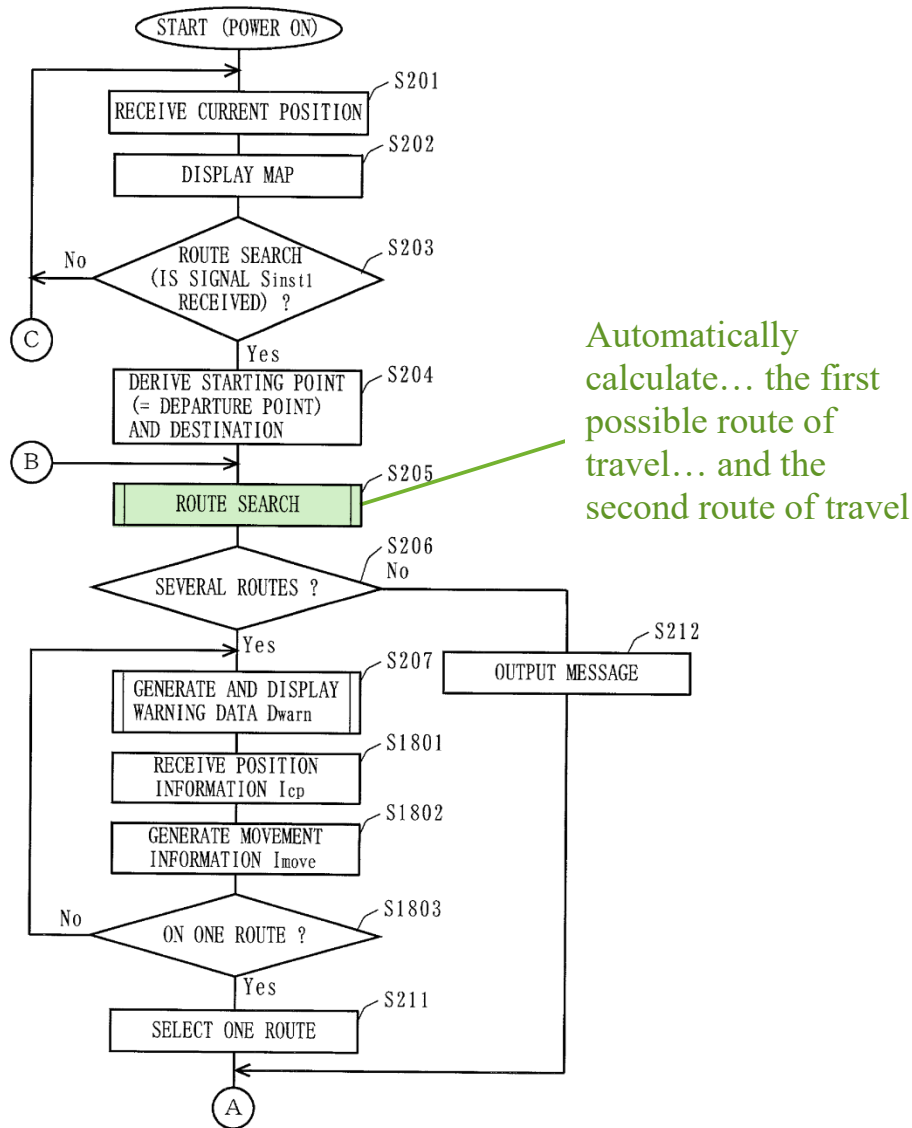
6. [1e] (ii) automatically calculate, using map data, the destination location and at least the first location update, a **first possible route of travel** of the mobile device from the **first location** towards the destination location and a **second possible route of travel** of the mobile device from the **first location** towards the destination location, the **first possible route of travel** including a **first roadway intersection** and the second route of travel including **the first roadway intersection**,

119. In my opinion, [1e] requires automatically calculating two different routes, each passing through one common intersection. Yamashita discloses [1e] because, as Yamashita's Anavi travels to the destination ([1c]), Anavi performs a route search S205 that calculates, using cartographic data (map data), an "optimum

route” and a “next-optimum route” where the routes “head in different directions at a certain intersection.” EX1005 (Yamashita), ¶¶76-77, 96, *see also* ¶¶78-79, 129.

120. Yamashita’s Figure 18 depicts Anavi’s process where, after the current position and destination are determined, “[t]he CPU 1 then searches for several routes under any well-known route search algorithm such as the Dijkstra’s algorithm (step S205).” EX1005 (Yamashita), ¶¶75-76.

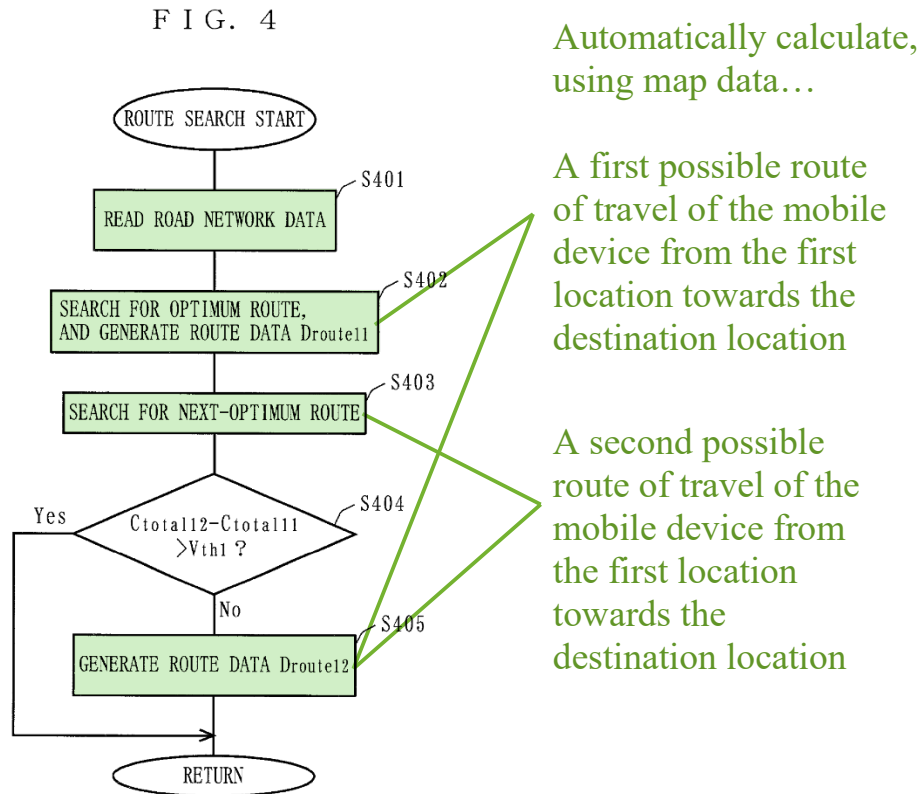
FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated).

121. Yamashita explains that its “routes, however, differ in course on the way. Such routes include, for example, those taking the user to his/her destination in the shortest distance [i.e., optimum route] and the second-shortest distance [i.e., next-optimum route], or in the shortest time [i.e., optimum route] and the second-

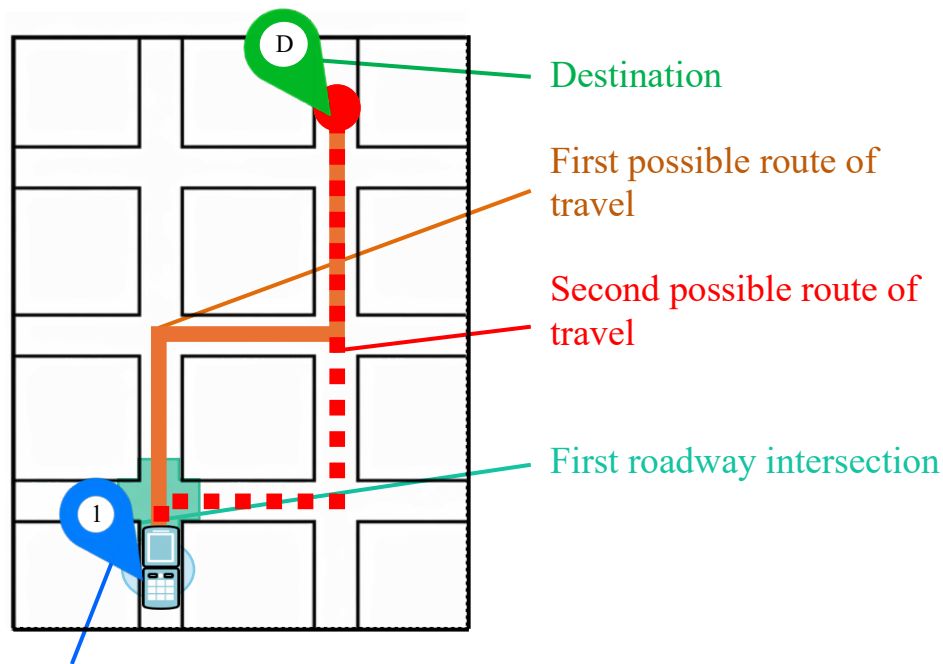
shortest time [i.e., next-optimum route].” EX1005 (Yamashita), ¶¶77-79, 129, 157-58. This process is further described in Figure 4, showing “the detailed process of route search (step 205)” (EX1005 (Yamashita), ¶24), which discloses that the optimum and next-optimum routes are determined “using the cartographic data Dcart on the RAM 3, more specifically, the road network data and the cost.” EX1005 (Yamashita), ¶¶78-79, Fig. 4; *see also id.*, ¶¶80-85. Yamashita discloses that “route data Droute11 [] represents the found optimum route” and “route data Droute12 [] represents the next-optimum route.” EX1005 (Yamashita), ¶¶79, 82-83, Fig. 4; *see also id.*, ¶¶80-85. Yamashita teaches that “the optimum and next-optimum routes thus head in different directions at a certain intersection...below, such an intersection is referred to as a junction intersection.” EX1005 (Yamashita), ¶¶79, 82, 96-97.



EX1005 (Yamashita), Fig. 4 (annotated).

122. Step 205 occurs as part of Yamashita's iterative process, depicting an automated process that continually calculates routes based on updated information. Yamashita, ¶¶126-129, 133, 152-158, Figs. 2, 18. Accordingly, Yamashita's route search process corresponds to [1e] because Yamashita discloses automatically calculating two routes, which diverge at the same intersection, based on cartographic data, a starting position, and a destination.

123. Figure A(2) below illustrates Yamashita's teachings with a graphical display of the two possible routes calculated (optimum route and next-optimum route) with reference to the roadway network map.



A first location update signal generated by a positioning device of the mobile device...representing a first location of the mobile device at a first time

Fig. A(2)

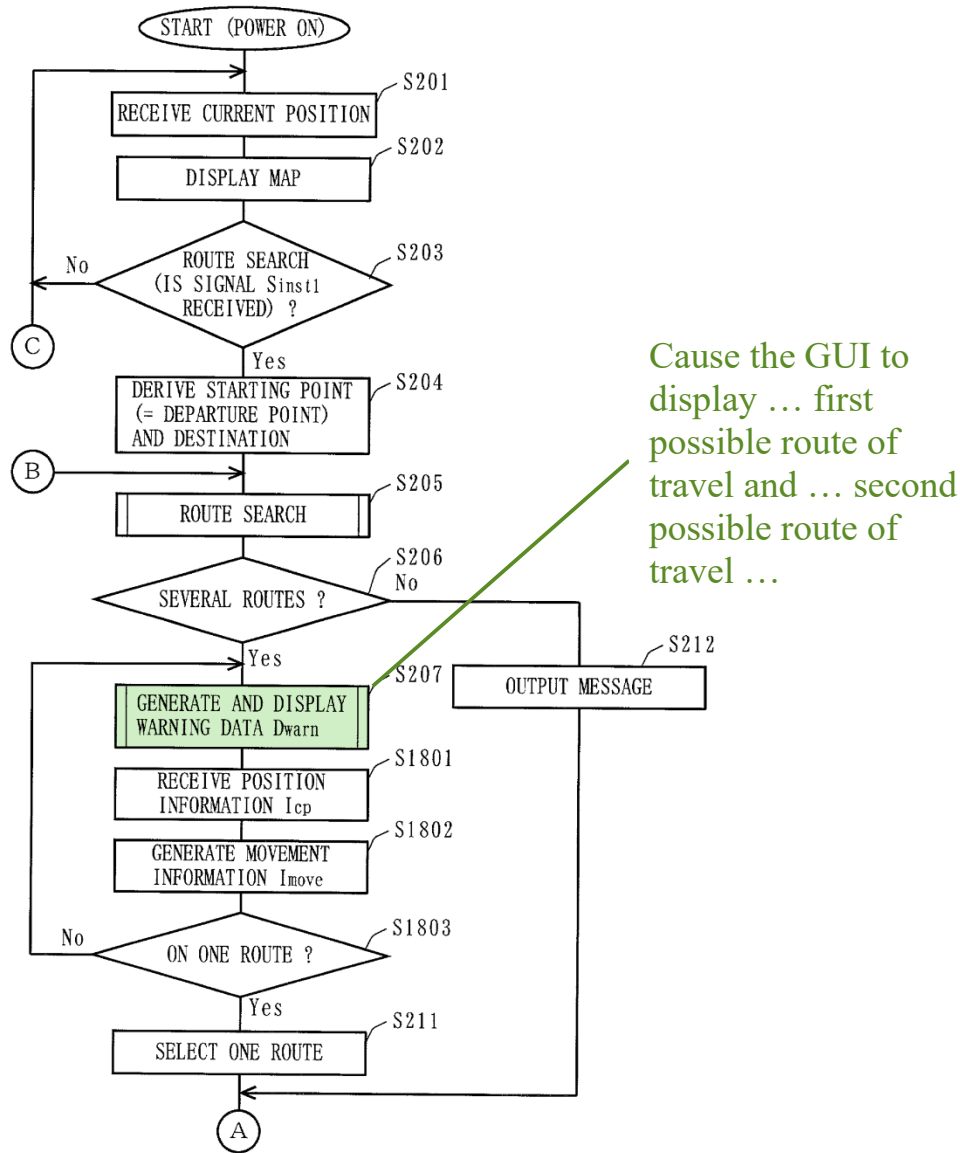
7. [1f] (iii) cause the GUI to display a graphical representation of a map together with a graphical representation of the **first possible route of travel** and a graphical representation of the **second possible route of travel** on segments of roadways of the graphical representation of the map,

124. In my opinion, [1f] requires displaying the first and second routes graphically on a map on the GUI, showing the various roadway segments that would be traversed by each. Yamashita discloses [1f] because, after the optimum and next-optimum routes are calculated, the generation and transfer of Dwarn to the display

causes the routes to be displayed at step 207. EX1005 (Yamashita), ¶¶85-93, 102, 112-13, 153, Figs. 5, 7, 8, 10, 18.

125. After route calculation in step 205, if there are multiple routes (S206), Yamashita discloses that “the procedure goes to step S207 for a process of generating and displaying warning data Dwarn.” EX1005 (Yamashita), ¶¶82-85. Yamashita describes that Dwarn “allows the display device 7 to display the user’s current position, the destination, and the optimum and next-optimum routes overlaid all together on the map.” EX1005 (Yamashita), ¶89.

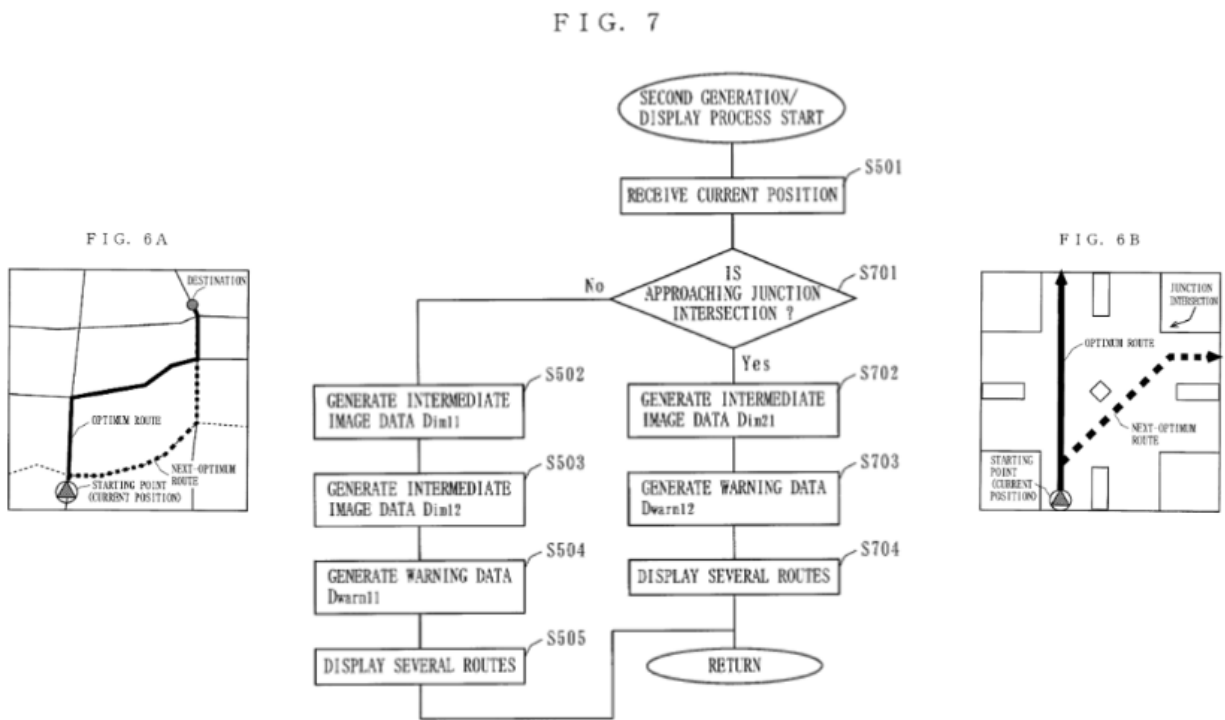
FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated).

126. Figure 7 shows a detailed flowchart of step 207 (EX1005 (Yamashita), ¶28) similar to that of Figure 5 showing the same (EX1005 (Yamashita), ¶25). EX1005 (Yamashita), ¶¶25, 28, 85, 86, 94, Figs. 5, 7; see also ¶¶103, 110, Figs. 8, 10. In Figure 7, the CPU receives the current position (S501), determines whether

the Anavi is approaching a first intersection (S701), and then displays both respective routes (in Figures 6A (full routes)/6B (focused display of an intersection with both routes)). Yamashita, ¶¶87-93, 95-102. In both iterations, the result of the process displays “a map image having, at least, the optimum and next-optimum routes overlaid thereon.” EX1005 (Yamashita), ¶¶93, 102.



EX1005 (Yamashita), Figs. 6A, 6B, 7.

127. Figure A(3) below depicts Yamashita’s process for this limitation where the information is displayed on the GUI. The routes displayed on the screen of display device 7 are depicted with a (👁) symbol in this (and all subsequent diagrams).

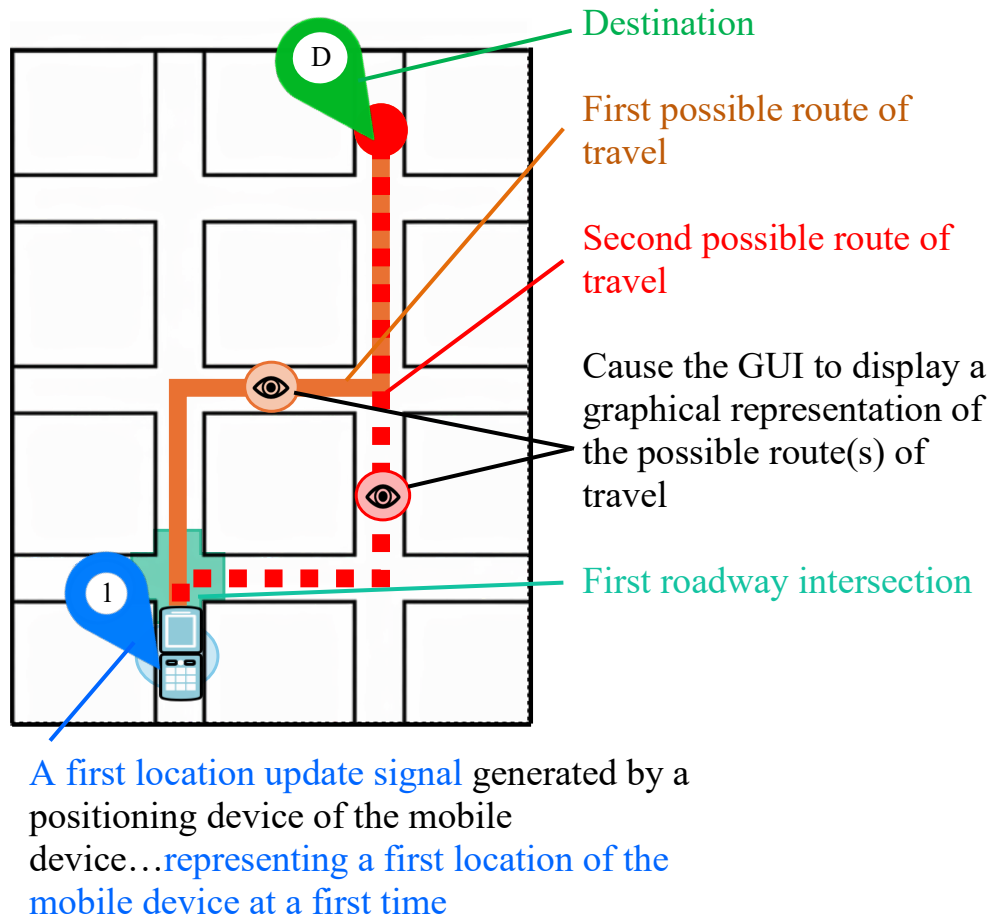


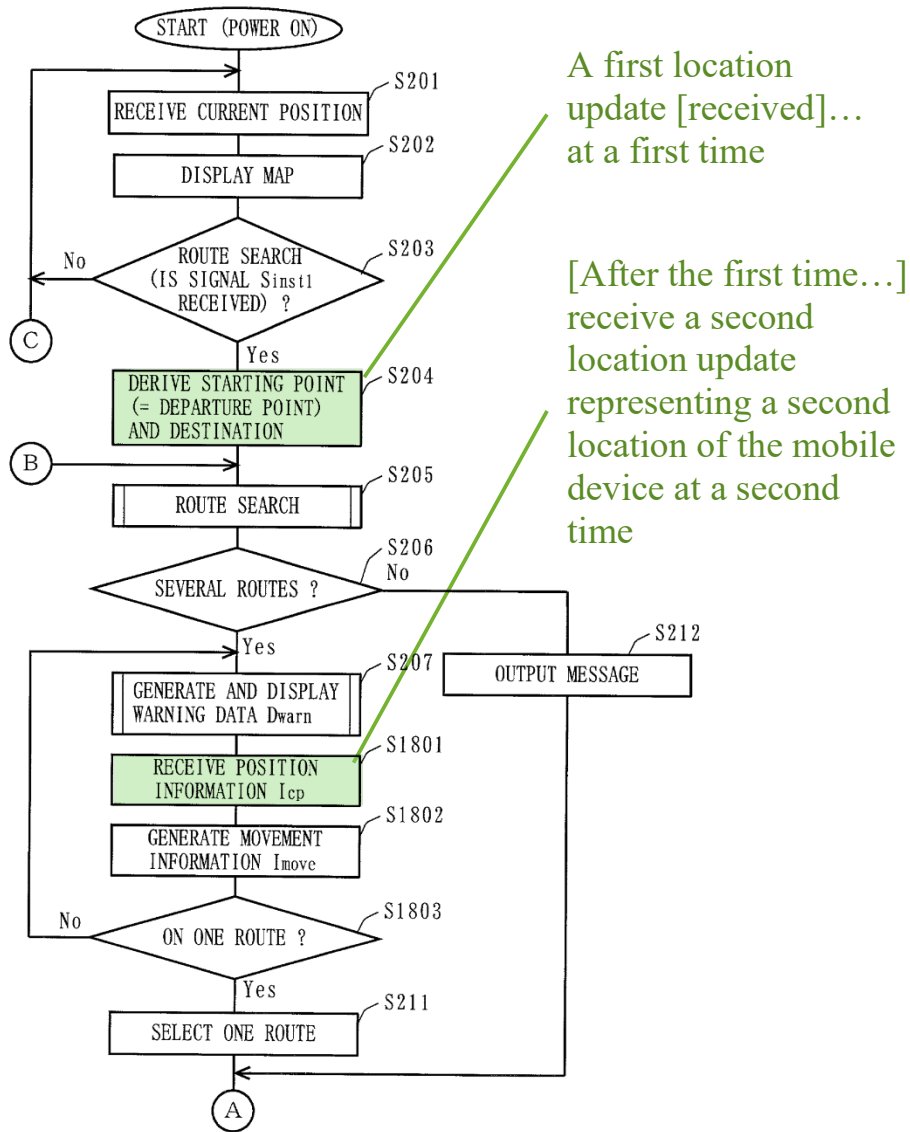
Fig. A(3).

8. [1g] (iv) receive a second location update generated by the positioning device of the mobile device, the second location update representing a **second location** of the mobile device at a second time after the first time,

128. In my opinion, [1g] requires receipt of a second location of the mobile device at a second, later time. Yamashita discloses [1g] because, after the optimum and next-optimum route are displayed, “the CPU 1 receives the position information Icp from the locator 9 (step S1801)” at a time later than when the current position

was received at step S204 (at a second time after the first time). EX1005 (Yamashita), ¶¶67, 153, 158. In fact, Yamashita discloses iteratively collecting later position information (Icps) of the user. EX1005 (Yamashita), ¶¶67, 153, 155-56, 158, Fig. 18. After sufficient iterations such that a user had traveled far enough to determine whether an estimated route coincides with only either the first or second possible route, any future location received at step S1801 corresponds to the claimed “second location update.”

FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated).

129. Figure A(4) depicts Yamashita's process for this limitation.

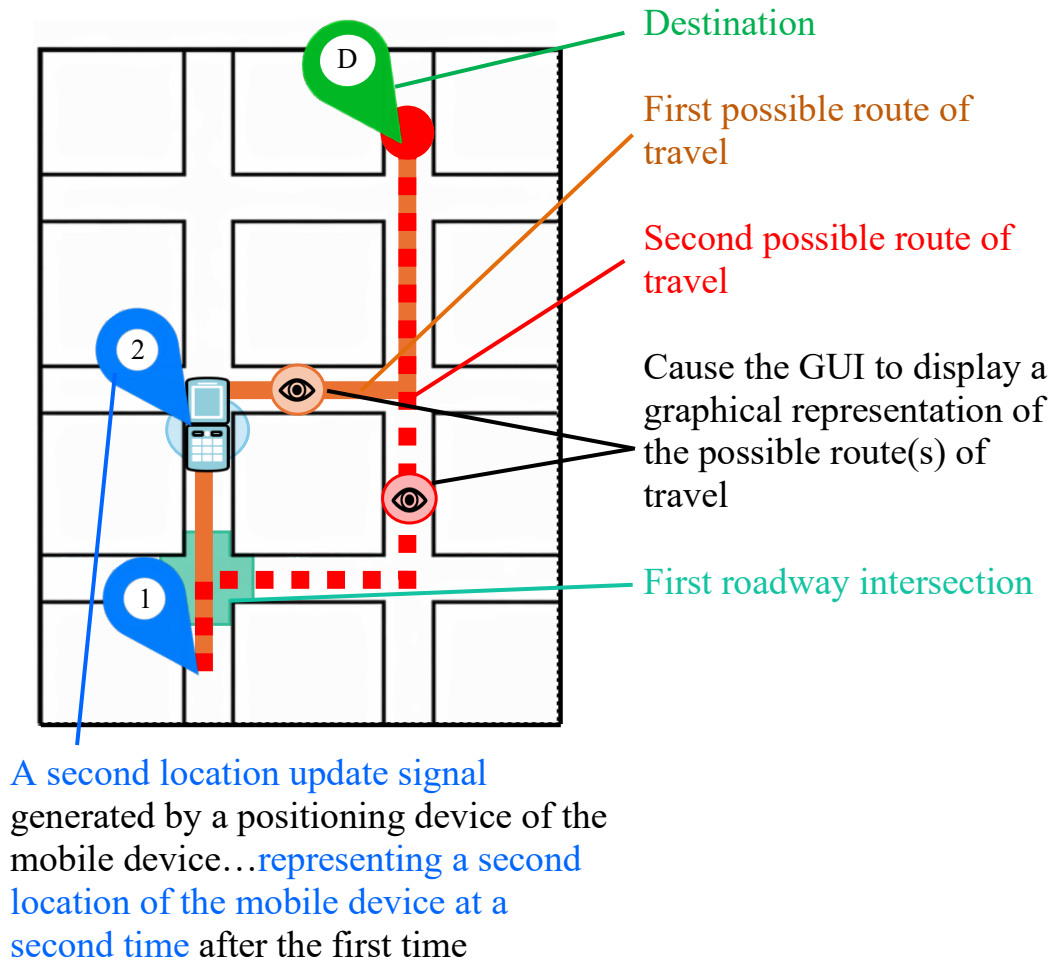


Fig. A(4).

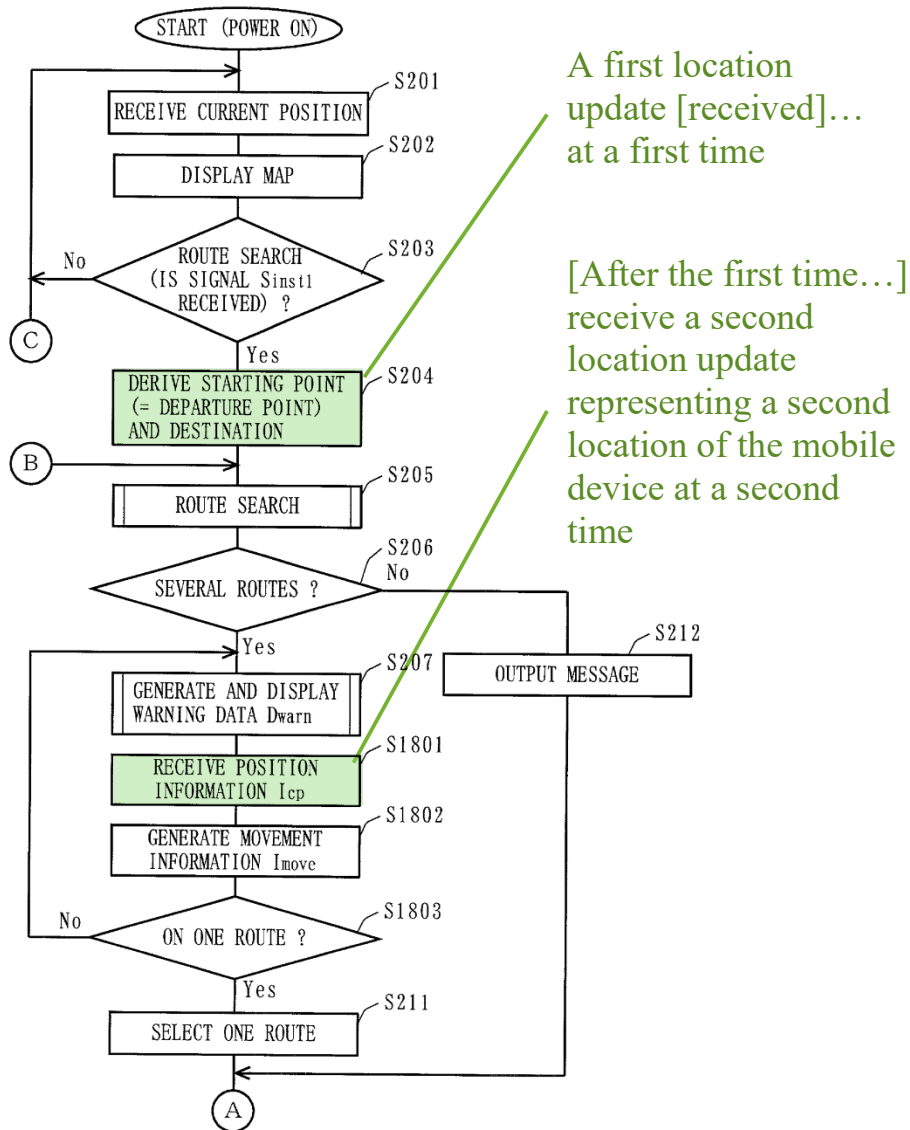
9. [1h] (v) automatically calculate, using the map data and at least the first location update and the second location update, a **first estimated route of travel** of the mobile device from the **first location** to the **second location**,

130. In my opinion, [1h] requires estimating the user's route of travel based on map data and the first and second location updates. Yamashita teaches [1h] because Yamashita teaches that Anavi calculates a first estimated route using "movement information Imove" (comprised of first and second location updates)

and “cartographic data” (the map data). EX1005 (Yamashita), ¶¶113-15, 153, 158, Figs. 2, 18.

131. As explained for [1d], Yamashita’s locator 9 generates position information Icp indicating where the user currently is (step S204) (first location update). EX1005 (Yamashita), ¶¶70, 74-75. This location is updated using the Dcart (the map data). Yamashita, ¶¶71, 89, 100. And as explained for [1g], the CPU receives a second position update after the first (step 1801, iteratively) and displays the updated position on the map (the map data) (step 207, iteratively).

FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated).

132. Yamashita discloses automatically calculating a first estimated route of travel of the mobile device from the first location to the second location using these first and second updates and the cartographic data using the following process of

Figure 18 (incorporating relevant processes of Figures 2, 5, and 7 as explained by Yamashita).

133. **At step 207**, Yamashita displays the first location update with reference to cartographic data. EX1005 (Yamashita), ¶¶113-114 (“The CPU 1 performs map matching by using cartographic data Dcart on the Ram 3 and the received position information Icp so as to calculate the user’s current position on the road network on the map (step S209).”); EX1005 (Yamashita), ¶99 (“The CPU 1 performs map matching by using the position information Icp and the corresponding cartographic data Dcart so as to generate, on the RAM 3, intermediate image data Dim21 in which a mark denoting the user’s current position is correctly overlaid on any corresponding road in the map (step S702).”); EX1005 (Yamashita), ¶87 (same); EX1005 (Yamashita), ¶86 (“... Dwarn is a displaying portion of the cartographic data Dcart.”); ¶109.³ As a user’s location is updated as they travel throughout the

³ Paragraphs 86 and 87 describe Figure 5, paragraph 94-100 describes Figure 7, paragraphs 103-109 describes Figure 8, and paragraphs 113-114 describes Figure 10, all of which are detailed flowchart of step 207. EX1005 (Yamashita), ¶¶25, 28, 31. Yamashita further explains that “any one of the following first to fourth generation/display processes is performed in step 207.” EX1005 (Yamashita), ¶85.

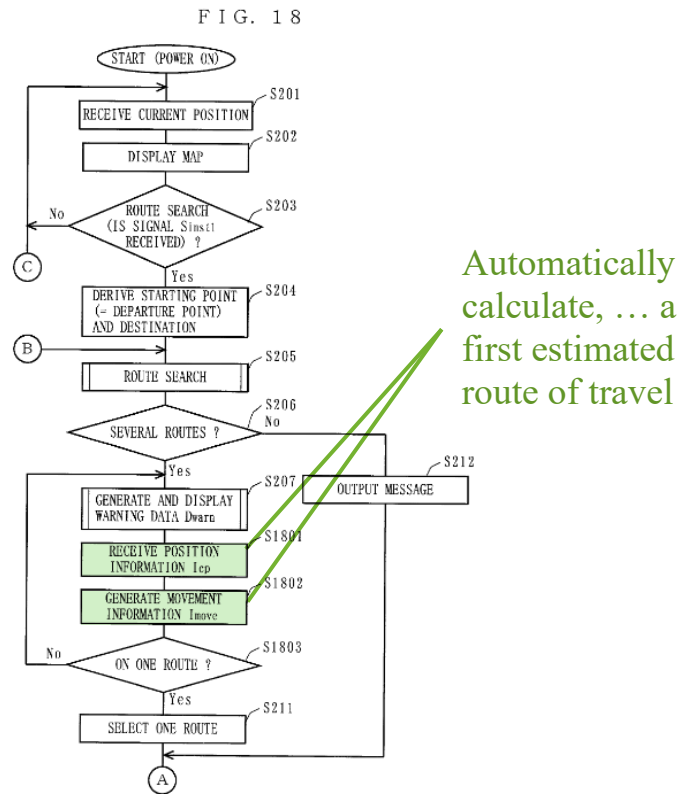
iterative process, step 207 depicts that Anavi continues to update the display to show the most current location.

134. **At step 1801**, Yamashita receives a later location, the “position information Icp from the locator 9” of Anavi. EX1005 (Yamashita), ¶153.

135. **At step 1802**, Yamashita generates “movement information” (Imove) or Itraj, which “indicates the trail the user **has moved so far** and is composed of the string of coordinate values indicated by several pieces of position information Icp” from the first location determined at step S204 to a later location at step S1801. EX1005 (Yamashita), ¶153 (emphasis added). In the first iteration of S1802, a POSITA would have understood that to generate “movement information,” the first location determined at step S204 would have been used to create the trail to the location at step S1801. Yamashita, ¶153 (emphasis added).

136. **At step 1803**, Yamashita repeats the process from S207 through S1802 if the Itraj/Imove data collected thus far is not enough to determine whether the user is on a particular route. EX1005 (Yamashita), ¶154 (“The CPU 1 then determines whether or not the user’s trail substantially coincides with only one route, i.e., optimum or next-optimum route (step S1803),” or, in other words, “determines if **the route specified by the trail information Itraj** coincides with only either of the optimum route ... or the next-optimum route.”) (emphasis added). If the Itraj/Imove data is not sufficient, Yamashita iterates the process again, stating that, “the CPU 1

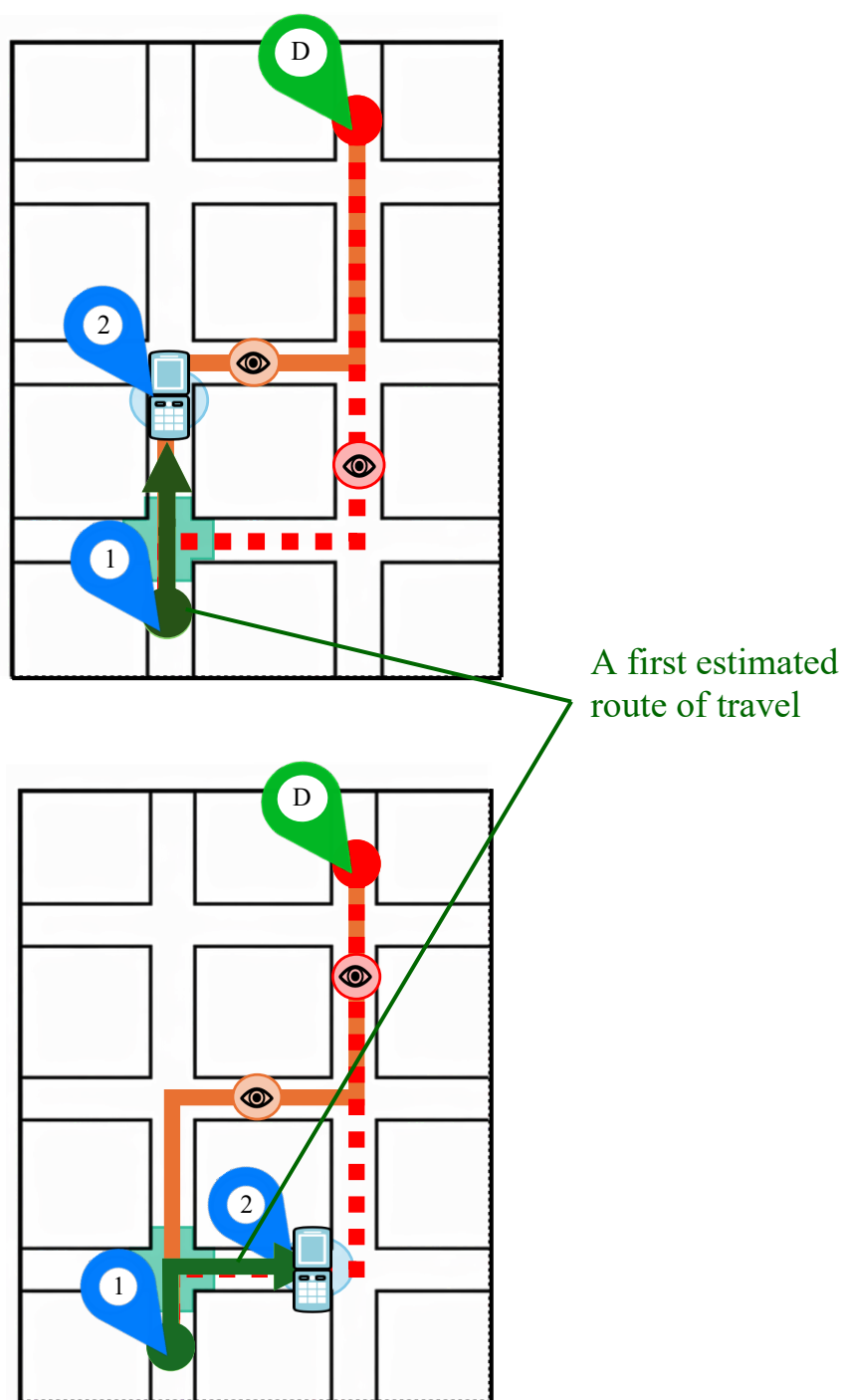
determines that the user is not being on one route so that the procedure returns to step S207.” EX1005 (Yamashita), ¶155; *see also id.*, ¶156 (describing the opposite, which is addressed with reference to later claim limitations). So, when Itraj is not sufficient, Yamashita returns to S207, which causes the most recent location to be displayed on the map (step 207), receives another updated location Icp (step 1801), generates an updated Itraj/Imove string (step 1802) (EX1005 (Yamashita), ¶153 (“every time in step S1802, the trail information Itraj is to be updated by being added with coordinate values of the position information Icp derived in step S1801”)), and again determines if the data is sufficient.



EX1005 (Yamashita), Fig. 18 (annotated).

137. It is my opinion that Yamashita's Itraj generated in S1802, determined and used as described above and depicted in Figure 18 is the claimed estimated route of travel because it is an automatically calculated "route specified by the trail information Itraj" between a user's first location (current position/starting point) and second location (later location in time) along the map and roadway network reflecting the route the user has traveled so far.

138. Figures A(5.1) and A(5.2) illustrate Yamashita's calculation of Itraj (estimated route) depending on which route the user has traveled.



Figs. A(5.1) and A(5.2), respectively.

139. As explained above, Yamashita's Itraj (first estimated route) is based on the first location update, second location update, and map data because it

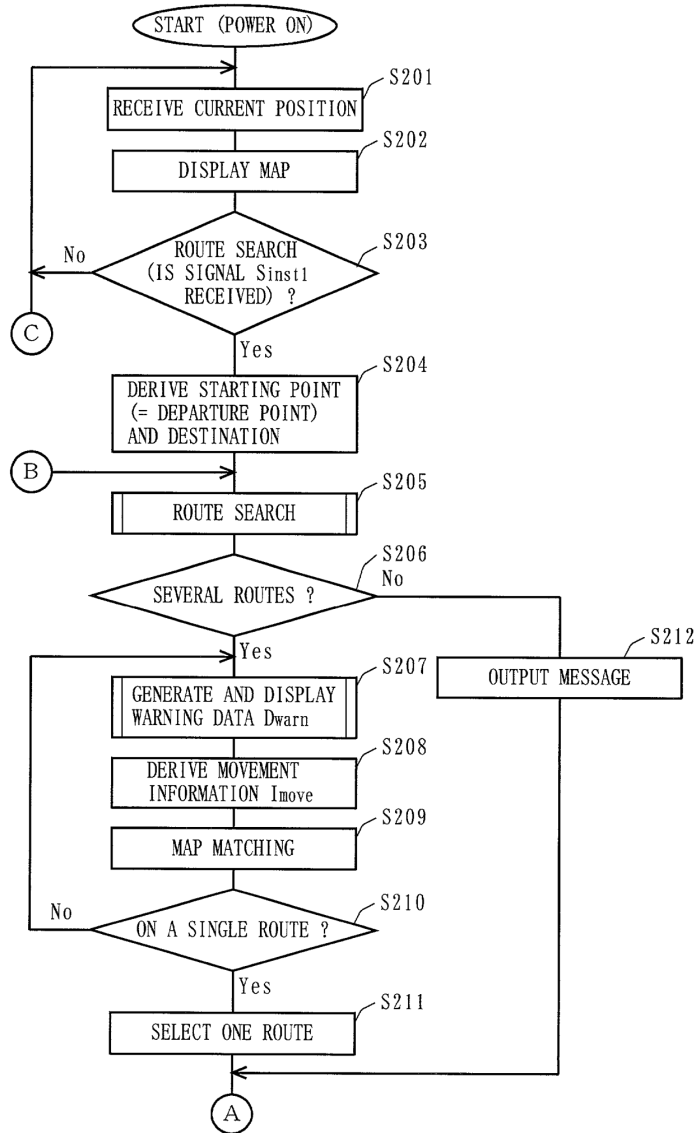
determines the “route specified by the trail information Itraj” between the first location and the second location in relation to the cartographic data. To the extent that Patent Owner disputes that Yamashita’s Itraj expressly determines trail data encompassing the first starting/current location of S204, it would have been obvious to include the S204 location because Yamashita instructs that Itraj indicates “the trail the user has moved so far.” EX1005 (Yamashita), ¶153. A POSITA would have understood that a trail is more than one location and, that to complete the first route comparison in S1803, the first iteration of S1801-S1802 would have required more than one data point to compare “the trail the user has moved so far” against the possible routes. EX1005 (Yamashita), ¶153. Accordingly, a POSITA would have understood that Yamashita discloses this element, or a POSITA would have found it obvious to include S204 in Itraj because doing so would have merely involved combining prior art elements—i.e., the previously mapped starting location and the collection of mapped location updates—according to known methods—i.e., creation of Itraj—to yield the predictable result of producing movement information in the form of a route. A POSITA would have been further motivated with a reasonable expectation of success to do so because it would have provided a more complete picture and more accurate estimation of the “trail the user has moved so far.” EX1005 (Yamashita), ¶153. Indeed, establishing a trail from stating location S204

would have been a simple programming modification that merely involves storing and using a known position, no different from collecting additional S1801 positions.

140. It is also my opinion that Yamashita also teaches [1h] for a second, independent and alternative reason depicted in Figure 2. Steps 207 through 209 illustrate a subset of Yamashita's iterative process steps that involve automatic calculation of an estimated route. EX1005 (Yamashita), ¶¶112-14. Step 207 is the same as explained above, causing the current position and multiple possible routes to be displayed on the map. In step 208, the CPU "instructs the locator 9 to transfer the position information Icp, i.e., movement information Imove... the locator 9 generates the position information Icp indicating where the user currently is, and transfers it to the CPU 1." EX1005 (Yamashita), ¶113. This current location corresponds to a second location update like step 1801 discussed in [1g] above. The CPU "then performs map matching by using the cartographic data Dcart on the RAM 3 and the received position information Icp so as to calculate the user's current position on the road network on the map (step S209)." EX1005 (Yamashita), ¶114. The map-matched movement information is then iteratively compared against the possible routes to determine whether the user is on one route (S210). Yamashita, ¶¶115-16. Because Yamashita describes the Icp in S208 as "movement information" and notes how this process enables Anavi to "automatically perform[] route selection *by monitoring the user's (i.e., the vehicle's) actual movement,*" a POSITA would

have understood that this Icp is more than a mere location update but information about how the device moved. Based on these teachings, a POSITA would therefore have understood that Yamashita's iterative process of Figure 2 also corresponds to the claimed automatic calculation of a first estimated route because the iteratively map-matched "movement information" depicts how the Anavi traveled from a first location to a second location based on the cartographic data. EX1005 (Yamashita), ¶115.

FIG. 2



EX1005 (Yamashita), Fig. 2.

10. [1i] (vi) determine whether the **first estimated route of travel** includes the **first roadway intersection**, whether the **first possible route of travel** includes the **second location**, and whether the **second possible route of travel** includes the **second location**,

141. It is my opinion that [1i] requires determining whether the user's estimated route includes the intersection common to both possible routes, and then testing whether the user's second location is on the first or second possible route—in short, determining if the user is on the first or second possible route, which can only be determined after passing the common intersection. Yamashita renders obvious [1i] because the CPU “then determines whether or not the user's trail substantially coincides with only one route, i.e., optimum or next-optimum route (step S1803).” EX1005 (Yamashita), ¶¶115-17, 154-157, Fig. 18.

142. As explained above, Yamashita calculates an estimated route of travel that “indicates the trail the user has moved so far” between a first location and a second location at a later time. EX1005 (Yamashita), ¶¶114, 153. Yamashita's Itraj data reflects when a user has passed through a junction intersection because it is used to determine whether the user's path “coincides with only either of the optimum route specified by the route data Droute 11 or the next-optimum route specified by the route data Droute 12.” EX1005 (Yamashita), ¶¶114-17, 153-54. The CPU “determines whether or not the user's trail substantially coincides with **only** one route,” by comparing “the trail information Itraj” with the data representing the

optimum and next optimum routes (Droute11 and Droute12, respectively) to “determine[] if the route specified by the trail information Itraj **coincides** with **only either** of the optimum route ... or the next optimum route.” EX1005 (Yamashita), ¶154 (emphasis added). If the two possible routes coincide until the first intersection, as Yamashita discloses, the trail would pass through the first intersection to determine whether the user’s trail coincides with only a single possible route. EX1005 (Yamashita), ¶¶117,154.

143. Yamashita also discloses the process for when the estimated route does not pass through the first intersection—it repeats the process (as explained for [1h]). Yamashita describes that “[i]f not in step S1802, the CPU 1 determines that the user is not being on one route so that the procedure returns to step S207 to continually display several routes for the user.” EX1005 (Yamashita), ¶155.

144. Figure A(6) below illustrates Yamashita’s process for this limitation.

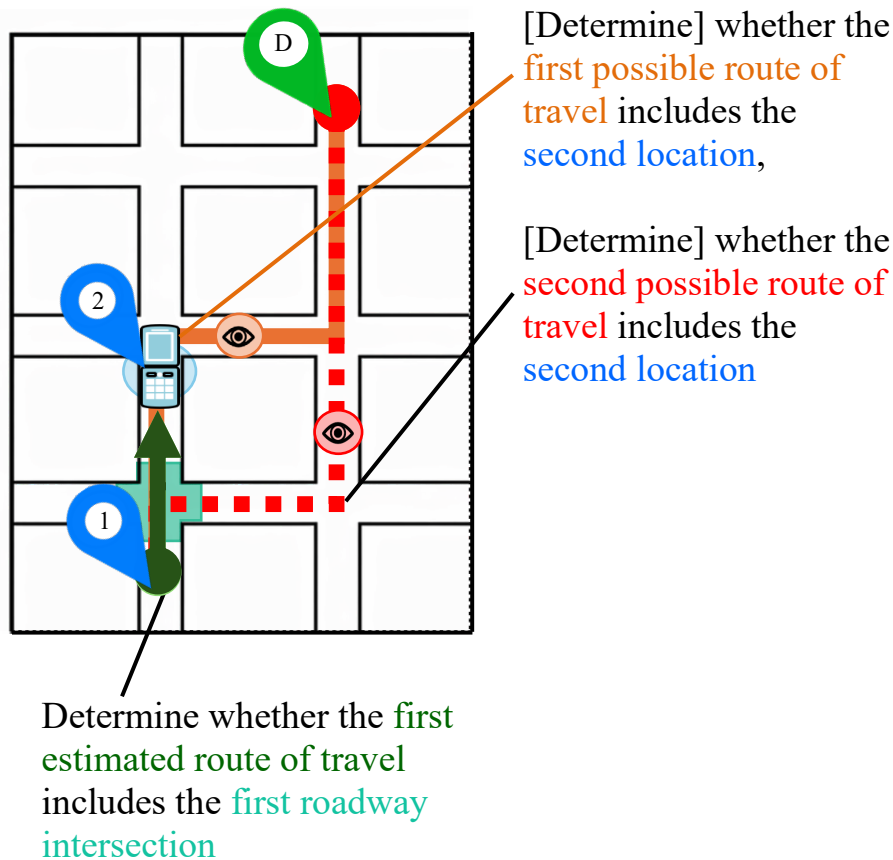


Fig. A(6).

145. Further to the analysis in [1h], Yamashita also teaches [1i] for a second, independent and alternative reason depicted in Figure 2. Yamashita's step S210 "determines on which of the optimum and next-optimum route the user currently is" similar to the decision process in step S1803 by comparing the map-matched Icp (representing movement information from a first location to a second location) against the possible routes. EX1005 (Yamashita), ¶¶115-18, 154-156. This step also assesses whether the user is "at the junction of the several routes," demonstrating that Yamashita determination in S210 further involves assessing whether the Icp

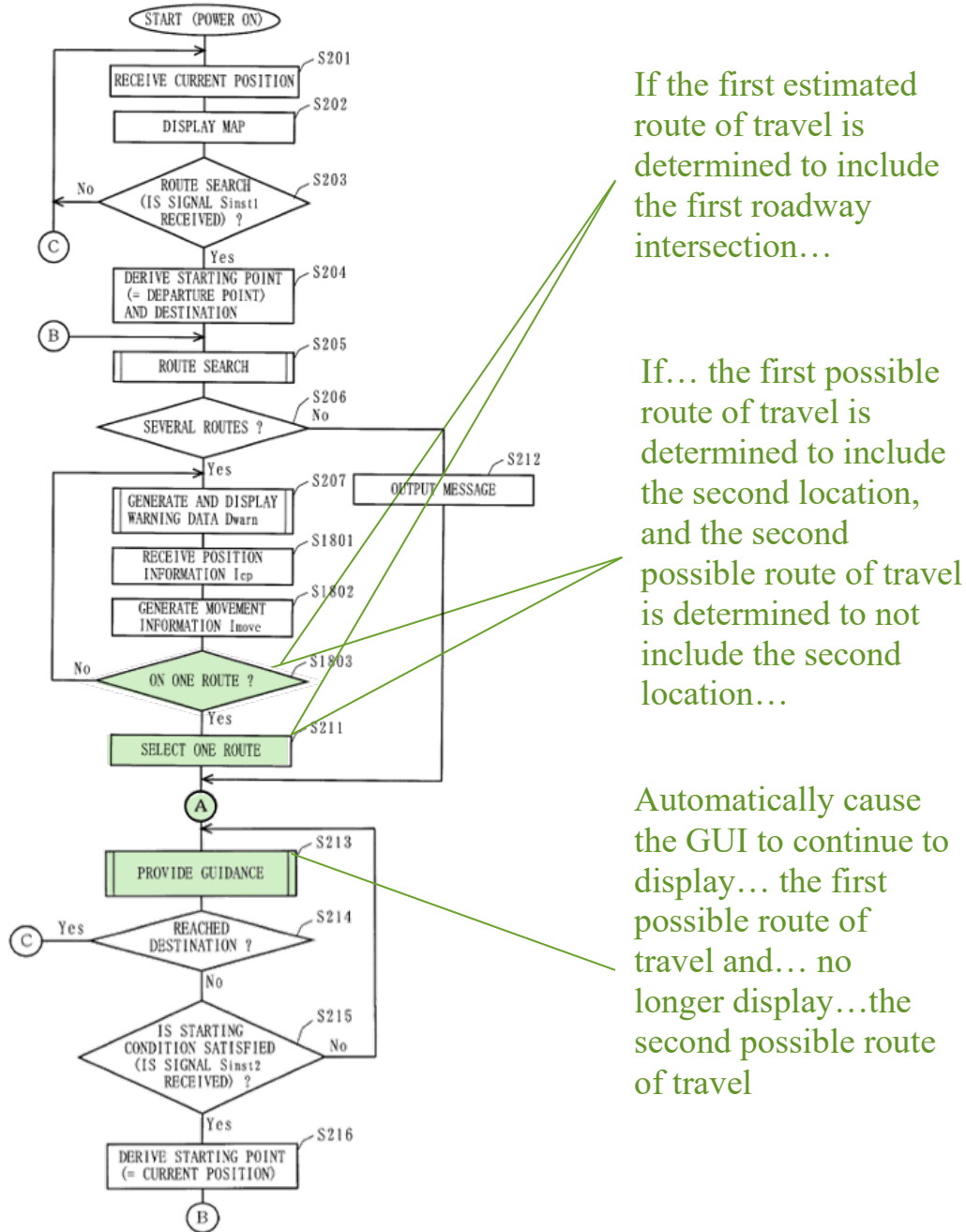
(representing movement information) includes the first roadway intersection.

EX1005 (Yamashita), ¶¶115-18.

11. [1j] (vii) if the **first estimated route of travel** is determined to include the **first roadway intersection**, the **first possible route of travel** is determined to include the **second location**, and the **second possible route of travel** is determined to not include the **second location**, automatically cause the GUI to continue to display the graphical representation of the map together with the graphical representation of the **first possible route of travel** and automatically cause the GUI to no longer display the graphical representation of the **second possible route of travel**,

146. It is my opinion that [1j] conditionally requires that the GUI remove the second possible route from display if the user is travelling the first possible route (determined as whether the user has passed the first intersection)—in short, the GUI will only display the possible route the user is on. Yamashita renders obvious [1j] because it teaches that if the condition in S1803 (Fig. 18) or S210 (Fig. 2) is met, “the CPU 1 determines that the user is now being on one route, and accordingly selects the route on which the user currently is (step S211)” and proceeds “to display the route from the user’s current position toward the destination overlaid on any corresponding road on the map.” EX1005 (Yamashita), ¶¶156-57, 117-23.

FIG. 18

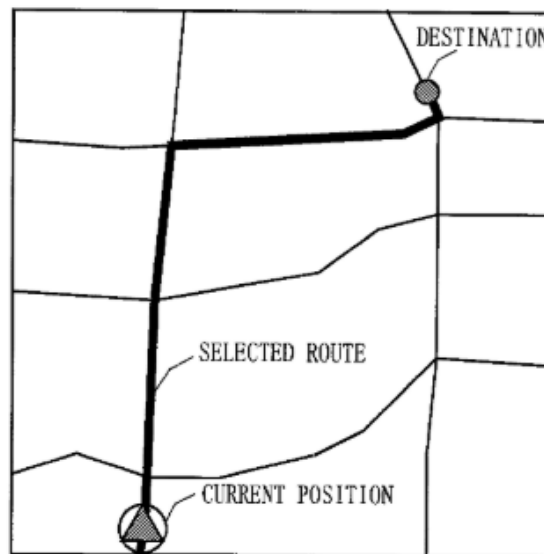


EX1005 (Yamashita), Fig. 18 and Fig. 3 (combined and annotated).

147. After Yamashita's CPU selects one route in S211, "the procedure goes to step S213 of Fig. 3, i.e., circled letter A" where "the CPU 1 guides the user's

vehicle depending on which route data has been selected.” EX1005 (Yamashita), ¶¶117, 119, 157. As part of guiding the user, the CPU generates “image data” using cartographic data and the selected route to display “the user’s current position, the destination, and the route selected in step S211 overlaid all together on the map.” EX1005 (Yamashita), ¶¶119-123. Only the selected route, i.e., the optimum route/first possible route, is displayed as depicted in Figure 12, and the next-optimum/second possible route is removed. *Id.* Yamashita teaches that this selection process occurs “automatically.” EX1005 (Yamashita), ¶¶129, 158.

F I G. 1 2



EX1005 (Yamashita), Fig. 12.

148. Figure A(7) below illustrates Yamashita's process for this limitation where the information is displayed on the GUI. The first possible route is displayed while the second possible route has been made translucent, denoting its removal.

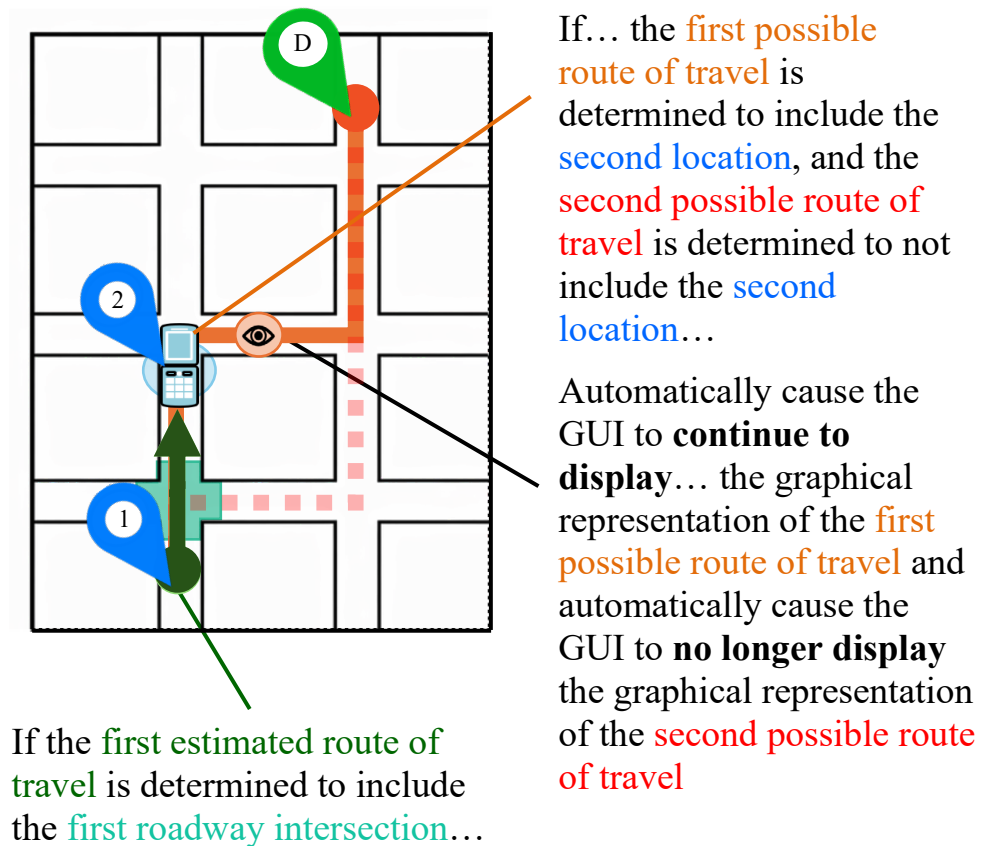


Fig. A(7).

12. [1k] (viii) if the **first estimated route of travel** is determined to include the **first roadway intersection**, the **first possible route of travel** is determined to not include the **second location**, and the **second possible route of travel** is determined to include the **second location**, automatically cause the GUI to continue to display the graphical representation of the map together with the graphical representation of the **second possible route of travel** and automatically cause the GUI to no longer display the graphical representation of the **first possible route of travel**,

149. In my opinion, [1k] conditionally requires the alternative of [1j], that the GUI removes the first possible route from display if the user is travelling the second possible route—in short, the GUI will only display the possible route the user is on. Yamashita renders obvious [1k] for the same reasons explained for [1j] because [1k] recites the alternative selection. EX1005 (Yamashita), ¶¶117-23, 129, 156-58. For example, Yamashita teaches and renders obvious that, if the user proceeds along the next-optimum route (second possible route), that route is displayed and the optimum route is removed from the screen. EX1005 (Yamashita), ¶¶117-123, 129, 156-58.

150. Figure A(8) below illustrates Yamashita's process for this limitation where the information is displayed on the GUI. The second possible route is displayed while the first possible route has been made translucent, denoting its removal.

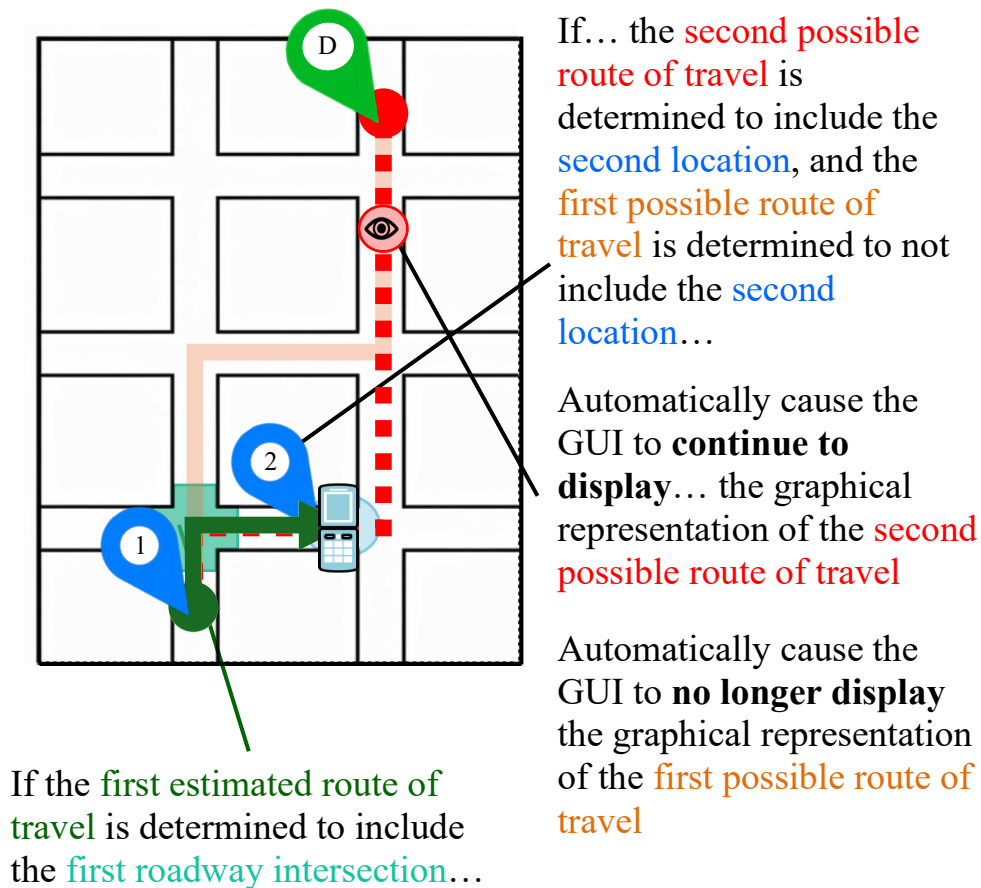


Fig. A(8).

13. [11] (ix) automatically calculate, using map data, the destination location and at least the **second location** update, a **third possible route of travel** of the mobile device from the **second location** towards the destination location and a **fourth possible route of travel** of the mobile device from the **second location** towards the destination location, the **second possible route of travel** including a **second roadway intersection** and the **third route of travel** including the **first roadway intersection**,

151. In my opinion, [11] requires calculating third and fourth possible routes (based on map data, destination, and second location), where the previously calculated second route includes a second intersection and where the newly

calculated third route includes the first intersection common to the prior first and second routes—in short, two new routes are calculated and the new third route returns to pass through the original first intersection. Yamashita alone or in combination with Irie teaches [11].

152. Yamashita discloses that after one route is selected and guidance is provided in S213, if the user has not reached their destination (S214), the system determines whether a predetermined condition indicates the need to reroute (S215). EX1005 (Yamashita), ¶¶117-126, 133, 155-158, Fig. 3. Yamashita’s navigation system may re-route automatically for “any other condition set for the purpose. For example, the CPU 1 may start re-routing when the user’s current position comes closer to an intersection, or when any traffic accident or jam is occurring on a route along which the user is guided in step S213.” EX1005 (Yamashita), ¶¶68, 125, 133. Once the CPU has determined that rerouting is necessary, the CPU “then derives the coordinates of the starting point for re-routing this time (step S216)” (second location) and then “the procedure returns to step S205 for re-routing,” using the current location as the new starting point to calculate new optimum (third possible route) and next-optimum (fourth possible route). EX1005 (Yamashita), ¶¶126-131.

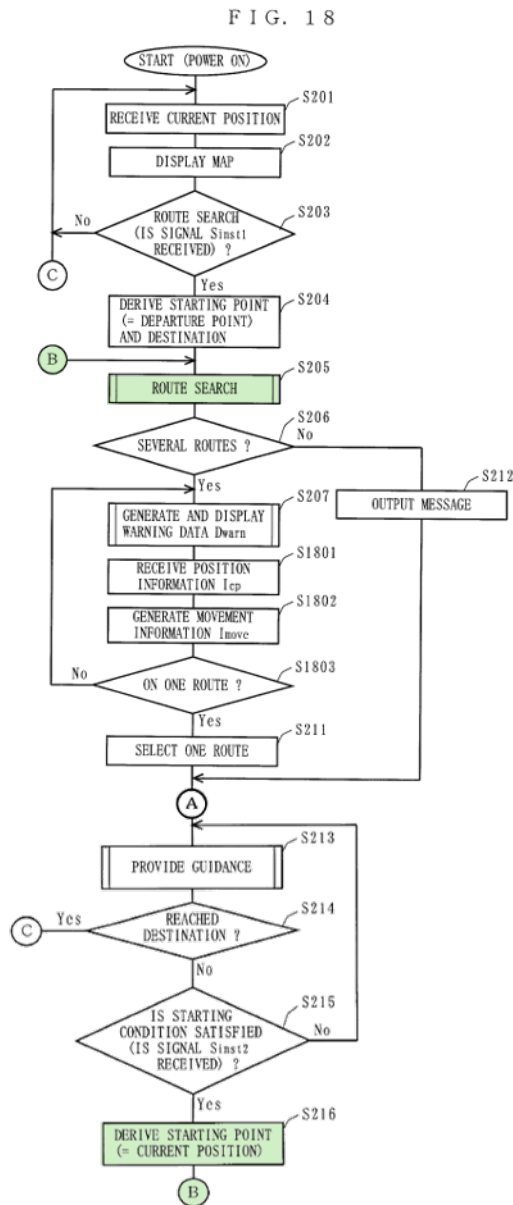
153. The current position in S216 may be the same position as in the last updated location in S1801/S208 when, for example, the process proceeds rapidly that the GPS receiver has not generated a new position signal. Yamashita notes that

the CPU “derives the coordinates of the starting point for re-routing” in S216 based on received position information. EX1005, ¶126. Yamashita does not limit this derivation to a specific time or a new signal from the GPS receiver. Durocher provides an explanation about how GPS receivers output location updates on a periodic basis. EX1006 (Durocher), 14:44-48. Durocher notes that a GPS receiver “transmits its position regularly, for instance every second to the microcontroller,” which is then shared with the guidance program. EX1006 (Durocher), 14:44-48; *see also* EX1014, 73. Thus, a POSITA would have understood that Yamashita’s derivation of a new starting point in S216 may use the same position signal produced by the GPS receiver in S1801/S208 when the time interval to generate a new position has not yet elapsed.

154. To the extent Patent Owner disputes that S216 and S1801/S208 may be the same location, a POSITA alternatively would have found it obvious to use the same location in S216 as the last updated location in S1801/S208 or include it in the calculation because Yamashita suggests using the same location update multiple times (EX1005 (Yamashita), ¶¶113, 134) and doing so would have reduced the amount of processing performed, improving efficiency. *See* EX1014, 67-73 (describing the calculations performed by a GPS receiver, which would have to be repeated each time a location is determined). A POSITA would have been motivated to do so because it would have facilitated Yamashita’s goal of providing users with

new route options before the user goes off a first route. Yamashita, ¶16. Indeed, by reusing the last updated location in S1801/S208 for rerouting in S216, Yamashita's system would have been able to provide the user with new routes faster. A POSITA would have also recognized that there are circumstances in which a GPS receiver may not be able to calculate the user's current location. EX1014, 67-74. For example, signals to a GPS receiver may be blocked by tall buildings in urban areas, preventing position fixes for "indefinitely long periods of time." EX1013, 145-46, 156-58. Under this circumstance, a POSITA would have found it beneficial to reuse the last known location update from S1801/S208 for rerouting because it provides users with the most up-to-date route in the shortest possible time, facilitating dynamic navigation and avoiding traffic jams. For example, this would have been particularly useful when Yamashita's Anavi does not include other position sensors, such as the azimuth/gyro sensor described in paragraphs 135-145, to determine movement information. Without the other location sensors, a POSITA would have understood that Yamashita's GPS receiver is the source of location updates, which would have made it nearly impossible to determine a new current position without receiving new signals. Moreover, a POSITA would have had a reasonable expectation of success in doing so because Yamashita discloses using the same location update multiple times (Yamashita, ¶¶113, 134), making the reuse of S1801/S208 no more than the application of a known technique. Accordingly,

because Yamashita repeats the process described in limitations [1d]-[11], Yamashita discloses or renders obvious automatically calculating a third and fourth possible route based on the current location (second location), the destination, and cartographic data (map data). EX1005 (Yamashita), ¶¶17, 193-98.



Yamashita, Fig.18 and Fig. 3 (combined and annotated).

155. As Yamashita discloses for the original route calculations, the new optimum (third possible) and next-optimum (fourth possible) routes are also automatically calculated using “any well-known route search algorithm such as the Dijkstra’s algorithm” and suggested based on which is the most efficient (e.g., shortest distance, fastest time, cheapest). EX1005 (Yamashita), ¶¶76-77, 127. Yamashita further provides that the cost of the next-optimum route may be increased during re-routing such that the process generates new routes to the destination which do not coincide with the previous route. EX1005 (Yamashita), ¶127. As also explained for [1e], in my opinion, a POSITA would have understood that Yamashita discloses that the new optimum (third possible) and next-optimum (fourth possible) routes would diverge at a new junction (e.g., second intersection) to allow Anavi to later determine which route the user is traveling along after passing the common intersection. EX1005 (Yamashita), ¶¶76-77, 96, 127. Alternatively, a POSITA would have understood that when Yamashita performs its iterative process to calculate new routes, a second intersection would have been one of a finite amount of available intersections along the various routes for which Yamashita’s process would have used in calculating new routes and selecting a point of divergence for those routes, and therefore would have at least been obvious.

156. Yamashita’s original next-optimum route (i.e., the second possible route) includes a second intersection because, as explained for [1e], it is made up of

a node/intersection string, where an intersection that is different from the first constitutes a second intersection. EX1005 (Yamashita), ¶¶76-77, 96. Because Yamashita describes that the rerouting may occur as the user is traveling down a previously calculated route (e.g., when the user is on the next-optimum route/second route), a POSITA would have understood that Yamashita teaches that the second intersection would be present in the second route and the newly calculated third and fourth routes.

157. Yamashita's third possible route includes the first intersection when that is an optimal route based on current conditions.

158. Yamashita's rerouting occurs "when any traffic accident or jam is occurring on a route along which the user is guided in step S213." EX1005 (Yamashita), ¶¶68, 125, 133. In my opinion, a POSITA would have understood that, if a traffic accident or jam is obstructing the current route (depicted as  below), the optimum (third) route determined may require a user to traverse the first intersection again to avoid the obstruction. That is, the optimum route may include a double-back or U-turn to avoid the obstruction on the current route. Yamashita teaches that the routes are calculated using "any well known route search algorithm" and suggested based on which is the most efficient (e.g., shortest distance, fastest time, cheapest), and in my opinion, a POSITA would have understood that a third

possible route exists where the path causes the user to be rerouted through a previously traversed intersection when that is the most efficient route. *See* EX1007 (Irie), 1:10-17; EX1014, 136-41; EX1015, 9.

159. Figures B(1.1) and B(1.2) below illustrate Yamashita's process for this limitation, expanding the display of the map and showing two ways in which a U-turn would have been accomplished.

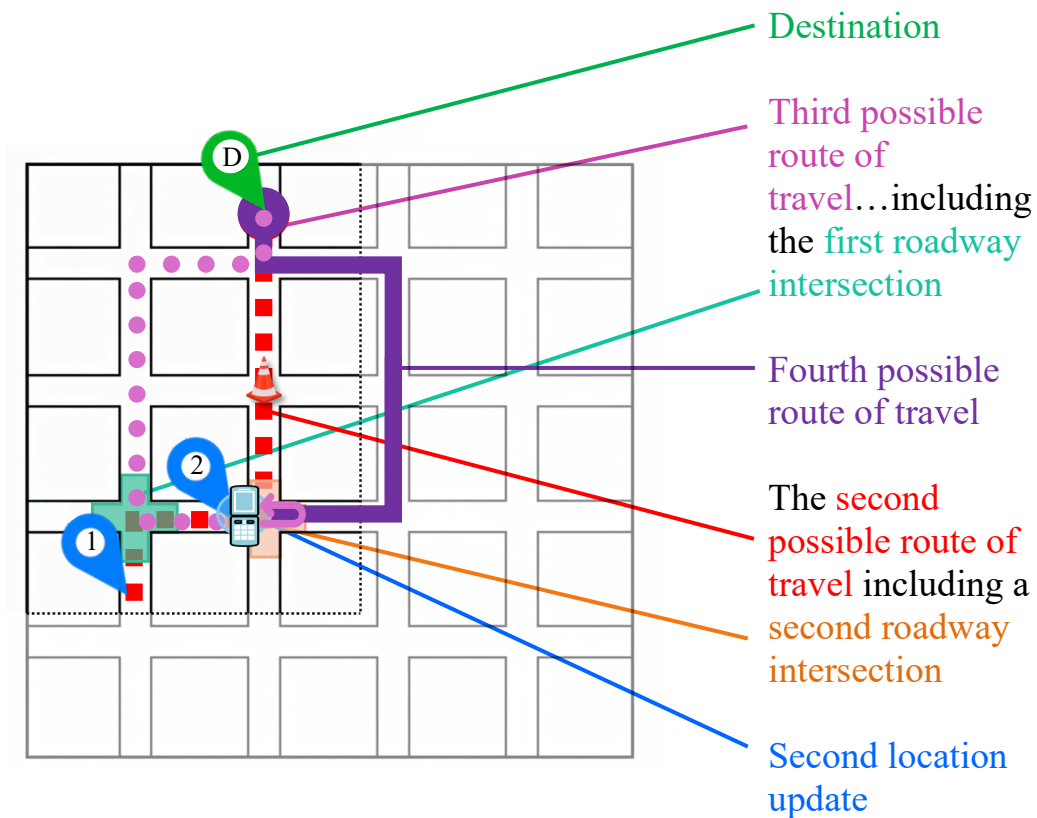


Fig. B(1.1).

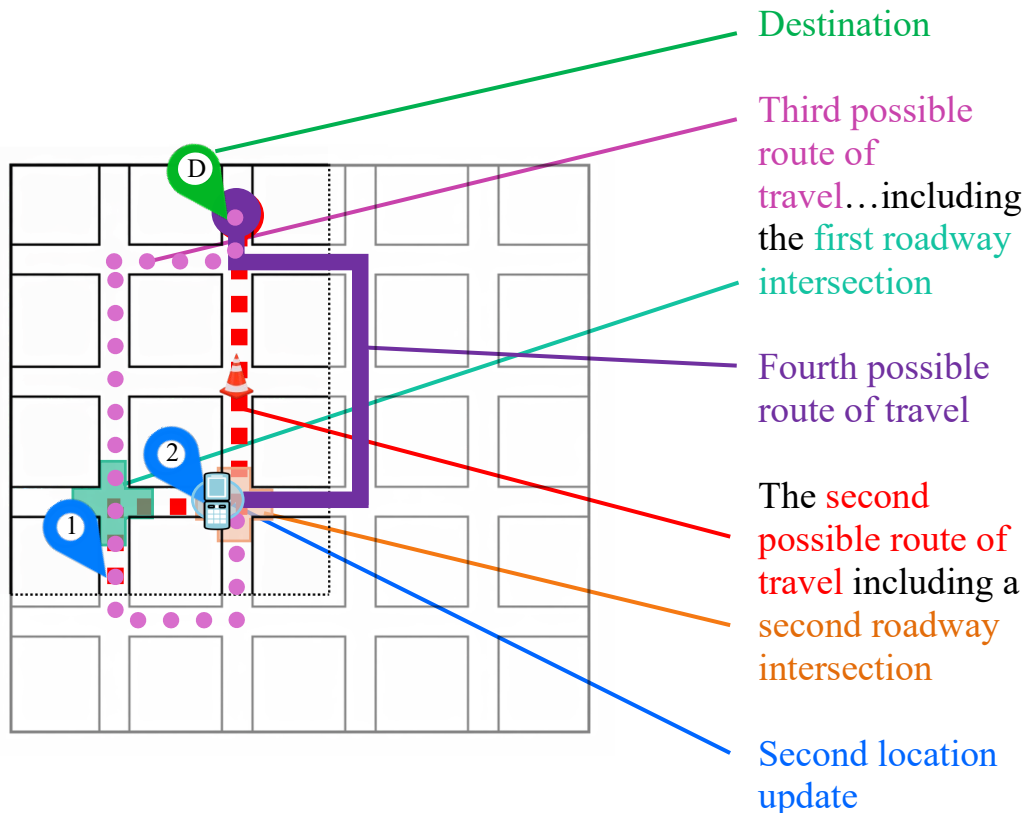
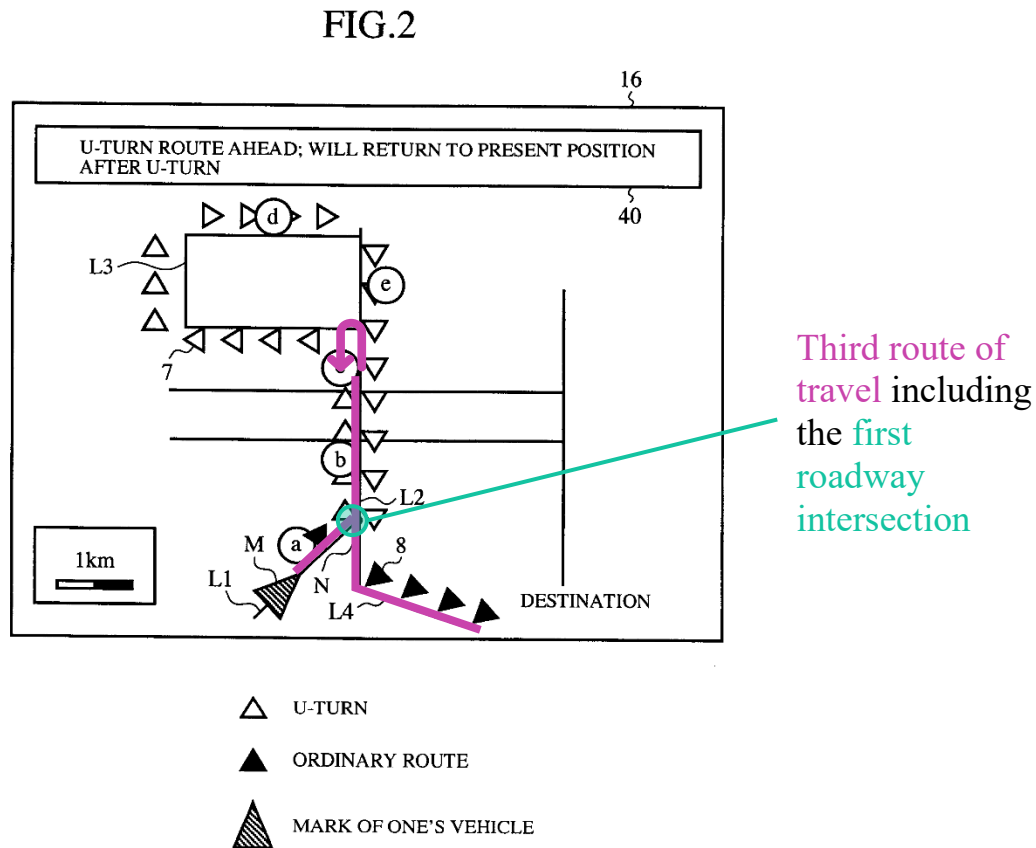


Fig. B(1.2).

160. To the extent Patent Owner disputes Yamashita's teachings, it is my opinion that Irie discloses calculating a route that involves a user taking a U-turn to return to a prior node (first intersection) because Irie discloses "performing a U-turn guide to indicate that the vehicle will return to the node by performing a U-turn on the closest link." (EX1007 (Irie), claim 1, 1:63-2:5).

161. Irie discloses a "guide indication method in an onboard navigator" that specifically addresses the case in which a traveling vehicle needs to make a U-turn to pass through the same intersection twice. EX1007 (Irie), 1:10-17. This may be the

case when an intersection prohibits a turn in a certain direction. *Id.*, 4:23-43, 5:11-17. The method is invoked when a vehicle is following a route, such as that illustrated in Figure 2, where a user is routed through point N twice as part of a U-turn:



EX1007 (Irie), Fig. 2 (annotated).

In the context of both Yamashita and Irie, a U-turn could either be an immediate turn around (as depicted in the annotated figures) or a route that goes around a block to return to a common intersection, as also shown in Irie's Fig. 2.

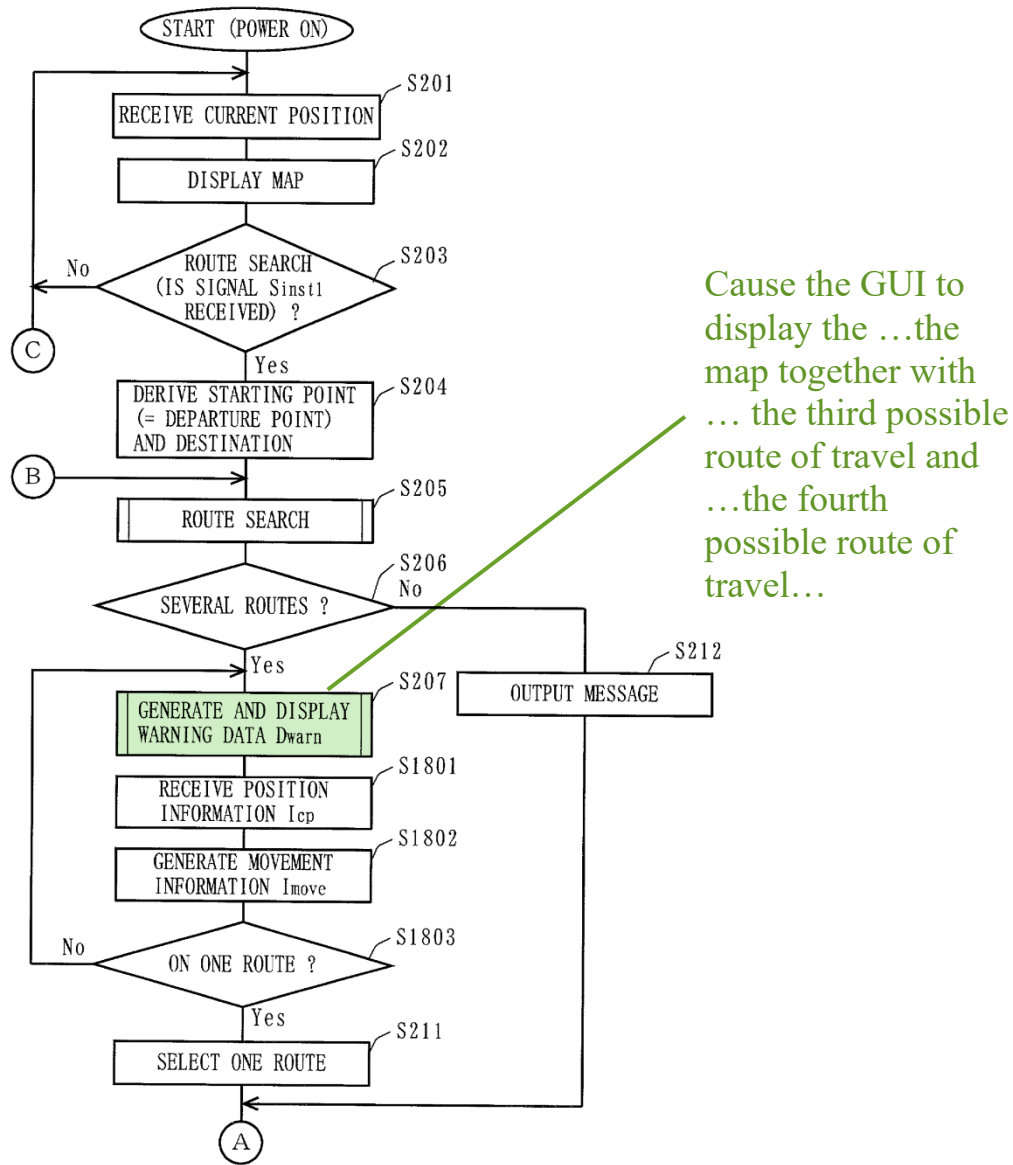
162. In my opinion, a POSITA would have been motivated to implement Irie's U-turn route alternative in Yamashita's rerouting calculation because it furthers Yamashita's goals of providing the fastest, most efficient route. EX1005 (Yamashita), ¶77. A POSITA would have understood that a U-turn route may be the most efficient route under certain circumstances because it may, for example, avoid a traffic accident or jam, avoid a road closure, or prevent drivers from having to wait to take a left turn in a four-way intersection. *See* EX1014, 136-41; EX1015, 9.

163. In my opinion, a POSITA would have had a reasonable expectation of success in implementing Irie's U-turn teaching as a third possible route in Yamashita's rerouting calculation because it would have merely involved the use of a known technique (i.e., Irie's use of a U-turn) to improve a similar method (Yamashita's rerouting) in the same way. Both Yamashita and Irie disclose similar navigation devices that display potential routes to guide a user on a route. EX1007 (Irie), 1:63-2:5; EX1005 (Yamashita), ¶¶18, 89, 100. A POSITA would have understood that implementing a U-turn route in Yamashita would have merely involved including such an option in a list of possible routes based on priorities that Yamashita already evaluates. *See* EX1014, 136-41; EX1015, 9. Accordingly, such an implementation would not have altered Yamashita's system in any way such that it would become inoperable or unusable for its intended purpose.

14. [1m] (x) cause the GUI to display the graphical representation of the map together with a graphical representation of the **third possible route of travel** and a graphical representation of the **fourth possible route of travel** on segments of roadways of the graphical representation of the map,

164. It is my opinion that [1m] requires display of the third and fourth possible routes of travel on the GUI. Yamashita discloses [1m] because, as explained for [1f], step 207 is a “process of generating and displaying warning data Dwarn (step S207)” (the calculated routes) EX1005 (Yamashita), ¶¶85-93, 102, 112-13. Because Yamashita instructs that its re-routing process repeats the process described above, a POSITA would have appreciated that the display of the new optimum and next-optimum routes would have been displayed instead of the originally calculated routes as explained for [1f].

FIG. 18



EX1005 (Yamashita), Fig. 18 (annotated).

165. Figure B(2) below illustrates Yamashita's process for this limitation where the information is displayed on the GUI.

new routes involves a third location update representing a third location of the mobile device at a third time after the second time.

167. Figure B(3) below depicts Yamashita's process for this limitation.

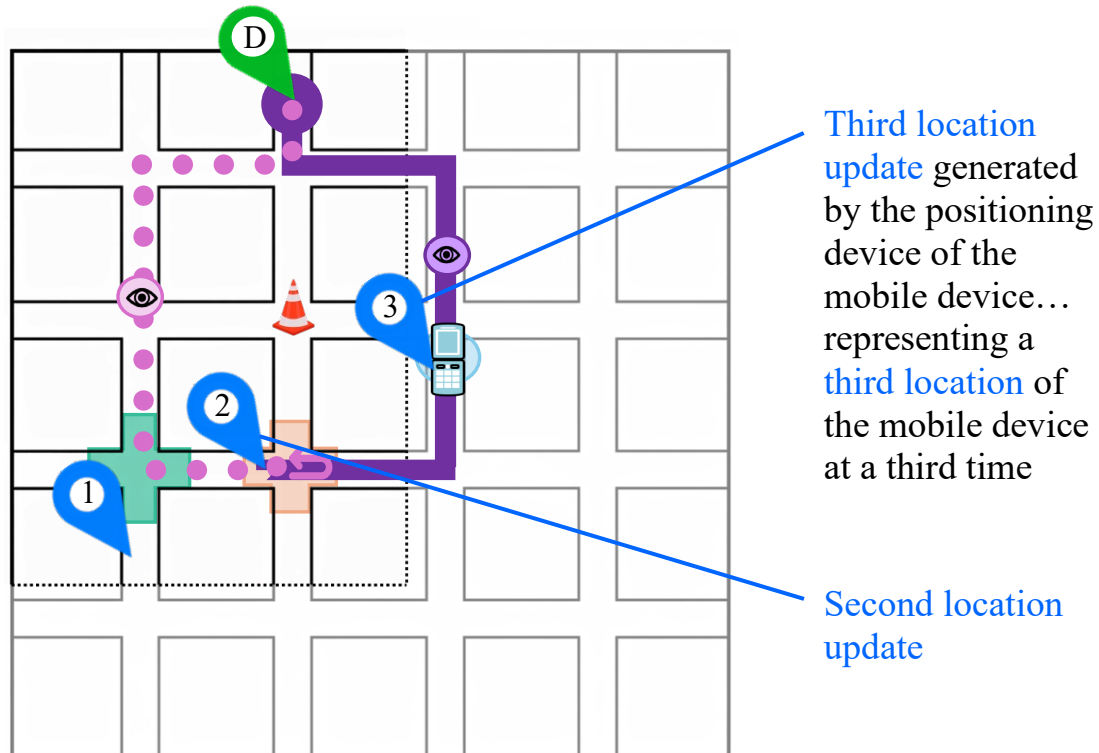


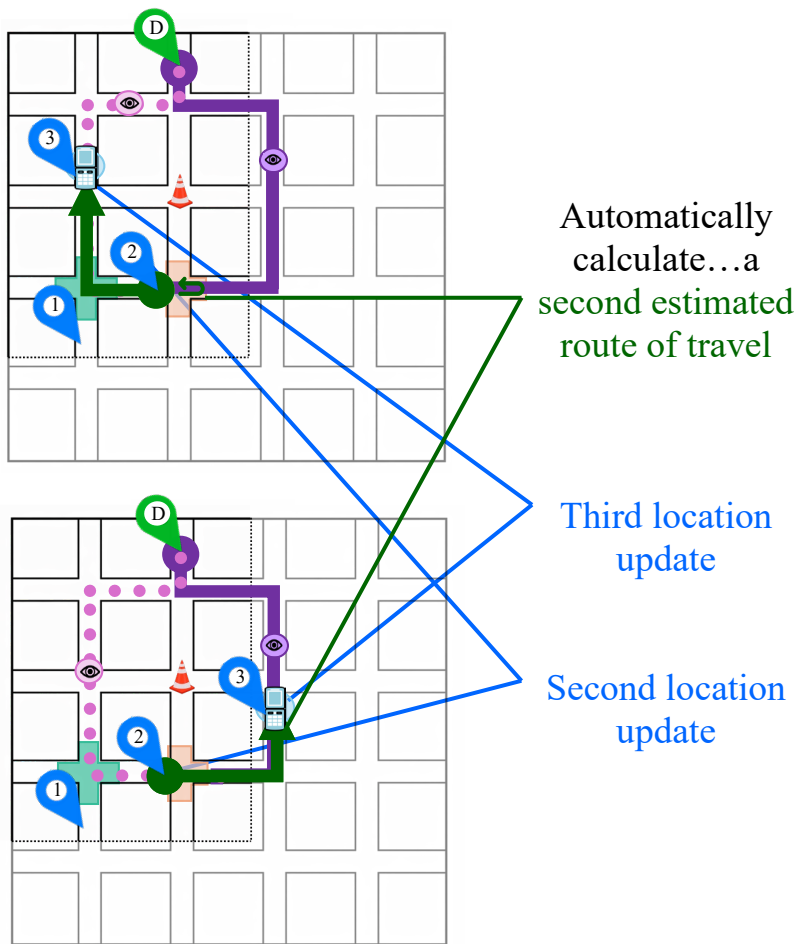
Fig. B(3).

16. [1o] (xii) automatically calculate, using the map data and at least the second location update and the third location update, a **second estimated route of travel** of the mobile device from the **second location** to the **third location**,

168. In my opinion, [1o] requires calculating a second estimated route of travel using the same process as in [1h] for the first estimated route of travel, except based on the second and third locations. Yamashita renders obvious [1o] because, as

explained for [1h], Yamashita uses “movement information Imove” with “map matching” and/or “trail information Itraj” to “calculate the user’s current position on the road network.” EX1005 (Yamashita), ¶¶113-115, 153, Figs. 2, 18. Because Yamashita instructs that its re-routing process repeats the process described above, a POSITA would have appreciated that Yamashita’s subsequent iterations correspond to the second estimated route of travel of the mobile device from the second location to the third location for the same reasons explained in [1h] and the first estimated route.

169. Figure B(4.1) and B(4.2) below depict Yamashita’s process for this limitation.



Figs. B(4.1) and B(4.2), respectively.

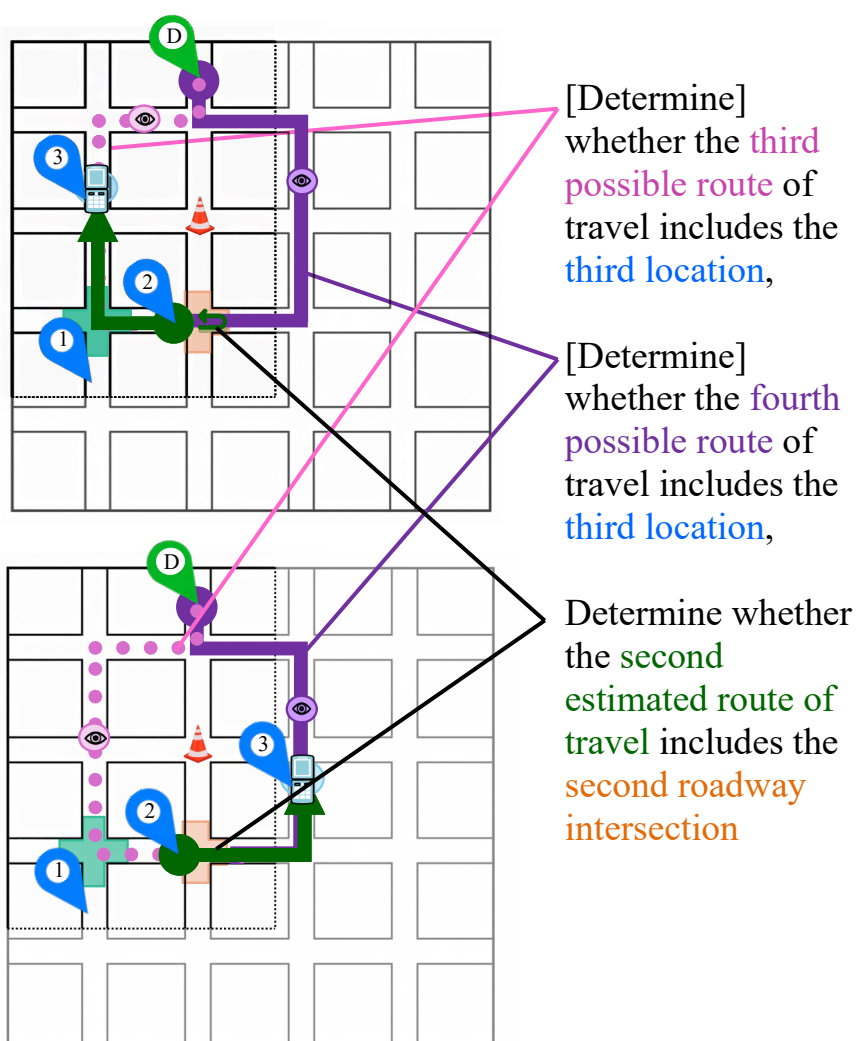
17. [1p] (xiii) determine whether the **second estimated route of travel** includes the **second roadway intersection**, whether the **third possible route of travel** includes the **third location**, and whether the **fourth possible route of travel** includes the **third location**,

170. In my opinion, [1p] requires determining if the user is on the third or fourth possible route using a similar process as in [1i]. Yamashita discloses [1p] because, as explained for [1i], the CPU determines whether the trail information Itraj (second estimated route of travel), containing a collection of location updates,

coincides with either of the optimum or next optimum routes that diverge at a second junction intersection. EX1005 (Yamashita), ¶¶153-56.

171. Because Yamashita instructs that its re-routing process repeats the process described above ([1d]-[1k]), a POSITA would have understood that a subsequent iteration of Yamashita's process ([1l]-[1o]) for the new optimum and next-optimum routes correspond to the second estimated route, second roadway intersection, and third/fourth possible routes for the same reasons explained for [1i].

172. Figures B(5.1) and B(5.2) below depict Yamashita's process for this limitation dependent on the user's later location.



Figs. B(5.1) and B(5.2), respectively.

18. [1q] (xiv) if the **second estimated route of travel** is determined to include the **second roadway intersection**, the **third possible route of travel** is determined to include the **third location**, and the **fourth possible route of travel** is determined to not include the **third location**, automatically cause the GUI to continue to display the graphical representation of the map together with the graphical representation of the **third possible route of travel** and automatically cause the GUI to no longer display the graphical representation of the **fourth possible route of travel**,

173. In my opinion, [1q] conditionally requires that the GUI remove the fourth possible route from display if the user is travelling the third possible route and has passed the second intersection—in short, the GUI will only display the possible route actually taken, using the same process as in [1j]. Yamashita discloses [1q] because, as explained for [1j], after the CPU compares the estimated route against the optimum and next-optimum routes, and determines which route the user is traveling, the CPU “allows the display device 7 to display the route from the user’s current position toward the destination overlaid on any corresponding road on the map.” EX1005 (Yamashita), ¶¶122, 153-58. Because Yamashita instructs that its re-routing process repeats the process described above, a POSITA would have understood that Yamashita’s subsequent display will be of either the new optimum or new next-optimum routes depending on which route is being traveled, as explained for [1j].

174. Figure B(6) below depicts Yamashita's process for this limitation where the information is displayed on the GUI. The third possible route is displayed while the fourth possible route has been made translucent, denoting its removal.

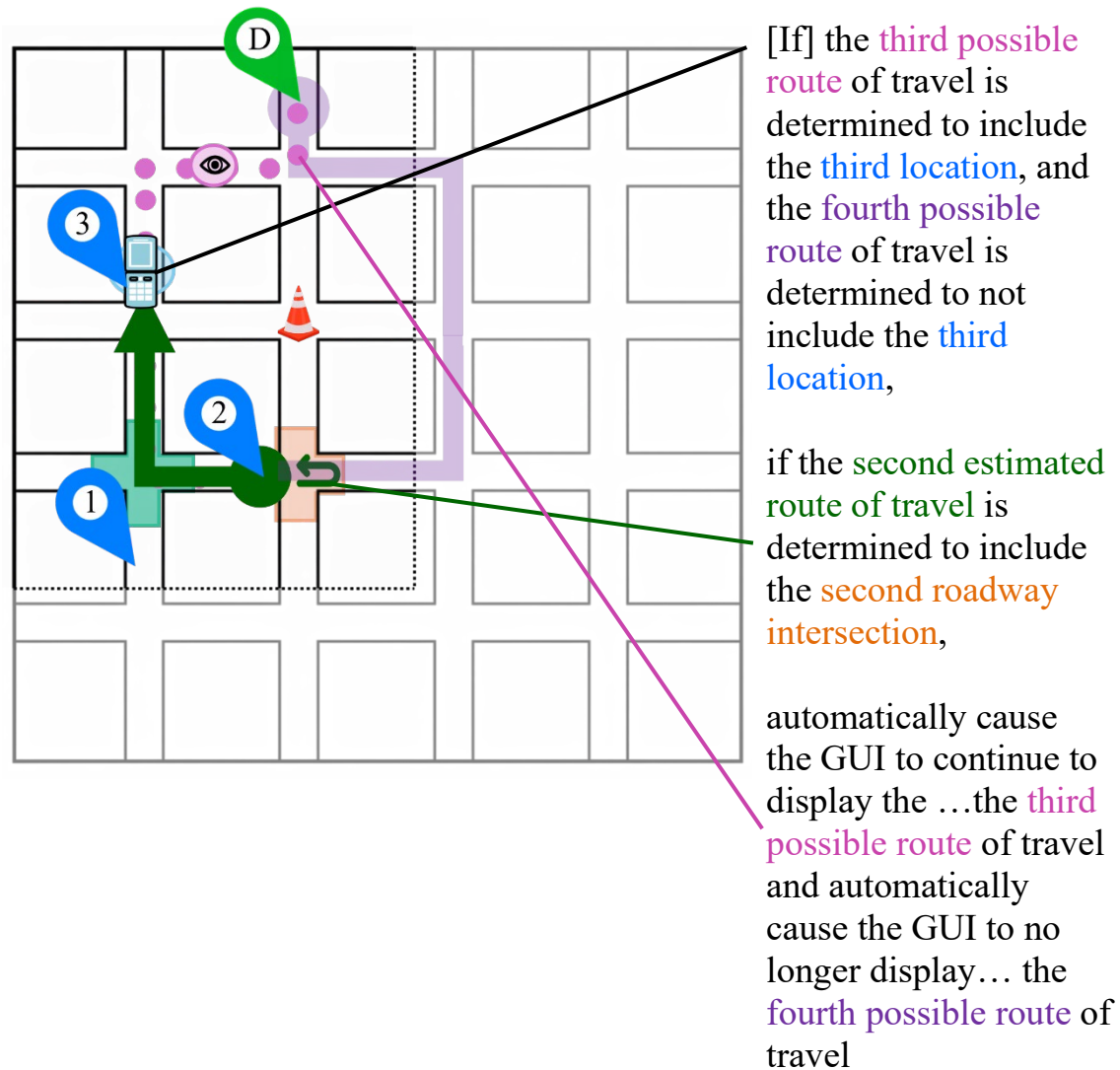


Fig. B(6).

19. [1r] (xv) if the **second estimated route of travel** is determined to include the **second roadway intersection**, the **third possible route of travel** is determined to not include the **third location**, and the **fourth possible route of travel** is determined to include the **third location**, automatically cause the GUI to continue to display the graphical representation of the map together with the graphical representation of the **fourth possible route of travel** and automatically cause the GUI to no longer display the graphical representation of the **third possible route of travel**.

175. In my opinion, [1r] conditionally requires that the GUI remove the third possible route from display if the user is travelling on the fourth possible route and has passed the second intersection—in short, the GUI will only display the possible route actually taken, using the same process as in [1k]. Yamashita discloses [1r] because, as discussed for [1k] (and [1j], [1q]), after the CPU compares the estimated route against the optimum and next-optimum routes, and determines which route the user is traveling, the CPU “allows the display device 7 to display the route from the user’s current position toward the destination overlaid on any corresponding road on the map.” EX1005 (Yamashita), ¶¶122, 153-58. Because Yamashita instructs that its re-routing process repeats the process described above, a POSITA would have appreciated that Yamashita’s subsequent display will be of either the new optimum or new next-optimum routes depending on which route is being traveled, as explained for [1k].

176. Figure B(7) below depicts Yamashita's process for this limitation where the information is displayed on the GUI. The fourth possible route is displayed while the third possible route has been made translucent, denoting its removal.

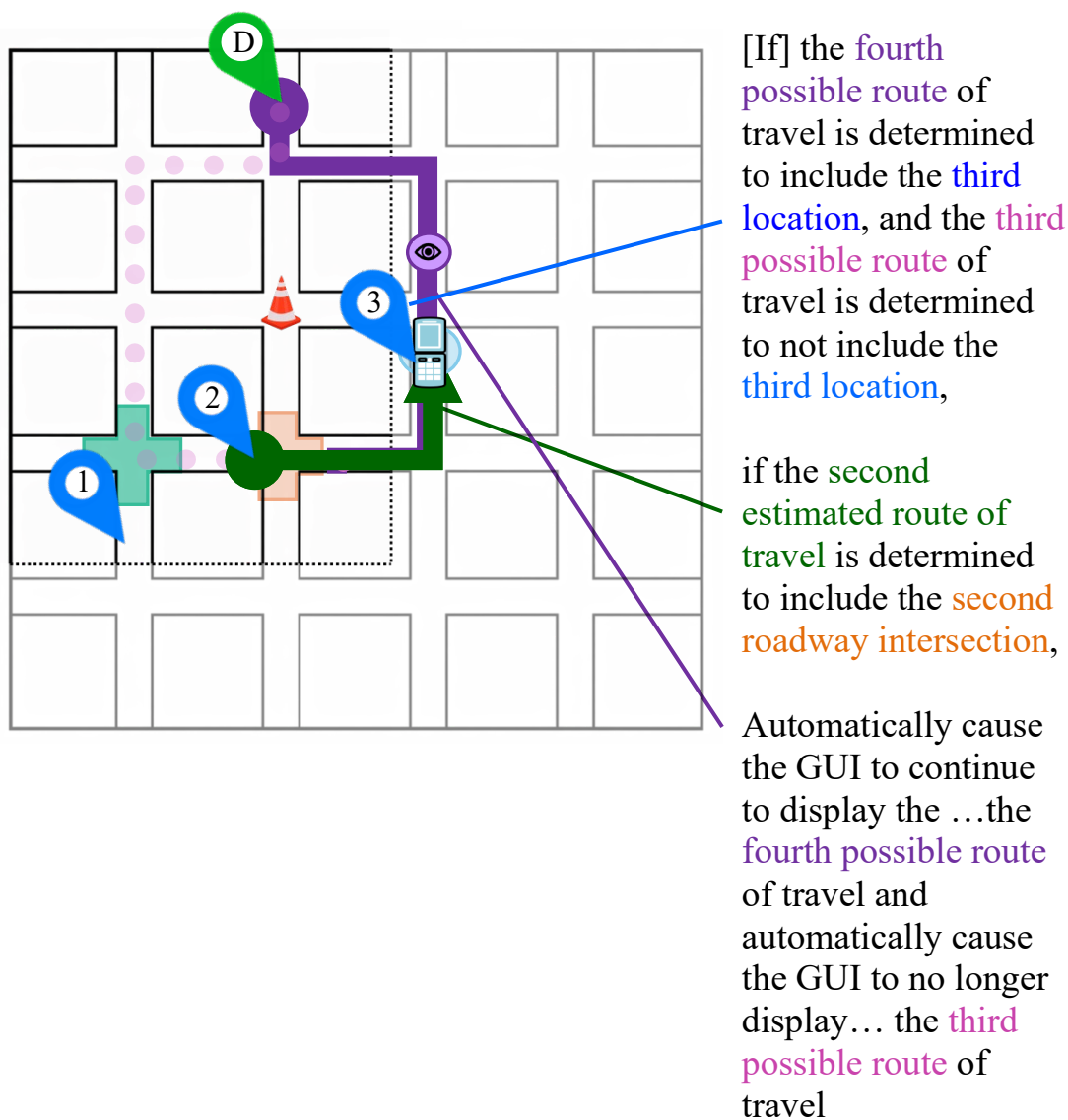


Fig. B(7).

B. Dependent Claims 2-6

1. **Claim 2. The computer program product of claim 1, wherein first possible route of travel, the second possible route of travel, the third possible route of travel, and the fourth possible route of travel are calculated by the mobile device.**

177. Claim 2 requires the possible routes to be determined by the mobile device. As explained for [1c] and [1m], the CPU of Yamashita's Anavi (mobile device) performs the "route search" in S205 and thus determines the various routes. *See* EX1005 (Yamashita), ¶¶39, 58-59, 68, 76-77, 96, 159; Figs. 1, 2, 17, 18; *see also* EX1001, 11:3-8.

2. **Claim 3. The computer program product of claim 1, wherein first possible route of travel, the second possible route of travel, the third possible route of travel, and the fourth possible route of travel are calculated by the one or more servers.**

178. Claim 3 requires the possible routes to be determined by a server. In my opinion, Yamashita in combination with Durocher renders obvious claim 3 because, as explained for [1e] and [11], Yamashita discloses calculating various possible routes, and Durocher discloses performing route calculations on a server instead of on the device, and a POSITA would have been motivated with a reasonable expectation of success to perform route calculations on the server. EX1006 (Durocher), 4:12-25, 1:65-2:6, 2:60-66, 3:59-4:3; *see also* EX1005 (Yamashita), ¶160.

179. Like Yamashita, Durocher discloses a navigation system that includes a mobile terminal and a centralized server. EX1006 (Durocher), 2:60-66. In Durocher, the mobile terminal determines the starting and destination points and then sends this information to the centralized server. EX1006 (Durocher), 3:3-10. Durocher's centralized server "contains cartographic data and is capable of calculating itineraries." EX1006 (Durocher), 2:65-66. Once calculated, Durocher's server transmits the "best itinerary" and the "best alternative itinerary[ies]" for "several or each of the possible deviations" a driver may take "from its course." EX1006 (Durocher), 3:59-65, 3:67-4:3. Moreover, Durocher's terminal may also "contact[] the centralized server automatically" and "ask[] the server for a new itinerary to reach the original destination." EX1006 (Durocher), 4:12-25.

180. In my opinion, a POSITA would have been motivated to calculate Yamashita's routes using Durocher's method of offloading route calculation from a local device to a remote server to increase the accuracy of the route determinations, increase the processing speed of the determinations, and reduce the cost of Yamashita's Anavi. As Durocher expressly teaches, suggests, and motivates, removing "program[s] of local calculation of itinerar[ies]" results in a "lower degree of capability required for processing and memory" on the terminal, and also "reduces the cost of the mobile terminal." EX1006 (Durocher), 4:12-25. It also eliminates the need for the mobile terminal to store "cartographic data, which are essential for

calculating itineraries” but which cause “disadvantages [such as] a difficult updating [sic] and an increase in the cost, size, and manageability of the navigational system.” EX1006 (Durocher), 1:65-2:3. Using centrally stored cartographic data also would simplify Yamashita’s system because it would be able to account for updated maps and traffic conditions in one place, allowing routes to be calculated using the most current and accurate map data. A POSITA thus would have understood that moving Yamashita’s route calculation to the server would have enhanced the efficiency, enhanced the user experience, and reduced the cost by reducing necessary storage of Yamashita’s Anavi.

181. A POSITA would have had a reasonable expectation of success in offloading the route calculation because it would have merely involved a simple substitution of one known element (local route calculations) for another (server-based route calculation) to obtain predictable results (routes to a destination). Yamashita and Durocher involve similar navigation devices, servers, and methods. EX1005 (Yamashita), ¶¶15-19, 68, 160; EX1006 (Durocher), 2:60-66, 3:3-10. Indeed, Yamashita’s system involves at least two servers (e.g., “a network server” that also stores Pnavi programming and a VCIS for distributing traffic conditions) and the Anavi includes a communication device configured to exchange data with the servers. EX1005 (Yamashita), ¶¶15-19, 68, 133, 160.

182. In my opinion, changing where the routes are calculated would not have involved more than minor modifications to the location of processing of data Yamashita already discloses, and these modifications were within a POSITA's skill set before 2002. *See, e.g.*, EX1014, 239-64 (offering an entire chapter on navigation systems including centralized servers). Moreover, while the change moves the location of the calculation, it would not have required any modification that would have rendered Yamashita's system, devices, or underlying method inoperable. Performing the calculations on the server would have been one of very finite and conventional choices (e.g., local vs server). Based on Durocher's teachings, a POSITA would have understood such a modification to merely apply a known technique to a system ready for improvement to yield predictable results.

3. Claim 4. The computer program product of claim 1, wherein first estimated route of travel and the second estimated route of travel are calculated by the mobile device.

183. Claim 4 requires the mobile device to calculate the estimated routes. Yamashita discloses claim 4, as explained for [1h] and [1o], because Yamashita's calculations, including the generation of trail data Itraj, in its method are performed on Anavi (mobile device). EX1005 (Yamashita), ¶¶22-23, 58, 68, 113-14, 153, 159.

4. Claim 5. The computer program product of claim 1, wherein first estimated route of travel and the second estimated route of travel are calculated by the one or more servers.

184. Claim 5 requires that a server calculate first and second estimated routes of travel. Yamashita in combination with Durocher renders obvious claim 5 because, as explained for [1h] and [1o], Yamashita discloses calculating estimated routes, and, as explained for claim 3 Durocher discloses performing route calculations on a server instead of on the device. EX1006 (Durocher), 1:65-2:3, 3:3-10, 4:12-25. The combination therefore teaches determining Yamashita's estimated routes at a server, as taught by Durocher.

185. As explained for [1h] and [1o], Yamashita's calculation of estimated routes involves trail data Itraj that is a collection of locations indicating the route traveled. EX1005 (Yamashita), ¶¶113-14, 152-55. Durocher discloses transferring such location updates to a remote server: "[the terminal may] transfer its position to the server on a regular basis, [and] ... these positions can be stored by the server." EX1006 (Durocher), 7:12-17.

186. In my opinion, a POSITA further would have been motivated with a reasonable expectation of success to move Yamashita's route estimation calculations to the server to realize the same benefits explained for claim 3.

- 5. Claim 6. The computer program product of claim 1, wherein the first estimated route of travel is an actual route traveled by the mobile device from the first location to the second location along a known network of road paths and the second estimated route of travel is an actual route traveled by the mobile device from the second location to the third location along the known network of road paths.**

187. Claim 6 requires that the estimated routes be actual routes along known roads. Yamashita discloses claim 6 because its disclosed first and second estimated routes of travel as explained for [1h] and [1o], “indicate[] the trail the user has moved so far” (EX1005 (Yamashita), ¶¶153) and is mapped against “road network data [that] is known” (EX1005 (Yamashita), ¶¶63, 154). *See also* ¶¶86-87, 99, 113-15, 153-55, Figs. 2, 18. It is then my opinion that a POSITA would have understood that Yamashita’s Itraj data corresponds to the user’s actual route of travel along a known road network.

C. Independent Claim 9 and Dependent Claims 10-14

188. Independent claim 9 is identical to independent claim 1 except that it recites a method instead of a computer program product. As explained for claim 1, Yamashita discloses a method performed by executing the computer program. The remainder of the claim is taught by the prior art for the same reasons explained for claim 1 as the following chart shows:

Claim 9 Limitation	Relevant Explanation
[9pre]	[1pre], Section XI.A.1
[9a]	[1a], Section XI.A.2
[9b]	[1b], Section XI.A.3
[9c]	[1c], Section XI.A.4
[9d]	[1d], Section XI.A.5
[9e]	[1e], Section XI.A.6
[9f]	[1f], Section XI.A.7
[9g]	[1g], Section XI.A.8
[9h]	[1h], Section XI.A.9
[9i]	[1i], Section XI.A.10
[9j]	[1j], Section XI.A.11
[9k]	[1k], Section XI.A.12
[9l]	[1l], Section XI.A.13
[9m]	[1m], Section XI.A.14
[9n]	[1n], Section XI.A.15
[9o]	[1o], Section XI.A.16
[9p]	[1p], Section XI.A.17
[9q]	[1q], Section XI.A.18

Claim 9 Limitation	Relevant Explanation
[9r]	[1r], Section XI.A.19

189. Dependent claims 10-14 are identical to dependent claims 2-6, except that they depend from claim 9 instead of claim 1. Claims 10-14 are taught by the prior art for the same reasons explained for claims 2-6 as the following chart shows:

Claim	Relevant Explanation
10	2, Section XI.B.1
11	3, Section XI.B.2
12	4, Section XI.B.3
13	5, Section XI.B.4
14	6, Section XI.B.5

XII. Ground 2: Yamashita, Durocher, Irie and Dickerson Render Obvious Claims 7 and 15

1. Claim 7

- a. [7pre] The computer program product of claim 1, wherein the mobile device corresponds to a preferred service provider and wherein the non-transitory computer readable medium further includes computer instructions that when executed by the at least one processor of the computing system cause the computing system to:

190. In my opinion, [7pre] requires that the mobile device correspond to a preferred service provider. A POSITA would have understood that claim 7's

reference to a “computing system” refers to the “navigation system” in claim 1. For example, claim 7 recites “wherein the mobile device,” “the non-transitory computer readable medium,” and “the at least one processor.” These terms all find their antecedent basis from claim 1’s preamble. Claim 1 does not recite a “computing system” with these components but does recite a “navigation system” with them. Thus, in my opinion, a POSITA would have understood “computing system” to refer to a “navigation system.”

191. To the extent that claim 7’s preamble is limiting, Dickerson discloses using navigation devices, like Anavi of Yamashita, used by ride-sharing service providers configured through a centralized assignment system. Dickerson discloses “an automated transit system” where a “central assigning system” connects passenger and ride-sharing driver devices, such that “volunteering to drive allows dynamic ‘car-pool’ assignment.” EX1008 (Dickerson), ¶¶3, 7, 19, 27-28, 32, 58, 94-96, 99.

192. In my opinion, a POSITA would have found it obvious to integrate Dickerson’s central assigning system into Yamashita’s network server (*see* [1pre]), such that Yamashita’s Anavi is usable to accept rides and navigate drivers in a rideshare implementation. Dickerson discloses “an automated transit system” that “provide[s] real-time command and control of passengers and vehicles.” EX1008 (Dickerson), ¶¶3, 32. Dickerson’s system includes, for example, passengers,

drivers/vehicles, and a central assigning system that matches a passenger with a specific driver. EX1008 (Dickerson), ¶¶19-21, 102. The “system equips the passengers and vehicles with wireless communication devices that transmits information to, and receives information from, the central assigning system.” EX1008 (Dickerson), ¶21. Passenger and ride-sharing driver devices are “essentially the same” but “the software capabilities are slightly different.” EX1008 (Dickerson), ¶39; *see also id.* ¶¶27, 39, 81, 94, 100. When used for “[r]ide-sharing drivers,” the device is programmed with a “[o]ne-button request to ... volunteer to drive in the immediate future.” EX1008 (Dickerson), ¶¶39-40, 76-81, 94-96. Dickerson’s central assigning system “matches a passenger’s parameters with current transit parameters.” EX1008 (Dickerson), ¶102. “Transit parameters can include vehicle availability, traffic conditions, travel conditions such as weather conditions, vehicle location, driver availability, vehicle status, driver status, and the like,” and “passenger parameters include preferred routes, preferred means of transportation, preferred number of additional passengers in shared-ride vehicles, preferred type of vehicle, time of day of travel, duration of travel, preferred method of payment, and the like.” Dickerson, ¶¶19, 43, 100, 102, 127.

193. It is my opinion that a POSITA would have found it obvious to implement Dickerson’s ride-sharing central assignment server in Yamashita’s navigation system by simply modifying the software of Yamashita’s Anavi to

communicate a volunteer request with Dickerson's central assigning server to assign rides. EX1008 (Dickerson), ¶¶95-96.

194. **First**, it is my opinion that a POSITA would have been motivated to use Dickerson's central assigning server in Yamashita's navigation system because it would have provided the ability to use the Anavi mobile devices within the ride-sharing industry and enabled drivers (and riders) to navigate using Yamashita's navigation methods while optimizing trips by centrally configuring the assignments. *See* EX1014, 256 (discussing centralized multi-vehicle systems, noting "[t]he overall efficiency and road utilization should be higher for a road network managed by a centralized host."). A POSITA would have understood Yamashita's adaptive navigation and optimal routing software would benefit the ride-sharing industry because it would have allowed drivers and service providers to increase profitability by timely and efficiently pairing drivers with riders, allowing drivers to perform more trips. *See id.*

195. The combination would also have increased passenger satisfaction because it would have ensured that the driver gets to the passenger in the quickest way possible (using Dickerson's central assignment server) and also gets the passenger to their ultimate location in the quickest way possible or based on other specified criteria Yamashita discloses (using Yamashita's navigation methods). *See* Yamashita, ¶¶77, 169; EX1014, 254 (discussing an exemplary centralized multi-

vehicle system, explaining that “the multi-vehicle route planning module calculates optimal or near-optimal routes for every possible (or selected) origin-and-destination (O-D) pair”).

196. **Second**, a POSITA would have been motivated to supplement Yamashita’s Pnavi programming on the Anavi mobile device with Dickerson’s one-button volunteer request because it would have consolidated the need for multiple devices. Both Yamashita and Dickerson suggest that integrating communication devices with navigation devices simplifies the overall system. EX1005 (Yamashita), ¶¶58, 68, 133-34, 159-60; EX1008 (Dickerson), ¶¶21, 39-40, 71, 75-82. Moreover, allowing a driver to accept a ride through the selection of one button would minimize the distractions in front of the driver. *See* EX1014, 156 (“The most important design considerations for an in-vehicle display are safety and ease of use.”). For example, the driver would not need to answer a phone to accept a ride from a dispatcher, nor would the driver need to navigate through complex menus to accept the ride.

197. A POSITA would have had a reasonable expectation of success in implementing Dickerson’s ride-sharing central assignment server in Yamashita’s navigation system because it merely would have involved the use of a known technique (Dickerson’s central assigning system) to a known system and method (Yamashita’s navigation apparatus) to yield predictable results of a ride-sharing system with improved route navigation. Like Yamashita, Dickerson also relates to

routing and navigation devices and methods. EX1008 (“Dickerson”), ¶¶18, 19, 43, 77, 100, 102. Indeed, implementing Yamashita’s navigation system to use Dickerson’s central assigning server would have involved simple modifications or additions to the navigation system, including implementing a server to take on assigning duties and programming Anavi devices to accept, process, and execute a driving assignment. *See* EX1014, 254 (discussing centralized multi-vehicle route-planning systems which determine optimal routes for different origin-destination pairings for many vehicles.). As both Dickerson and Yamashita disclose a GPS receiver for calculating the position of the mobile device and both Dickerson and Yamashita disclose at least one server, a POSITA would have understood the systems to involve similar components. Yamashita ¶¶58,67; Dickerson, ¶¶3, 27-28, 38, 43, 73. Because Yamashita’s Anavi is already configured to communicate with servers at least using the Internet, the modification would not have required any changes that would render the system and method inoperable or unsuited for its original purpose.

- b. [7a] designate, based on a determined distance between the preferred service provider and the destination location, a determined estimated time of arrival at the destination location of the preferred service provider, and a vehicle type of the preferred service provider, one of a plurality of available service providers as the preferred service provider to provide a service for a customer.**

198. In my opinion, [7a] requires that the navigation system assign a service provider based on 1) distance between the provider and the destination, 2) estimated arrival at a destination, and 3) vehicle type of the provider. Dickerson discloses assigning a driver (preferred service provider) to a rider based on distance from a rider (i.e., where the driver's destination is the rider's pick-up location), estimated time of arrival at the destination, and vehicle type. EX1008 (Dickerson), ¶¶19, 39, 42, 96, 102.

199. As explained for [7pre], Dickerson discloses “a central assigning system capable of matching a passenger's trip request with current transit parameters to determine vehicle assignment and routes that reduce passenger trip and wait times.” EX1008, (Dickerson), ¶19. These considerations include, for example, “vehicle availability, ... vehicle location, driver availability, vehicle status, driver status, and the like. Additional exemplary passenger parameters include ... preferred type of vehicle, time of day of travel, duration of travel.” EX1008, (Dickerson), ¶102. The system then “will match a user's request with existing services located at or near the user's pickup sites.” EX1008, (Dickerson), ¶102; *see also* ¶42 (“The scheduling processor can further inform the passenger of the type of vehicle, the exact destination site (if not fixed by the request), the expected time of arrival, the cost of the trip (if not fixed and requested as part of the passenger profile), and the expected total time of travel.”). After the passenger accepts the recommended driver,

the “assigning system communicates with the driver and assigns him or her to arrange the trip based on the same considerations as discussed earlier.” EX1008 (Dickerson) ¶39. Dickerson’s system thus assigns a driver based on at least the distance between the driver and the destination (i.e., the pick-up location), the expected time of arrival, and the driver’s vehicle type.

200. Dickerson teaches that a driver may only receive an assignment after the driver has informed the system that it is available. *See, e.g.*, EX1008 (Dickerson), ¶96 (“This volunteering to drive allows dynamic ‘car-pool’ assignment.”). A POSITA would have understood that Dickerson’s teachings correspond to the claimed “computer instructions” that “cause the computing [i.e., navigation] system to: designate...” because the one-button volunteering signal informs the assigning system of its availability, which causes the driver to be included in the list of potential service providers.

201. In my opinion, a POSITA would have found it obvious to implement Dickerson’s ride-sharing central assignment server in Yamashita’s navigation system for the reasons explained in [7pre].

2. Claim 15

202. In my opinion, claim 15 is similar to claim 7 except that it depends from claim 9 (reciting a method) rather than claim 1 (reciting a computer program

product). Claim 15 is rendered obvious by the proposed combination for the reasons explained for claim 7.

- a. **[15pre] The method of claim 9, wherein the mobile device corresponds to a preferred service provider and wherein the method further comprises:**

203. Dickerson discloses a mobile device that is a preferred service provider as explained for [7pre].

- b. **[15a] designating, based on a determined distance between the preferred service provider and the destination location, a determined estimated time of arrival at the destination location of the preferred service provider, and a vehicle type of the preferred service provider, one of a plurality of available service providers as the preferred service provider to provide a service for a customer.**

204. In my opinion, [15a] is identical to [7a], and Dickerson discloses it for the reasons explained for [7a].

XIII. Conclusion

205. For the reasons set forth above, it is my opinion that claims 1-7 and 9-15 of the '925 patent are unpatentable in view of the prior art.

206. 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.

207. I declare that all statements made herein of my knowledge are true, 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.

Dated: 7/30/2026

By: Dr. Philip A. Dafesh
Dr. Philip A. Dafesh