

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

HYUNDAI MOTOR COMPANY
Petitioner

v.

MEL NAVIP LLC
Patent Owner.

U.S. Patent No. 8,649,971 to Machino

Case No.: IPR2024-00173

DECLARATION OF DAVID H. WILLIAMS

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Exhibit	Description
1001	U.S. Patent No. 8,649,971 (“the ‘971 patent”)
1002	File history of U.S. Patent No. 8,649,971
1003	Declaration of David H. Williams
1004	Curriculum Vitae of David H. Williams
1005	U.S. Patent No. 7,054,742 to Khavakh et al. (“Khavakh”)
1006	U.S. Patent No. 5,243,528 to Lefebvre (“Lefebvre”)
1007	2008 RDX Navigation Manual (Unlinked) (“RDX”)
1008	Chart comparing the limitations of Challenged Claims 1 and 19 of the ‘971 patent
1009	Exhibit D to MEL NavIP LLC’s Infringement Contentions in <i>MEL NavIP LLC v. Hyundai Motor Company et al.</i> , Case No. 23-cv-00176 (E.D. Tex.)
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1012	Declaration of Dr. Sylvia Hall-Ellis
1013	Curriculum Vitae of Dr. Sylvia Hall-Ellis
1014	U.S. Patent No. 5,262,775 to Tamai et al. (“Tamai”)
1015	U.S. Patent No. 5,757,289 to Nimura et al. (“Nimura”)
1016	Pioneer AVIC-Z1 Operation Manual (“AVIC-Z1”)
1017	European Patent No. EP1146496B1 (“EP ‘496”)
1018	European Patent No. EP1611416B1 (“EP ‘416”)
1019	U.S. Patent No. 7,149,625 to Mathews et al. (“Mathews”)
1020	U.S. Patent App. Pub. No. 2006/0116818 to Chao et al. (“Chao”)
1021	Docket Control Order in <i>MEL NavIP LLC v. Hyundai Motor Company et al.</i> , Case No. 23-cv-00176 (E.D. Tex.)
1022	U.S. Patent No. 7,643,917 to Kolletzki (“Kolletzki”)
1023	Canadian Patent App. Pub. No. CA2511765A1 (“CA ‘765”)

1. I, David H. Williams, declare as follows:

I. INTRODUCTION

2. I have been retained by Hyundai Motor Company (“Hyundai” or “Petitioner”) as an independent expert consultant in this *inter partes* review (“IPR”) proceeding before the United States Patent and Trademark Office (“PTO”).

3. I have been asked by Hyundai’s counsel (“Counsel”) to provide my opinions regarding the unpatentability and invalidity of claims 1-4, 7-12, 14, 16-17, and 19 (collectively, the “Challenged Claims”) of U.S. Patent No. 8,649,971 (“the ‘971 patent”) (EX1001). My opinions and the bases for my opinions are set forth below.

4. My compensation in this matter is \$635 per hour without regard to the outcome of this proceeding. I am not, and never have been, an employee of Hyundai. I am not receiving compensation for this declaration beyond my normal hourly fees based on my time actually spent analyzing and documenting my opinions on the Challenged Claims of the ‘971 patent.

II. BACKGROUND AND QUALIFICATIONS

5. All of my opinions stated in this Declaration are based on my own personal knowledge and professional judgment. In forming my opinions, I have relied on my knowledge and experience in designing, developing, researching, and

teaching the technology referenced in this Declaration.

6. I am over 18 years of age and, if I am called upon to do so, I would be competent to testify as to the matters set forth herein. My background, qualifications, and educational and employment history are set forth in my *curriculum vitae*, which is attached hereto as EX1004. My *curriculum vitae* also sets forth my deposition and trial testimony over the last four years. In this Declaration I have also provided a brief overview of some of my experience that I believe is relevant to the matters set forth in this Declaration.

7. I was awarded an MBA in Information Systems Management in 1987 from the University of Texas at Austin where I was the first in my graduating class. I also received a BSEE in 1983 from Purdue University with top honors and an emphasis in digital system design.

8. I have over 35 years of experience in wireless location services, including experience designing, implementing, and managing numerous location-based service (LBS) applications such as navigation, telematics, ride sharing, mobile social networking, family tracking, local search, games and gaming, mobile resource management, asset tracking and management, as well as working in all fields within the location services ecosystem including all forms of location determination

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technologies, map data, handset technologies, and associated Information Technology systems including identification, authentication, privacy, security, and other related capabilities such as network engineering and operations.

9. I am currently the President of the company E911-LBS Consulting, and I have been with the company since 2002. As the President of E911-LBS Consulting, I provide services across the entire wireless value chain, particularly with respect to technology and business strategic planning and product design and development associated with LBS, Global Positioning Satellite (GPS) systems, E911, WiFi-Based and other medium/long-range Real-Time Location Systems (RTLS), Radio Frequency Identification (RFID), Bluetooth, Near Field Communications (NFC), and beacon-based and other short-range communications/location systems, and other location determination and sensing technologies and services. I am also President of E911-LBS Forensics Engineering, which utilizes the above technologies in assisting in criminal and civil cases.

10. I have extensive expertise in all aspects of LBS delivery across the wireless location ecosystem including enabling network, map data, geospatial platform, chipset, data management, device, and location determination infrastructure and integration providers. I have extensive experience in all related

aspects of LBS, including data privacy and security management.

11. In the 1995 to 2000 timeframe, as an Associate Partner in the Communications & High Technology Practice of Accenture (one of the world's leading technology companies), I focused on using wireless location technologies to provide services to the public sector and commercial markets. From 1998 to 2000, I led the development of the LBS product/technology strategy and roadmap for Nextel Communications, Inc. My work with Nextel resulted in some of the earliest LBS applications in the U.S. market and included extensive research into the potential use of various technologies to provide and enable a wide array of LBS, including Mobile Resource Management (MRM) worker navigation, tracking, and vehicle/fleet management applications. This work also included leading the development of the underlying network and Information Technology architectures that would be required to support the LBS applications product strategy and roadmap.

12. In 2003, I led the development of part of AT&T Wireless's E911 infrastructure, including the development of systems, processes, and reporting infrastructure to manage and track the deployment of time difference of arrival-based location determination technologies. I managed the testing and Federal

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Communications Commission reporting of network location inaccuracies, with a particular focus on detecting and troubleshooting out-of-norm technology deployment and inaccurate location conditions.

13. From 2005 to 2007, I worked with NAVTEQ—the leading provider of map data and services essential to creating LBS applications—to develop the company’s web developer website content and tools. I designed and managed the site map and overall content, including the development of comprehensive technical and business web content for all NAVTEQ map product and service lines. Through the developer site, application developers and business managers became intimately familiar with map data and associated attributes, Geographical Information System (GIS) platforms, and LBS to successfully develop and launch their LBS applications. For example, I developed the content to highlight key types of map data and to provide technical details on how NAVTEQ tools can be used in LBS design for various consumer and business applications. My NAVTEQ development work included the use of various attributes, rules and comparison capabilities, and routing/route optimization enablers to monitor and guide people, places, and things and to generate a variety of guidance instructions and time and/or event-based alerts and notifications. My NAVTEQ development work also included the distribution

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of this technology using a variety of networks and user interface mechanisms.

14. I have other LBS application product design and implementation experience, which includes data privacy and security management. From 2007 to 2010, I managed the design, development, and launch of several consumer and business-oriented LBS applications for AT&T Mobility. These LBS applications included navigation (AT&T Navigator), mobile social networking (Loopt), family tracking (AT&T FamilyMap), local search (Slifter), 411-with-LBS, mobile resource management (TeleNav), and asset tracking (various providers). At AT&T Mobility, I also developed corporate-wide location data privacy policies and associated system implementation for all LBS customers.

15. My AT&T work involved various aspects of worker and telematics/vehicle/fleet management tracking. I was the Product Manager for the several of the joint AT&T-TeleNav Mobile Resource Management applications, as well as various fleet management solutions. My roles required extensive knowledge of how the various applications worked, both generally as well as what design modifications were required so that the applications I was working on “fit into” AT&T’s product, network and IT infrastructure. I also needed to ensure that AT&T’s privacy and security policies were implemented. My AT&T work also

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included the design and modification of AT&T's network and IT infrastructure to enable the applications to work seamlessly with AT&T's location infrastructure and the various IT systems that were used for Sales, Customer Care, Fulfillment, Billing/Accounts Receivable functions, along with a variety of network and IT operations. My efforts included working closely with AT&T Legal to develop and implement AT&T's location privacy policies.

16. I have authored five books on wireless location, including *The Definitive Guide to IoT Sensors* (In Development), *The Definitive Guide to GPS, RFID, Wi-Fi, and Other Wireless Location-Based Services* (two versions, third in development), *The Definitive Guide to Wireless E911*, and (co-authored) *The Definitive Guide to Mobile Positioning and Location Management*. I have authored dozens of research reports, and track and analyze leading companies in the LBS, IoT, and public safety industries, particularly with respect to their product and technology strategies, competitive capabilities and implementation issues. I am also a named inventor on eight patents relating to networking/communications, control, and information technology solutions design, selection, and implementation. I have also been published and quoted by leading magazines and newspapers, including The New York Times, CBS News.com, The Columbus (Ohio) Dispatch, The Boston

Globe, Computerworld, Directions Mag, Mission Critical Communications, Popular Mechanics, and RFID Journal.

17. I have extensive experience in LBS applications, enabling location technologies, wireless communications, privacy and security, and information technology.

18. I consider myself an expert in the field of navigation systems, and the topic areas of the '971 patent generally.

III. INFORMATION CONSIDERED

19. In preparing this Declaration, I have considered the materials and Exhibits discussed and cited herein, including the '971 patent and the prosecution history of the '971 patent. In addition, my opinions are based on my education, training, experience, and knowledge in the relevant field.

IV. RELEVANT LEGAL STANDARDS

20. I am not an attorney and I do not legal opinions. For the purposes of this Declaration, Counsel has informed me of certain aspects of the law that are relevant to my analysis, as summarized below.

A. Person of Ordinary Skill in the Art and Effective Filing Date

21. I understand that a patent is evaluated from the perspective of a person of ordinary skill in the art ("POSITA") as of the patent's earliest effective filing date.

Here, the '971 patent claims priority to a Japanese patent application filed on April 2, 2008. (EX1001 at [30].) Thus, I understand that the '971 patent's earliest effective filing date is April 2, 2008.

22. I understand that my assessment of the claims of the '971 patent must be undertaken from the perspective of what would have been known or understood by a POSITA as of the '971 patent's earliest effective filing date, taking into account the specification and file history of the '971 patent.

23. I further understand that the disclosures and teachings of the prior art are evaluated from the perspective of a POSITA as of a patent's earliest effective filing date, *i.e.*, as of April 2, 2008, for the '971 patent.

24. I understand that a POSITA is not a specific real individual, but rather a hypothetical individual. This hypothetical person has knowledge of all prior art in the relevant field and takes from each reference what it would teach to a person having the skills of a POSITA.

25. I understand that the factors considered in determining the level of ordinary skill in the art include: (i) the levels of education and experience of persons working in the field; (ii) the types of problems encountered in the field; and (iii) the sophistication of the technology. I may also consider, if available, the education

level of the inventor, prior art solutions to the problems encountered in the art, and the rapidity with which innovations are made in the relevant art.

26. I understand that a POSITA is a person of ordinary creativity, but not an automaton, and that a POSITA can often fit multiple patents or prior art references together like pieces of a puzzle as a result of this ordinary creativity. I also understand that I may consider the inferences and creative steps that a POSITA would employ. In addition, I understand that a POSITA would necessarily have been capable of understanding the scientific and engineering principles applicable to the pertinent art. I also understand that when I consider what would have been obvious to a POSITA, I am not considering what would have been obvious to me at the time, nor to the inventors, judges, laymen, those skilled in other arts, or to geniuses in the art.

B. Claim Construction

27. It is my understanding that the purpose of the claim construction process is to determine the meaning of the terms in the claims of the '971 patent to a POSITA as of the time that the patent application was filed. I also understand that the words of the claims, the specification, and the prosecution history are to be primarily considered in order to construe the claims. These three sources are commonly referred to as "intrinsic evidence," while everything else is referred to as

“extrinsic evidence.”

28. It is my understanding that in an IPR the words of a claim are generally given their ordinary and customary meaning to a POSITA as of the time that the patent application containing the claimed invention was filed.

29. It is my further understanding that the same words and phrases within a claim or claims are presumed to have the same meaning. It is also my understanding that different words and phrases within a claim or claims are presumed to have different meanings. Similarly, all words in a claim have meaning, and a word or phrase in a claim should not be interpreted so as to render other words or phrases in the claim superfluous.

30. It is also my understanding that a POSITA is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification and the prosecution history.

C. Anticipation

31. I understand that a patent claim is unpatentable and invalid as anticipated if each and every limitation of the claim is disclosed, either expressly or inherently, in a single prior art reference. Claim limitations that are not expressly found in a prior art reference may be inherent if the prior art necessarily functions in

accordance with, or includes, the claim limitations. It is acceptable to examine evidence outside the prior art reference (extrinsic evidence) to determine whether or not a feature, while not expressly discussed in the reference, is necessarily present in it.

D. Obviousness

32. I understand that a patent claim is unpatentable and invalid if the invention recited in the claim would have been obvious to a POSITA at the time the invention was made in view of a prior art reference, or in view of a combination of prior art references. I understand that obviousness is determined from the perspective of a POSITA, and that the claims of the patent should be read from the point of view of such a person at the time the claimed invention was made. I also understand that a prior art reference should be viewed as a whole. I further understand that a POSITA is assumed to know and to have all relevant prior art in the field of endeavor covered by the challenged patent and all analogous prior art.

33. In considering whether the Challenged Claims of the '971 patent are obvious, I have been asked to consider (a) the level of ordinary skill in the art at the time of the claimed inventions, (b) the scope and content of the prior art, and (c) any differences between the prior art and the Challenged Claims. I further understand that the patent owner may show "secondary factors" related to nonobviousness,

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including commercial success, long-felt but unresolved need, failure of others, copying, praise by others, and unexpected results.

34. I understand that obviousness in an IPR proceeding is evaluated using a preponderance of the evidence standard, which means that the claims must be more likely obvious than nonobvious.

35. I understand that in considering whether patent claim would have been obvious, I may assess whether there are apparent reasons to combine known elements in the prior art in the manner claimed in view of the interrelated teachings of multiple prior art references, the effects of demands known to the design community or present in the marketplace, and/or the background knowledge possessed by a POSITA. I also understand that other principles may be relied on in evaluating whether a claimed invention would have been obvious, and that these principles include the following:

- A combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results;
- When a device or technology is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or in a different one, so that if a POSITA can implement a

predictable variation, the variation is likely obvious;

- If a technique has been used to improve one device, and a POSITA would have recognized that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill;
- An explicit or implicit teaching, suggestion, or motivation to combine two prior art references to form the claimed combination may demonstrate obviousness, but proof of obviousness does not depend on or require showing a teaching, suggestion, or motivation to combine;
- Market demand, rather than scientific literature, can drive design trends and may show obviousness;
- One of the ways in which a patent's subject can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims;
- Any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed;
- "Common sense" teaches that familiar items may have obvious uses beyond

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their primary purposes, and in many cases a POSITA will be able to fit the teachings of multiple patents together like pieces of a puzzle;

- A POSITA is also a person of ordinary creativity, not an automaton;
- A patent claim can be proved obvious by showing that the claimed combination of elements was “obvious to try,” particularly when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions such that a POSITA would have had good reason to pursue the known options within his or her technical grasp; and
- One should be cautious of using hindsight in evaluating whether a claimed invention would have been obvious.

V. LEVEL OF ORDINARY SKILL IN THE ART

36. In Section IV(A), I explained my understanding of the legal principles surrounding a POSITA. Based on my review and analysis of the ‘971 patent, the prior art cited herein, and the factors described in Section IV(A), a POSITA in the field of the ‘971 patent as of its earliest effective filing date (*i.e.*, April 2, 2008) would have had an undergraduate degree in electrical engineering, computer engineering, computer science, or an equivalent degree, as well as at least three years

of experience in the design and implementation of navigation systems.

37. As of April 2, 2008 (*i.e.*, the earliest effective filing date of the ‘971 patent), I was at least a POSITA. When I refer to the understanding of a POSITA, I am referring to the understanding of such a person as of April 2, 2008.

38. All of the opinions that I express in this Declaration have been made from the standpoint of a POSITA at the time of the invention of the Challenged Claims of the ‘971 patent.

VI. SUMMARY OF MY OPINIONS

39. I have been asked to consider the validity of Challenged Claims 1-4, 7-12, 14, 16-17, and 19 of the ’971 patent in view of certain prior art references. As explained below in detail, it is my opinion that:

(1) Challenged Claims 1-2, 7-12, 16-17, and 19 are unpatentable and invalid as obvious over Khavakh (EX1005) in combination with Lefebvre (EX1006) and the knowledge of a POSITA; and

(2) Challenged Claims 3-4 and 14 are unpatentable and invalid as obvious over Khavakh (EX1005) in combination with Lefebvre (EX1006), RDX (EX1007), and the knowledge of a POSITA.

VII. TECHNOLOGICAL BACKGROUND

40. The ‘971 patent characterizes its “Field of the Invention” as generally

relating to “a navigation device that carries out route guidance of a route including waypoints acquired through a route search.” (‘971 patent, EX1001 at 1:5-7.) The ‘971 patent asserts that the main difference between the prior art and the claimed invention of the ‘971 patent is that the ‘971 patent allows the user to determine how to handle a route deviation (as opposed to automatically determining how to handle a route deviation). (*Id.* at 1:13-62.) As shown in detail below, the prior art had already addressed allowing a user to determine how to handle a route deviation.

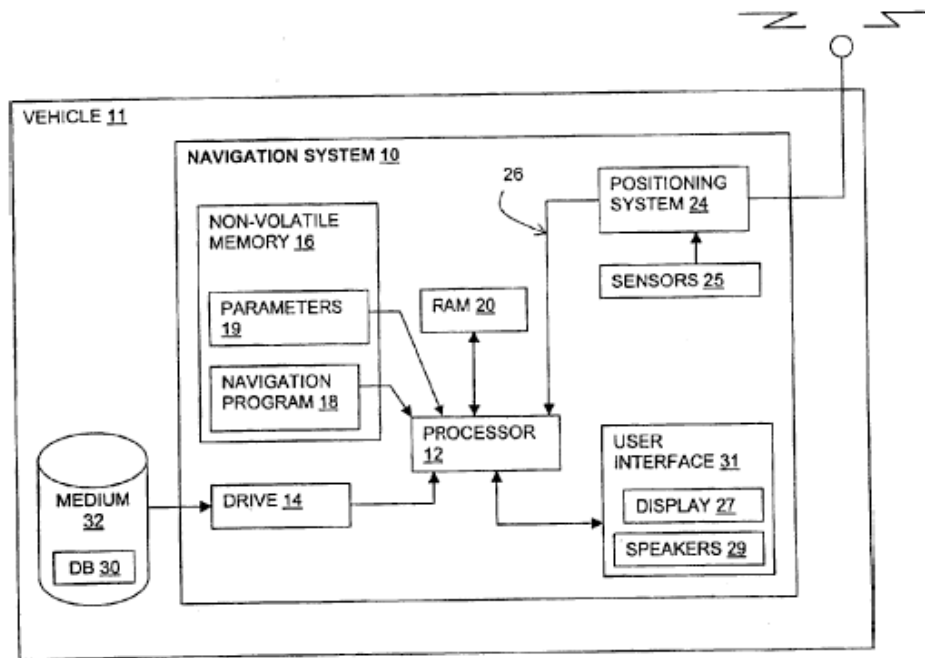
41. To provide background for my limitation-by-limitation analysis of the Challenged Claims to follow, I first present an overview of the relevant state of the art in the field of navigation systems as of the time of the alleged invention of the ‘971 patent.

A. Navigation System Architecture.

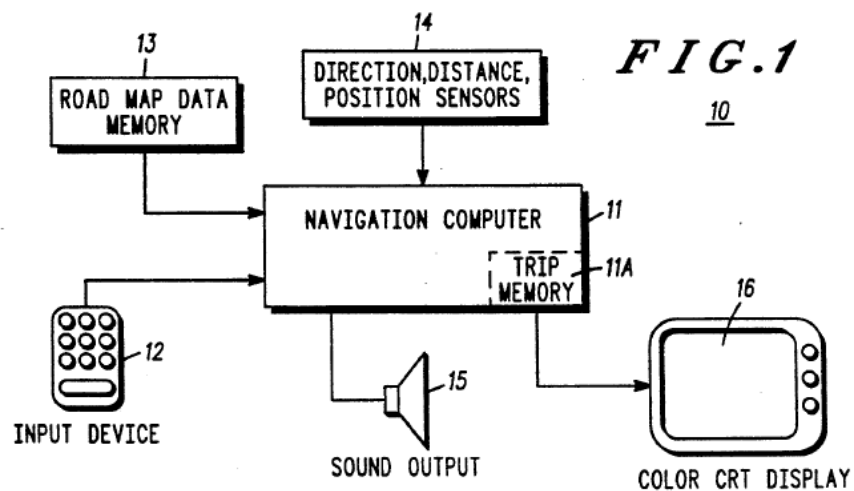
42. Prior to the alleged invention of the ‘971 patent, navigation systems for carrying out route guidance were well-known and widely used. Navigation systems typically included a storage medium for storing map data, a positioning system (typically a GPS-based positioning system), a processor, a display (*e.g.*, a CRT display or an LCD display), and an input device.

43. Several exemplary navigation systems are illustrated below in block diagram form:

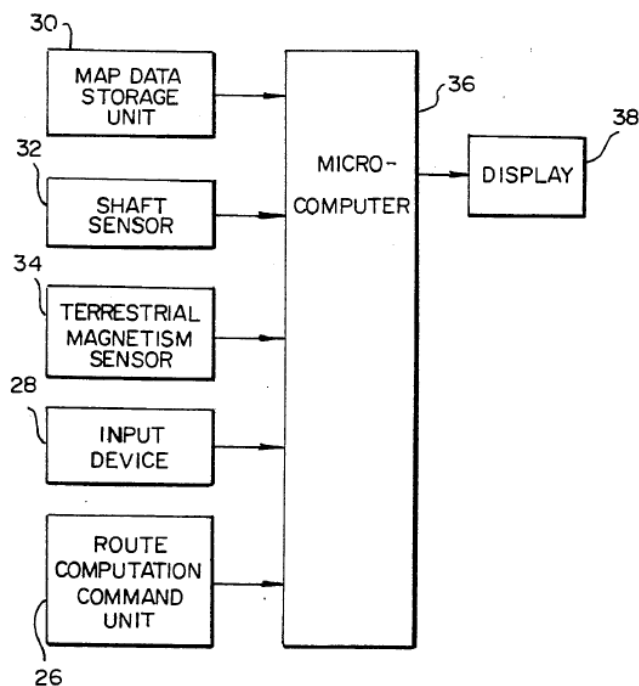
FIG. 1



(Khavakh, EX1005 at FIG. 1.)



(Lefebvre, EX1006 at FIG. 1.)



(Tamai, EX1014 at FIG. 2.)

44. Prior art navigation systems also included a navigation program or application stored in memory that, when executed on the processor, would control the navigation functions of the navigation system. The navigation program contained programming for, among other things: (i) setting a destination and, if desired, one or more intermediate waypoints; (ii) calculating a route to the destination via the set waypoints; and (iii) guiding the user along the calculated route.

45. Khavakh taught a navigation program 18 comprising a navigation application 47 for setting intermediate waypoints and a destination, a route

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calculation tool 40 for calculating a route to the destination via the intermediate waypoints, and a route guidance tool 91 for guiding the user along the calculated route. (Khavakh, EX1005 at FIG. 4, 5:35-43, 5:49-58, 8:35-50.) Khavakh's navigation program 18 is illustrated below:

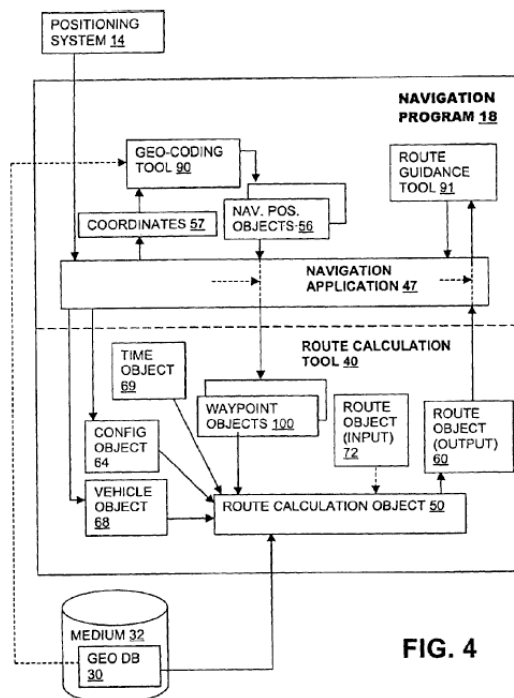
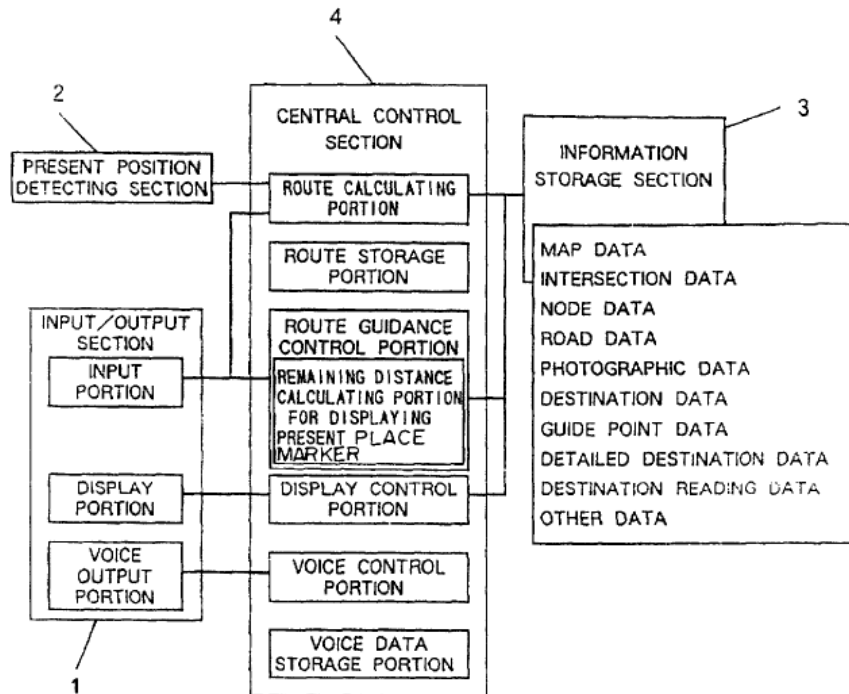


FIG. 4

(*Id.* at FIG. 4.)

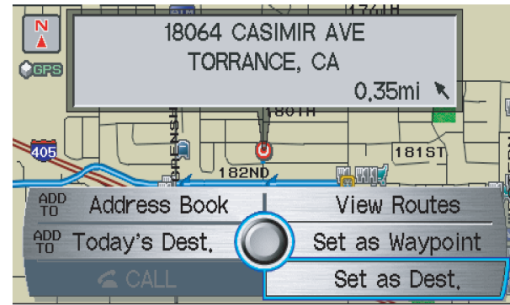
46. U.S. Patent No. 5,757,289 to Nimura et al. ("Nimura") taught a navigation system with a central control section 4 comprising a CPU 40 for executing programming for processing a route search, calculating a guidance route, and guiding the user along the calculated guidance route. (Nimura, EX1015 at FIG. 1, 4:12-20, 4:58-61, 5:9-17.)



(*Id.* at FIG. 1.)

47. To begin a route search, the user would first set the destination and any desired intermediate waypoints using an input device, such as a remote control, a keypad, a touchscreen, or the like. (*See, e.g.,* Khavakh, EX1005 at 4:8-19; Lefebvre, EX1006 at 6:31-37; Tamai, EX1014 at 4:26-29; Nimura, EX1015 at 3:34-43.) The 2008 RDX Navigation Manual (Unlinked) (“RDX”) provides examples of setting destinations and waypoints using addresses, as shown below:

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(RDX, EX1007 at 27, 73.)

48. The Pioneer AVIC-Z1 Operation Manual likewise provides examples of setting destinations and waypoints using addresses:

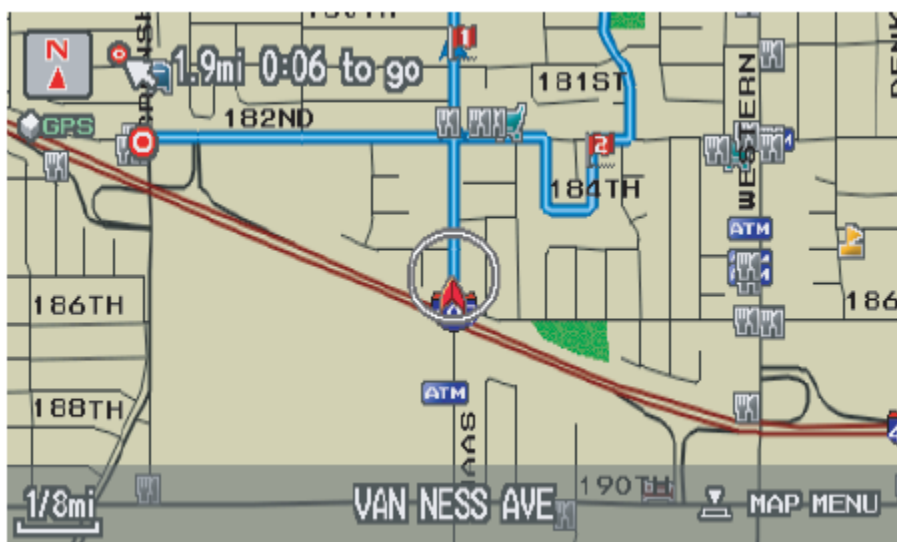


(AVIC-Z1, EX1016 at 28, 36.)

49. After the user set the destination and intermediate waypoints, the navigation system's programming would calculate a route to the destination via the intermediate waypoints. (See, e.g., Khavakh, EX1005 at 8:21-26, 10:10-15, 32:35-54; Lefebvre, EX1006 at 2:65-3:1; RDX, EX1007 at 6; Nimura, EX1015 at 4:58-61.) The navigation system's programming would then guide the user along the calculated route using instructions presented on the display screen. (See, e.g.,

Khavakh, EX1005 at 1:29-40; Lefebvre, EX1006 at 3:30-49.) Some navigation systems would also output audible route guidance instructions using a speaker. (Khavakh, EX1005 at 1:34-36; Lefebvre, EX1006 at 3:30-49.)

50. An exemplary route guidance display is illustrated below showing intermediate waypoints represented as flags and a final destination represented as a bullseye:



(RDX, EX1007 at 71.)

B. Off Route Or Route Deviation Messages Were Well-Known In The Art.

51. One important consideration for designers of navigation systems was what to do when the user deviated from the calculated guidance route or went off route. (See, e.g., Lefebvre, EX1006 at 1:64-2:23.)

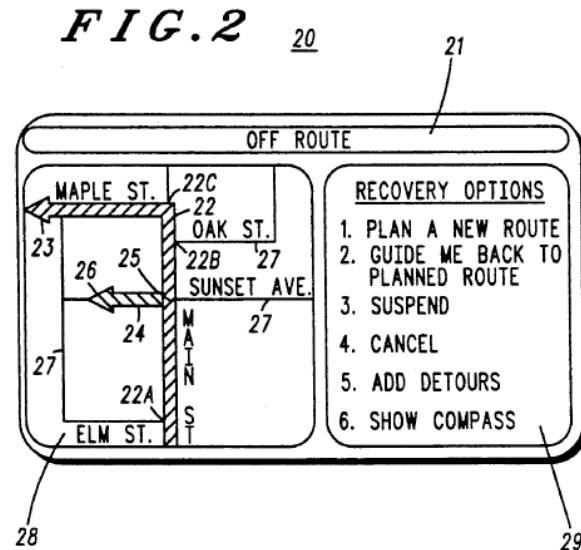
52. Navigation systems typically used a map matching technique to determine the user's position in relation to the calculated route. (Khavakh, EX1005 at 29:62-30:14; Lefebvre, EX1006 at 4:30-43, 7:42-65; RDX, EX1007 at 108-109, 142; AVIC-Z1, EX1016 at 182; EP '496, EX1017 at 8:37-46, 8:56-9:4.) Map matching allowed the navigation system to provide the user with driving instructions in advance of when a maneuver was required as part of the calculated guidance route. (Khavakh, EX1005 at 29:62-30:7; EP '496, EX1017 at 8:35-46.) Map matching also allowed the navigation system to determine when the user had deviated from the calculated guidance route. (Khavakh, EX1005 at 30:7-14; Lefebvre, EX1006 at 4:30-43, 7:42-65; EP '496, EX1017 at 9:35-10:9.)

53. Many navigation systems, after determining that the user had deviated from the calculated guidance route, would display an off route message to alert the user of the route deviation. These off route messages oftentimes included one or more user-selectable options for allowing the user to choose how to respond to the off route message, including an option to re-route the user back to the original destination and waypoints.

54. Lefebvre taught an off route display 20 that notified the user that he or she had deviated from the calculated guidance route and was off route, and provided

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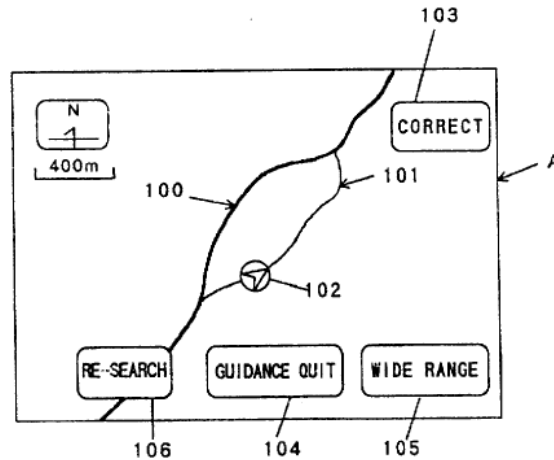
the user with several route “recovery options,” including options to “plan a new route” or “cancel” the route guidance. (Lefebvre, EX1006 at 4:62-5:58.)



(*Id.* at FIG. 2.)

55. Nimura also taught an off route screen “A” that included options to “re-search” for a new route or to quit the route guidance. (Nimura, EX1015 at 10:55-67.)

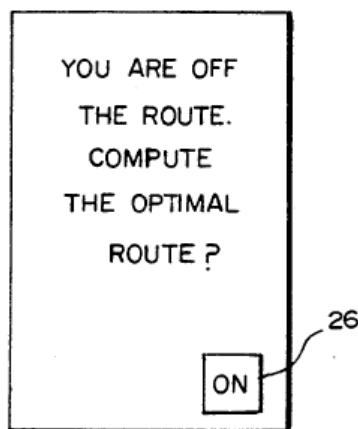
Fig.20



(*Id.* at FIG. 20.)

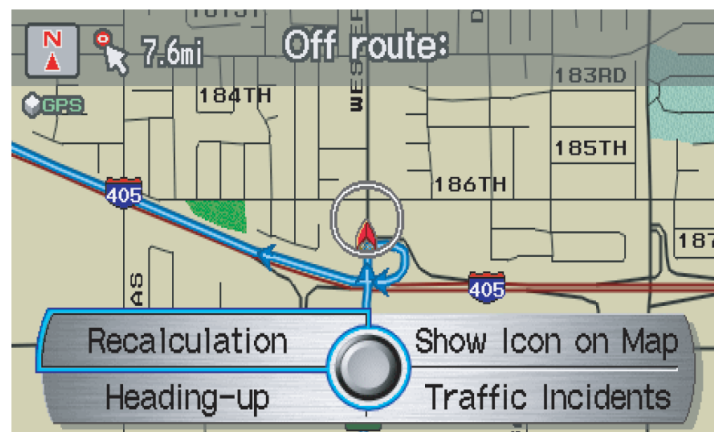
56. U.S. Patent No. 5,262,775 to Tamai et al. (“Tamai”) disclosed an off route message that read “You are off the route. Compute the optimal route?,” along with a touchscreen button 26 that, when pressed, caused a new route to be calculated. (Tamai, EX1014 at 5:67-6:27.)

FIG. 6B



(*Id.* at FIG. 6B.)

57. RDX also disclosed an “Off route” message that would appear at the top of the screen when the user deviated the calculated route, along with a user-selectable option to perform a route “Recalculation” to the destination and waypoints. (RDX, EX1007 at 67.)



(*Id.*)

58. Khavakh disclosed a navigation system that would “prompt[] the end-user to indicate whether he or she wants a new route (e.g., a re-route) to be calculated” when a route deviation was detected. (Khavakh, EX1005 at 30:17-20; *see also id.* at claim 9.)

59. It was also well-known in the art for navigation systems to wait until the user had deviated from the calculated route by a predetermined distance or more before displaying an off route message. Lefebvre taught an off route display 20 that

would be displayed when the user deviated from the calculated navigation route by a “predetermined distance.” (Lefebvre, EX1006 at 4:25-38.) Similarly, Nimura taught an off route screen “A” that would be displayed when the user deviated from the calculated route “by at least a predetermined distance.” (Nimura, EX1015 at 10:55-60; *see also id.* at 12:56-62.) The Pioneer AVIC-Z1 Operation Manual taught a reroute function that would not activate until the user had deviated by more than 0.01 mi from the calculated route. (AVIC-Z1, EX1016 at 197.)

60. One of the advantages of waiting until the user had deviated from the calculated route by a predetermined distance or more before displaying an off route message was that users, after making only a short deviation, could return to the originally calculated route themselves without interruption. (*See, e.g.,* Nimura, EX1015 at Abstract, 2:4-17, 13:38-42, 14:25-31, 15:1-10.)

VIII. OVERVIEW OF THE ‘971 PATENT

A. Priority Date (Earliest Effective Filing Date).

61. I understand from Counsel that the priority date (*i.e.*, the earliest effective filing date) of the ‘971 patent is April 2, 2008. I have, therefore, applied this date in considering the prior art and the viewpoint of a POSITA.

B. Overview Of The ‘971 Patent.

62. The ‘971 patent “relates to a navigation device that carries out route

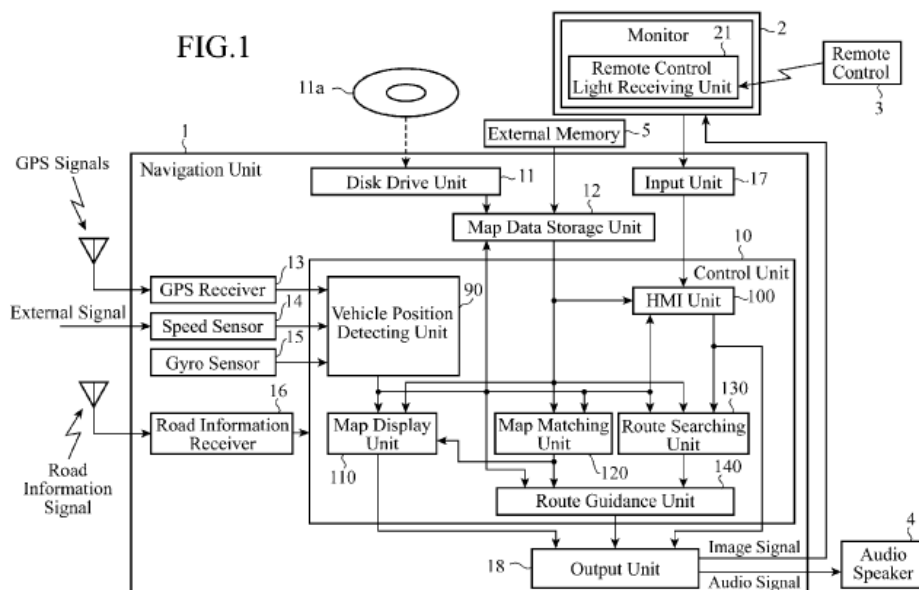
guidance of a route including waypoints acquired through a route search” and “to a technology of providing information suitable for users when a vehicle travels without passing via a waypoint on a route.” (‘971 patent, EX1001 at 1:5-10.) The navigation device comprises “a navigation unit 1, a monitor 2, ... an audio speaker 4, and an external memory 5.” (*Id.* at 2:62-67.) The navigation unit 1 “carries out processes including display of a map, a route search, display of a route, and route guidance.” (*Id.* at 3:1-3.) The monitor 2, which can be, for example, an LCD display, “displays a map, a vehicle position mark, a whole route to a destination, a route guidance view, and other various messages according to an image signal sent thereto from the navigation unit 1.” (*Id.* at 3:5-9.) Further, a remote control 3 and/or a touch panel on monitor 2 can be used to “input a waypoint and a destination, and respond to a message for urging the user to perform a certain operation.” (*Id.* at 3:14-23.)

63. The navigation unit 1 comprises, among other things, a control unit 10, an input unit 17, and an output unit 18. (*Id.* at 3:35-41.) The input unit 17 receives and analyzes an input signal and sends the result to the control unit 10. (*Id.* at 4:14-25.) The output unit 18 creates an image signal that is sent to the monitor 2 and an audio signal that is sent to the speaker 4. (*Id.* at 4:26-36, 5:39-47.) The control unit

10 (e.g., a microcomputer) controls the navigation unit 1 and comprises, inter alia, a route searching unit 130 and a route guidance unit 140. (*Id.* at 4:37-44.) “These components can be comprised of an application program that operates under the control of the microcomputer.” (*Id.* at 4:44-46.)

64. The route searching unit 130 searches for an optimal whole route leading from the current position of the vehicle to the destination. (*Id.* at 5:18-21, 7:26-31.) Route data showing the whole route is then sent to the route guidance unit 140. (*Id.* at 5:26-29, 7:32-34.) “The route guidance unit 140 creates both drawing data for displaying a route guidance view on the screen of the monitor 2 and audio data for outputting a route guidance message via voice ... and sends the drawing data and the audio data to the output unit 18.” (*Id.* at 5:30-38; see also *Id.* at 7:35-44.)

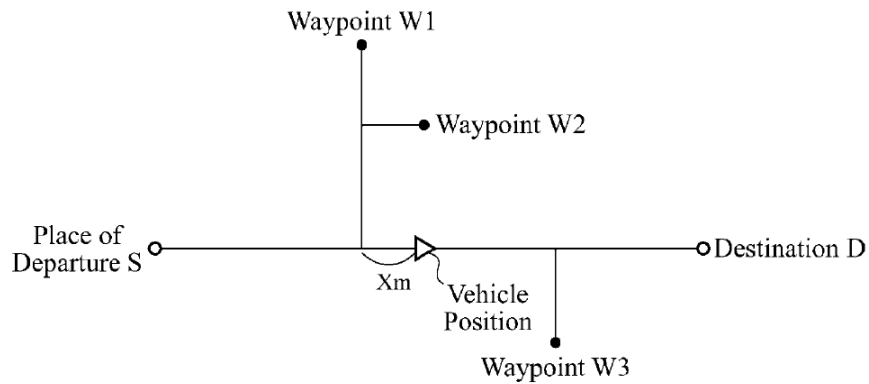
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(*Id.* at FIG. 1.)

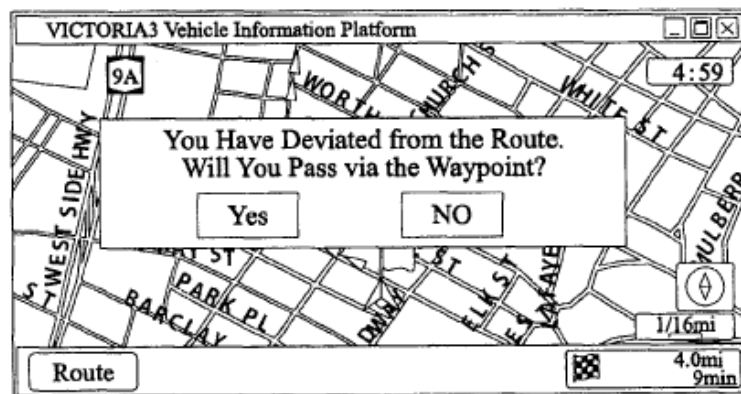
65. In one example of the operation of the ‘971 patent’s navigation device, a vehicle traveling along a route comprising departure point “S,” waypoints W1-W3, and destination “D” deviates from the portion of the route leading to first next waypoint W1 by a predetermined distance of “X” meters. (*Id.* at 5:48-63, 8:22-31.)

FIG.2



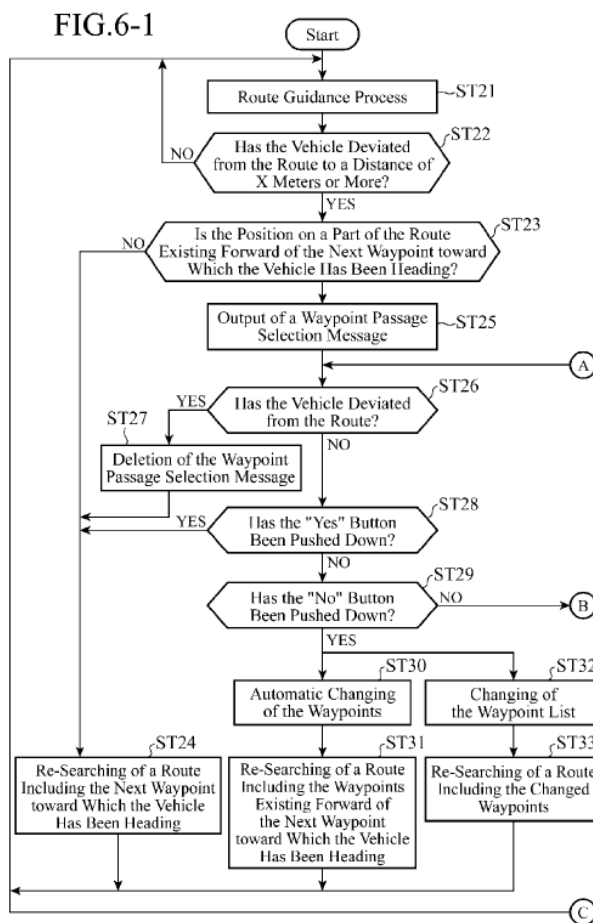
(*Id.* at FIG. 2.)

66. When the route guidance unit 140 determines that the vehicle has deviated from the route by the predetermined distance and that the vehicle is on the route after the first next waypoint (*i.e.*, waypoint W1), the output unit 18 outputs a “message” showing that the vehicle has deviated from the route. (*Id.* at 8:36-45, 8:60-67.) An example of the “message” is shown below:



(*Id.* at FIG. 7.)

67. In response to the output unit 18 displaying the “message,” a command indicating whether or not to travel via the first next waypoint W1 may be input into the navigation device using the input unit 17. (*Id.* at 9:24-37, 9:46-67.) Depending on the command, the navigation device can either re-search for a route including the first next waypoint W1 or can re-search for a route to the destination skipping the first next waypoint W1. (*Id.*)



(*Id.* at FIG. 6-1.)

C. The Prosecution History Of The ‘971 Patent.

68. On October 15, 2012, the Examiner issued a non-final office action rejecting pending claims 1-18 as obvious over Sugiura (U.S. Patent App. Pub. No. 2004/0044464) in view of Hayashida (U.S. Patent No. 5,926,118). (‘971 patent Prosecution History, EX1002 at 471.) In response, the Applicant argued that Sugiura and Hayashida do not teach or suggest displaying a “message” showing that a vehicle has deviated from a route. (*Id.* at 505, 507.) The Applicant also argued that there is no evidence that Hayashida teaches inputting a command to indicate whether or not to travel via a first next waypoint in response to an off route or route deviation message. (*Id.* at 507.) The Applicant also added new independent method claim 19 that tracked pending independent claim 1. (*Id.* at 500-501.)

69. On April 16, 2013, the Examiner issued a second non-final office action that included a restriction requirement between pending claims 1-18 and claim 19. (*Id.* at 516-517.) In response, the Applicant amended claim 19 to make it more consistent with claim 1 and argued that Examiner should withdraw the restriction requirement in view of the amendment to claim 19. (*Id.* at 526-529.)

70. The Examiner subsequently withdrew the restriction requirement (*id.* at 536) and issued a Notice of Allowance (*Id.* at 581). According to the Examiner’s

Reasons for Allowance, the prior art of record failed to teach or suggest a navigation device and method comprising “outputting a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading ... and inputting a command indicating whether or not to travel via said first next waypoint in response to the message outputted by said output unit.” (*Id.* at 590.)

D. The Challenged Claims.

71. I have been asked to analyze Challenged Claims 1-4, 7-12, 14, 16-17, and 19 of the ‘971 patent.

72. The Challenged Claims include two independent claims: 1 and 19. (‘971 patent, EX1001 at claims 1, 19.) Challenged Claim 1 is directed to an apparatus (*i.e.*, a “navigation device”), while Challenged Claim 19 is directed to a method performed using the apparatus of Challenged Claim 1. (*Id.*)

73. Independent Challenged Claims 1 and 19 are reproduced below:

1. A navigation device comprising:

a setting unit configured to set waypoints and a destination;

a route searching unit configured to search for a whole route leading to the destination via the waypoints set by said setting unit;

a route guidance unit configured to carry out route guidance according to the whole route which is searched for by said route searching unit;

an output unit configured to output a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when said route guidance unit determines that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint; and

an input unit configured to input a command indicating whether or not to travel via said first next waypoint in response to the message outputted by said output unit.

(*Id.* at claim 1.)

19. A navigation method performed by utilizing a navigation apparatus, comprising:

setting, by utilizing a setting unit of the navigation apparatus, waypoints and a destination;

searching, by utilizing a route searching unit of the navigation apparatus, for a whole route leading to the destination via the waypoints set by said setting step;

carrying out, by utilizing a route guidance unit of the navigation apparatus, route guidance according to the whole route which is searched for by said route searching step;

outputting, by utilizing an output unit of the navigation apparatus, a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when, by said route guidance

step, it is determined that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint; and

inputting, by utilizing an input unit of the navigation apparatus, a command indicating whether or not to travel via said first next waypoint in response to the outputted message.

(*Id.* at claim 19.)

74. As shown above and in EX1008, there are no material differences between independent Challenged Claims 1 and 19.

E. Claim Construction.

75. I understand that the Challenged Claims are to be read in light of the ‘971 patent’s specification, and that the claims themselves often provide guidance as to the meaning of a particular term. I also understand that extrinsic evidence may be helpful when construing a claim term, but that it is less relevant than the intrinsic evidence.

76. For purposes of this IPR, I believe no specific constructions are required. The Challenged Claims use terms and phrases that would have been easily understood by a POSITA, and the prior art discussed herein discloses, teaches, and suggests the limitations of the Challenged Claims under their plain and ordinary meanings.

IX. OVERVIEW OF THE PRIOR ART

A. Khavakh (EX1005).

77. Khavakh was issued on May 30, 2006. (Khavakh, EX1005 at [45].) I understand that Khavakh is prior art to the '971 patent. I understand that Khavakh was not cited during prosecution of the '971 patent.

78. Khavakh is directed to a navigation system 10 that is installed in a vehicle 11, such as a car or truck. (Khavakh, EX1005 at 3:36-38.) The navigation system 10 includes, among other things, a processor 12, a memory storage device 16 for storing a navigation software program 18, and a user interface 31 for allowing the user to input information into the navigation system, such as a request for a route to a desired destination. (*Id.* at 3:47-53, 4:8-13.) The user may also specify one or more intermediate waypoints for the route to pass through. (*Id.* at 9:39-47, 10:57-60, 12:12-18.)

79. Once the destination and intermediate waypoint(s) have been specified, a route calculation tool 40 calculates an entire solution route from the origin to the destination passing through all the intermediate waypoints. (*Id.* at 6:15-18, 13:56-61, 22:55-23:3, 29:41-43, 32:35-54.) A route guidance tool 91 then guides the user to the intermediate waypoint(s) and destination according to the calculated solution

route. (*Id.* at 5:49-58, 7:16-22, 17:37-44, claim 8.)

80. Khavakh further discloses an “improved rerouting feature” that “may be used when the vehicle in which the navigation system is installed departs from the originally calculated solution route as the vehicle is traveling.” (*Id.* at 29:35-40.) The rerouting feature of the route calculation tool 40 is implemented when, for example, the navigation system detects that the vehicle is no longer traveling in the proper direction on the roads represented by the solution route. (*Id.* at 29:54-62, 30:7-14.) In one embodiment, the rerouting feature may “prompt[] the end-user to indicate whether he or she wants a new route (e.g., a re-route) to be calculated.” (*Id.* at 30:17-20; *see also id.* at claim 9.) If the user indicates that he or she wants a re-route to be calculated, the navigation system may, in one example, calculate a route back to the original route. (*Id.* at 34:3-8.)

81. Khavakh is in the same field of endeavor as the ‘971 patent: navigation devices that carry out route guidance. Khavakh is also at least reasonably pertinent to a problem addressed by the ‘971 patent: allowing the user to determine how to respond to an off route or route deviation condition. (‘971 patent, EX1001 at 1:5-10, 1:48-62; Khavakh, EX1005 at 1:17-18, 3:36-44, 30:17-20, claim 9.)

B. Lefebvre (EX1006).

82. Lefebvre was issued on September 7, 1993. (Lefebvre, EX1006 at

[45].) I understand that Lefebvre is prior art to the ‘971 patent. I understand that Lefebvre was not cited during prosecution of the ‘971 patent.

83. Lefebvre is directed to a land vehicle navigation apparatus 10 that includes a navigation computer 11. (Lefebvre, EX1006 at 2:58-61.) In response to input commands from an input keyboard device 12, the navigation computer 11 computes a navigation route between the present vehicle location and the desired destination location specified by the input device 12. (*Id.* at 2:65-3:1, 3:25-30, 6:27-37.) The user may also specify one or more intermediate destinations (*i.e.*, waypoints) for the route to pass through. (*Id.* at 7:34-37.) “After computing a desired navigation route, the navigation computer 11 will then implement both audible and visual navigation guides to the vehicle operator to guide the vehicle to the destination along the calculated route.” (*Id.* at 3:30-34.)

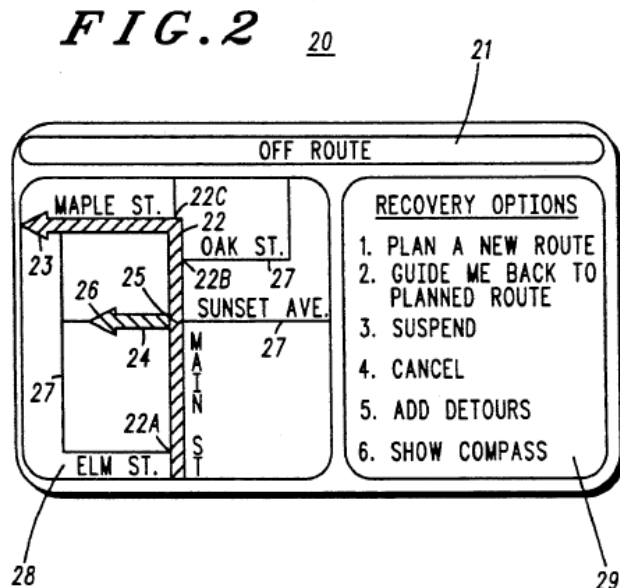
84. Lefebvre’s navigation apparatus 10 further includes means for detecting an off route condition in accordance with predetermined off route criteria. (*Id.* at 4:25-38, claims 6, 16, 23, 32, and 35.) “This ‘off route criteria’ can correspond to the estimated current vehicle position differing by more than a predetermined amount of distance from the desired navigation route.” (*Id.* at 4:25-38.)

85. When Lefebvre’s navigation computer 11 detects an off route

condition, an off route display 20 is produced on the color display 16. (*Id.* at 4:62-5:4.) The off route display 20 includes an “OFF ROUTE” text heading which identifies the display as an off route display and visually indicates to the driver that he or she is off route. (*Id.*) The off route display 20 may also include a visual indication of the desired direction of travel along the calculated navigation route and a visual indication of the actual vehicle travel route in a contrasting color. (*Id.* at 5:5-19.)

86. The off route display 20 also includes a recovery option table 29 that lists different recovery options, each of which represents a different manner of off route navigation recovery which can be selected by the vehicle operator by means of the input device 12. (*Id.* at 5:45-54.) The user may select an option to guide the user back to the current navigation route, or, in cases where the user intentionally deviated from the navigation route, the user may select options to suspend or cancel the route guidance. (*Id.* at 9:67-10:59.) An example of Lefebvre’s off route display 20 is shown below:

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(*Id.* at FIG. 2, 2:48-50.)

87. Lefebvre is in the same field of endeavor as the '971 patent: navigation devices that carry out route guidance. Lefebvre is also at least reasonably pertinent to a problem addressed by the '971 patent: allowing the user to determine how to respond to an off route or route deviation condition. ('971 patent, EX1001 at 1:5-10, 1:48-62; Lefebvre, EX1006 at 1:6-12, 2:26-40.)

C. RDX (EX1007).

88. RDX is a printed publication that I understand was publicly accessible no later than September 13, 2007. (Decl. of Hall-Ellis, EX1012, ¶¶ 18-23.) I understand that RDX is prior art to the '971 patent. I understand that RDX was not cited during prosecution of the '971 patent.

89. RDX is generally directed to a GPS-based vehicular “navigation system.” (RDX, EX1007 at 5.) RDX’s navigation system calculates a route to a user-entered destination and “provides map and voice guidance” as the user drives. (*Id.* at 6.) RDX’s navigation system is also capable of setting one or more intermediate waypoints along a calculated route to a destination. (*Id.* at 71.) “Waypoints are routed to in the order they were entered (number 1 first, etc.), with [the] final destination routed to last.” (*Id.*) “When [the user] enter[s] waypoints, they appear on the map screen as small red flags numbered 1-5.” (*Id.*) RDX’s navigation system also allows the user to delete waypoints. (*Id.* at 72.) When a waypoint is deleted, the “route is re-calculated to reflect the changes [the user] made to the waypoint(s).” (*Id.*)

90. If the user leaves the calculated route while driving, RDX’s navigation system will generate an “Off route” message that appears at the top of the display along with an option to perform a “Recalculation.” (*Id.* at 67; *see also id.* at 91.) If the user selects the “Recalculation” option from the displayed menu, RDX’s navigation system “will recalculate the route from [the] current location and direction to the desired destination then give [the user] a new route instruction.” (*Id.*)



(*Id.* at 67.)

91. RDX is in the same field of endeavor as the '971 patent: navigation devices that carry out route guidance. RDX is also at least reasonably pertinent to a problem addressed by the '971 patent: allowing the user to determine how to respond to an off route or route deviation condition. ('971 patent, EX1001 at 1:5-10, 1:48-62; RDX, EX1007 at 5-6, 67, 91.)

X. ANALYSIS

A. Ground 1: Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Renders Obvious Challenged Claims 1-2, 7-12, 16-17, And 19.

1. Motivation to Combine Khavakh With Lefebvre.

92. Khavakh is directed to a navigation system 10 that is installed in a vehicle 11, such as a car or truck. (Khavakh, EX1005 at 3:36-38.) The navigation

system 10 includes, among other things, a navigation software program 18 and a user interface 31 for allowing the driver to input information into the navigation system, such as a request for a route to a desired destination. (*Id.* at 3:47-53, 4:8-13.) The driver may also specify one or more intermediate waypoints for the route to pass through. (*Id.* at 9:39-47, 10:57-60, 12:12-18.)

93. Khavakh's navigation program 18 includes a route guidance tool 91 for guiding the driver along a calculated route to the desired intermediate waypoints and destination. (*Id.* at claim 8, 5:25-32, 5:49-58, 7:16-22, 17:37-44.) Khavakh's user interface 31 includes a display 27 for displaying a map and driving instructions to the driver. (*Id.* at 4:19-22, 29:64-30:7.)

94. Khavakh discloses "an improved rerouting feature" that is activated when it is determined that "the vehicle in which the navigation system is installed departs from the originally calculated solution route as the vehicle is traveling." (*Id.* at 29:35-40, 29:54-62, 30:7-14, claim 9.) When the rerouting feature is activated, Khavakh's navigation system "prompts the end-user to indicate whether he or she wants a new route (*e.g.*, a re-route) to be calculated." (*Id.* at 30:17-20, claim 9.) When a vehicle implementing Khavakh's navigation system departs from the calculated solution route, a deviation is detected and Khavakh "prompts" the driver

because the vehicle is no longer following the originally calculated solution route. (*Id.* at 29:35-40, 29:54-62, 30:7-14, claim 9.) Khavakh does not specify the format or content of the driver prompt, or how the prompt is presented to the driver. (*Id.*)

95. In the same field of endeavor, Lefebvre discloses a land vehicle navigation apparatus 10 that includes a navigation computer 11. (Lefebvre, EX1006 at 2:58-61.) Lefebvre's navigation computer 11 computes a navigation route passing through one or more intermediate waypoints and a destination specified by the driver using an input device 12. (*Id.* at 2:65-3:1, 3:25-30, 6:27-37, 7:34-37.) "After computing a desired navigation route, the navigation computer 11 will then implement both audible and visual navigation guides to the vehicle operator to guide the vehicle to the destination along the calculated route." (*Id.* at 3:30-34.)

96. When Lefebvre's navigation computer 11 detects an off route condition, an off route display 20 is produced on display 16. (*Id.* at 4:62-5:4, FIG. 2.) The off route display 20 includes an "OFF ROUTE" text heading which identifies the display as an off route display and visually indicates to the driver that he or she is off route. (*Id.*) The off route display 20 also includes a visual indication of the desired direction of travel along the calculated navigation route and a visual indication of the actual vehicle travel route in a contrasting color. (*Id.* at 5:5-19.)

97. Off route display 20 also includes a recovery option table 29 that lists different recovery options, each of which represents a different manner of off route navigation recovery, which can be selected by the vehicle operator by means of the input device 12. (*Id.* at 5:45-54.) The driver may select, for example, an option to guide the driver back to the current navigation route, or, in cases where the driver intentionally deviated from the navigation route, the driver may select an option to suspend or cancel the route guidance. (*Id.* at 9:67-10:59.)

98. A POSITA would have been motivated to implement Khavakh's driver prompt in the form of Lefebvre's off route display 20 output on Khavakh's display 27.

99. Prior to the alleged invention of the '971 patent, one of the well-known problems in the field of vehicle navigation systems was "how to rapidly convey to the vehicle operator sufficient navigation information, and how this can be achieved without causing any excessive distraction of the vehicle operator while he is driving the vehicle." (Lefebvre, EX1006 at 1:45-50.) As Lefebvre explains, some prior art navigation displays were undesirably complex and required a lengthy comprehension time for the vehicle driver, potentially causing the driver to be dangerously distracted. (*Id.* at 1:54-59.) On the other hand, some prior art

navigation displays were overly simple (*e.g.*, just illustrating desired turns) and provided insufficient information to the driver, especially if the driver deviated from the planned navigation route. (*Id.* at 1:59-63.)

100. As Lefebvre states, while it was often necessary and/or desirable to advise drivers that they have deviated from the planned navigation route, prior art systems that advised the operator that they are off route “typically [did] not take into account that sometimes the operator may require additional navigation instructions with regard to resuming his previous route and/or sometimes the vehicle operator may intentionally deviate from the previous route but wants to resumes the route with or without some modification at a later time.” (*Id.* at 1:64-2:5.) “In other words, prior systems [did] not sufficiently take[] into account the various reasons why an off course condition occurs, and therefore [did] not provide sufficient options to the driver with regard to recovering, in an efficient manner, from an off course condition.” (*Id.* at 2:5-10.)

101. Prior art systems also “fail[ed] to visually indicate to the vehicle operator, in a short time comprehension format, his deviation from the previously calculated route..., [did] not provide the vehicle operator with a plurality of operator selectable recovery options, and [did] not advise the operator what recovery options

are available.” (*Id.* at 3:56-66; *see also id.* at 2:10-12, 4:9-12.) “Typically, the only the options provided to the operator [were] either his resumption of the previous route within a specified amount of vehicle travel, or, if that does not occur, the automatic cancellation of the previous calculated route or the calculation of a new route.” (*Id.* at 3:66-4:3.) “This [did] not adequately take into account the desires of the vehicle operator which may be to be request guidance information from the navigation computer to guide him back to the previous route or to modify the previous route or plan a new route from his current position rather than trying to resume the previous calculated route.” (*Id.* at 4:3-9.)

102. Lefebvre teaches that its off route display 20 solves the above problems by: (i) visually providing navigation information to the driver in a format that takes a minimal amount of time to comprehend while still providing sufficient information to the driver; (ii) allowing the driver to efficiently select how they want to respond to a detected off route condition; and (iii) providing the driver recovery flexibility by offering the driver a plurality of route recovery options. (*Id.* at 2:31-40, 4:13-24, 5:54-58, 8:15-30, 11:51-55.) Each of these benefits of Lefebvre’s off route display 20 advantageously increases driver safety, optimizes information exchange with the driver, provides driver convenience, and enhances driver time management and

system operational efficiency.

103. A POSITA would have found each of the above benefits of Lefebvre's off route display 20 to be highly desirable and would have been motivated to implement Khavakh's prompt in the form of Lefebvre's off route display 20 to take advantage of each of these highly desirable benefits.

104. A POSITA also would have found it obvious to present Lefebvre's off route display 20 on Khavakh's display 27 because Lefebvre's off route display 20 is a visual display that is intended to be visually presented to the driver on a screen such as Khavakh's display 27. (Lefebvre, EX1006 at 3:36-38, 4:62-64, FIGS. 1-2; Khavakh, EX1005 at 4:19-22, 30:1-7.) Additionally, a POSITA would have known that an audible off route alert, alone, would provide insufficient information to the driver to fully understand the nature of the deviation and what kind of correction would be needed (or desired), both of which are problems that Lefebvre's off route display 20 solves. An off route display, as disclosed in Lefebvre, is able to provide significantly more information in an easier to comprehend format than an audible alert alone (*e.g.*, a picture is worth a thousand words).

105. A POSITA would have been further motivated to implement Khavakh's prompt in the form of Lefebvre's off route display 20 because the

proposed combination would have involved the mere application of a known technique (*i.e.*, displaying Lefebvre's off route display 20 when the driver deviates from the calculated route) to a piece of prior art (*i.e.*, Khavakh's system that "prompts" the driver when he or she deviates from the originally calculated solution route) that is ready for the improvement. Khavakh's system is nearly identical to, and functions in the same way as, Lefebvre's system because both systems provide an indication to the driver that he or she has deviated from a calculated route when a route deviation is detected, and both systems provide the driver with at least one option for responding to the route deviation. (Khavakh, EX1005 at 30:17-20, claim 9; Lefebvre, EX1006 at 4:62-5:1, FIG. 2.) Lefebvre provides details regarding the format and content of the driver prompt that are missing from Khavakh.

106. A POSITA would have had a reasonable expectation of success in implementing Khavakh's prompt in the form of Lefebvre's off route display 20. A POSITA would have known that implementing Khavakh's prompt in the form of Lefebvre's off route display 20 would have required routine, straightforward adjustments to the programming in Khavakh's navigation system. A POSITA also would have recognized that Khavakh already discloses the hardware for implementing Lefebvre's off route display 20, including a memory, a processor, and

a display. (Khavakh, EX1005 at 3:47-60, 4:19-21.) Further, as discussed above, Khavakh's and Lefebvre's systems operate in essentially the same way, with Lefebvre simply providing details regarding the format and content of a driver prompt that are missing from Khavakh.

107. In addition to the above, a POSITA would have been further motivated to modify Khavakh in view of Lefebvre to output Lefebvre's off route display 20 when Khavakh's system determines that the vehicle has deviated from the calculated route to a predetermined distance or more.

108. Prior art navigation systems, including both Khavakh's and Lefebvre's systems, typically used "map matching" to detect deviations from a calculated route. (Khavakh, EX1005 at 29:57-30:14; Lefebvre, EX1006 at 4:39-43, 7:42-53, 7:56-65; EP '496, EX1017 at 9:35-10:9.) "Map matching" worked by comparing the sensed vehicle location with road map data stored in memory. (*Id.*) If the sensed vehicle location did not correspond to a road segment which is part of the calculated route, or if the sensed vehicle heading did not correspond to the correct vehicle heading for proceeding along the calculated route, then an off route condition would be determined. (*Id.*)

109. To sense the vehicle's current location, both Khavakh's and Lefebvre's

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navigation systems include a positioning system that utilizes GPS and/or dead reckoning technology. (Khavakh, EX1005 at 3:61-64; Lefebvre, EX1006 at 7:14-16.) Prior to the alleged invention of the '971 patent, it was well-known that GPS and dead reckoning-based navigation systems had inherent accuracy limitations. (See, e.g., RDX, EX1007 at 102, 110; AVIC-Z1, EX1016 at 181-183, 186; Chao, EX1020 at [0040], [0046].) At the time, “most GPS receivers [could] provide position information accurate to within a range of approximately 50 meters, i.e., an inaccuracy of around 50 meters.” (Chao, EX1020 at [0046]; *see also* RDX, EX1007 at 110 (noting that positioning errors can be up to several hundred feet).) The accuracy of these systems was known to decrease even further in certain environments, such as in urban areas or in adverse weather conditions. (RDX, EX1007 at 102, 110; Chao, EX1020 at [0040], [0046].) Due the inherent accuracy limitations in prior art positioning systems, navigation systems would sometimes incorrectly show the driver as traveling on an entirely different street. (RDX, EX1007 at 102; Chao, EX1020 at [0046].)

110. To account for the inherent accuracy limitations of GPS and dead reckoning technology, navigation systems such as Lefebvre’s navigation apparatus 10 included means for detecting an off route condition “in accordance with

predetermined off route criteria.” (Lefebvre, EX1006 at 4:25-38, claims 6, 16, 23, 32, and 35.) This “off route criteria” corresponded to the estimated current vehicle position differing by a predetermined distance or more from the desired navigation route. (Lefebvre, EX1006 at 4:25-38; *see also* Nimura, EX1015 at 10:55-60, 12:56-62; AVIC-Z1, EX1016 at 197; Chao, EX1020 at [0040].) By requiring the current vehicle position to differ by a predetermined distance or more from the desired navigation route before establishing an off route condition (preferably a distance greater than the positioning system’s typical margin of error), systems such as Lefebvre’s helped avoid the undesirable scenario where the navigation system erroneously alerts the driver of an off route condition. (*See, e.g.*, Chao, EX1020 at [0039]-[0040].) A POSITA would have found such a scenario to be highly undesirable, particularly in systems such as Khavakh’s and Lefebvre’s that output a message when an off route condition is detected, because an erroneous off route message would unnecessarily distract, confuse, and frustrate the driver, and could cause the driver to incorrectly deviate from a route that he or she was correctly following. (*Id.*; *see also* RDX, EX1007 at 110.)

111. Requiring the current vehicle position to differ by a predetermined distance or more from the desired navigation route before alerting the driver of an

off route condition had an additional, well-known benefit. In the case where the driver deviates from the calculated route by a short distance (*e.g.*, misses a turn) and realizes his or her mistake quickly, the driver could correct his or her course back onto the calculated route without being notified of an off route condition (assuming the deviation was less than the predetermined distance). (*See, e.g.*, Nimura, EX1015 at Abstract, 2:4-17, 13:38-42, 14:25-31, 15:1-10.) This desirably prevented the driver from being unnecessarily distracted with an off route message when the driver was already aware that he or she had deviated from the calculated route. (*Id.*)

112. A POSITA would have been motivated to further modify Khavakh in view of Lefebvre to output Lefebvre's off route display 20 when Khavakh's system determines that the vehicle has deviated from the calculated route to a predetermined distance or more to desirably: (i) account for the inherent accuracy limitations of Khavakh's positioning system 24; (ii) help prevent erroneous off route messages and to avoid the distraction, confusion, and frustration that such erroneous off route messages create; and (iii) allow the driver to correct his or her course without being notified of an off route condition when the driver realizes his or her mistake quickly.

113. A POSITA would have had a reasonable expectation of success in further modifying Khavakh in view of Lefebvre to output Lefebvre's off route

display 20 when Khavakh's system determines that the vehicle has deviated from the calculated route to a predetermined distance or more. A POSITA would have known the proposed modification would have required routine, straightforward adjustments to the programming in Khavakh's navigation system (*i.e.*, simply incorporating a predetermined distance into Khavakh's logic for outputting an off route prompt). Khavakh's and Lefebvre's systems operate in essentially the same way, with both systems detecting off route conditions using a map matching technique. (Khavakh, EX1005 at 29:57-30:14; Lefebvre, EX1006 at 4:39-43, 7:42-53, 7:56-65.)

114. A POSITA would have been motivated to modify Khavakh in view of Lefebvre to (i) output Lefebvre's off route display 20 on Khavakh's display 27 when (ii) Khavakh's system determines that the vehicle has deviated from the calculated route to a predetermined distance or more.

2. Challenged Claims 1 And 19.

115. There are no material differences between Challenged Claims 1 and 19. (Claims 1 and 19 Comparison, EX1008.) While my analysis below first focuses on the limitations of Challenged Claim 19 (a method of using the apparatus of Challenged Claim 1), my analysis applies equally to the limitations of Challenged Claim 1 (an apparatus claim).

116. As discussed below, Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious Challenged Claim 1 and Challenged Claim 19.

a) Khavakh Discloses “A navigation method performed by utilizing a navigation apparatus” And “A navigation device.”

117. Regardless of whether the preambles of the Challenged Claims are limiting, Khavakh discloses a “navigation method performed by utilizing a navigation apparatus” (“limitation [19-PRE]”) and “a navigation device” (“limitation [1-PRE]”).

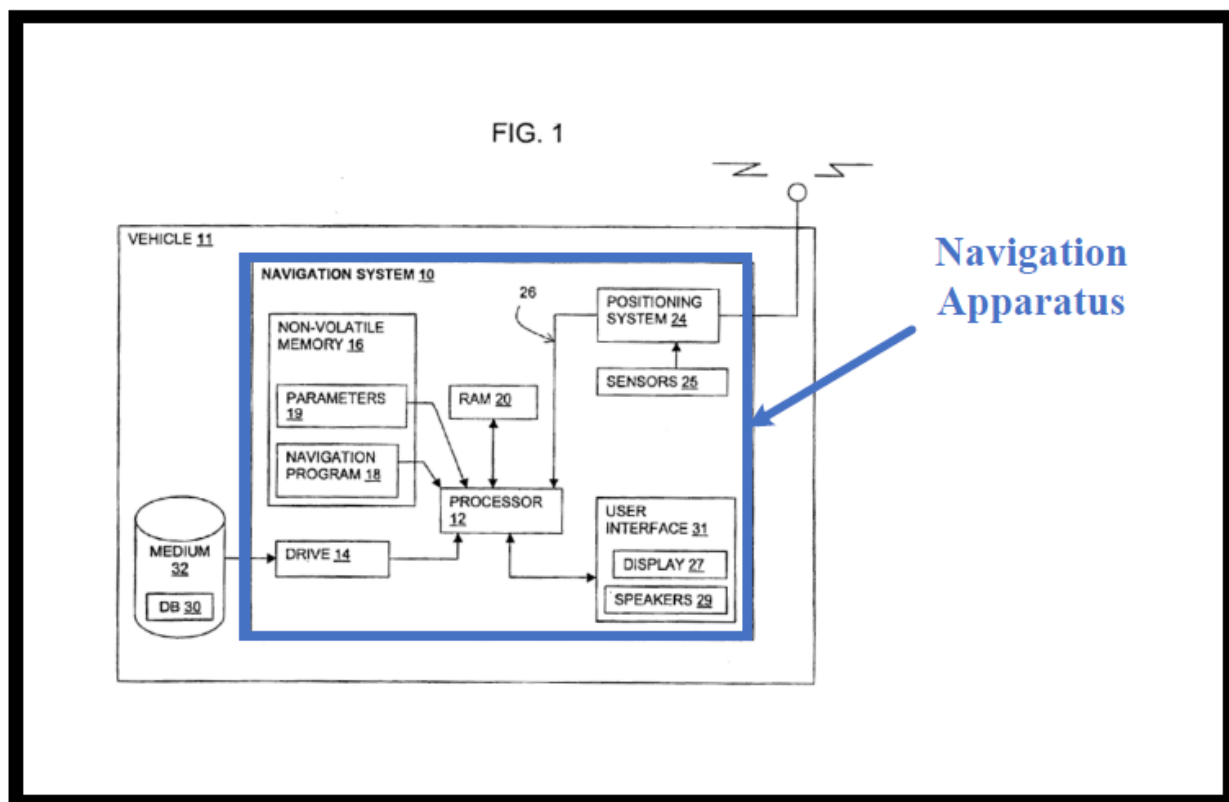
118. Khavakh discloses a navigation system 10 that is installed in a vehicle 11, such as a car or truck. (Khavakh, EX1005 at 3:36-38 (“Referring to FIG. 1, there is a block diagram of a navigation system 10. The navigation system 10 is installed in a vehicle 11, Such as a car or truck...”).)

119. Khavakh discloses that the navigation system 10 is a “combination of hardware and software components” that includes, among other things, a processor 12 and a navigation software program 18. (*Id.* at 3:47-53 (“Referring to the embodiment illustrated in FIG. 1, the navigation system 10 is a combination of hardware and software components. In one embodiment, the navigation system 10 includes a processor 12, a drive 14 connected to the processor 12, and a nonvolatile

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memory storage device 16 for storing a navigation software program 18, as well as other information, such as configuration parameters 19.”.)

120. Khavakh’s navigation system 10 is an apparatus (or device), and thus a POSITA would have understood that it is a “navigation apparatus” (or “navigation device”).



(Khavakh, EX1005 at FIG. 1 (annotated).)

121. Khavakh also discloses a navigation method performed using navigation system 10 (*i.e.*, the navigation apparatus) that includes, among other

things, calculating a solution route for the vehicle to travel and providing the driver with guidance for following the solution route to a destination. (*Id.* at claim 1, claim 8, 1:17-18, 2:25-29, 5:35-43, 7:16-22, 17:37-44.)

122. Khavakh discloses limitation [19-PRE]. While Challenged Claim 1 recites a “navigation device” and Challenged Claim 19 recites a “navigation apparatus,” there are no differences between the claimed “navigation device” and “navigation apparatus.” (‘971 patent, EX1001 at claims 1, 19.) For the reasons discussed above, Khavakh also discloses limitation [1-PRE].

b) Khavakh Discloses “setting, by utilizing a setting unit of the navigation apparatus, waypoints and a destination” And “a setting unit configured to set waypoints and a destination.”

123. Khavakh discloses “setting, by utilizing a setting unit of the navigation apparatus, waypoints and a destination” (“limitation [19a]”) and “a setting unit configured to set waypoints and a destination” (“limitation [1a]”).

124. Khavakh discloses that navigation program 18—which is part of navigation system 10 (*i.e.*, the navigation apparatus)—includes a navigation application 47 that creates waypoint objects 100. (Khavakh, EX1005 at 8:35-50 (“FIG. 11 shows the data included in a waypoint object 100. The waypoint objects 100 are formed or created by the navigation application 47 that provides the

waypoint objects 100 to the route calculation tool 40. Alternatively, the waypoint objects 100 may be provided by one or more other programs or routines that are part of the navigation program 18 that create the waypoint objects 100 and provide them to the navigation application 47, which in turn provides them to the route calculation tool 40. (In an alternative embodiment, the waypoint objects 100 may be provided by a program outside of the navigation program 18 or even outside of the navigation system 10. In one present embodiment, the waypoint object is created by the navigation application, but it uses one or more functions in the route calculation tool to do it. The contents of the waypoint object may therefore be opaque to the application.)”).)

125. “A waypoint object 100 is a data structure used to represent a waypoint,” such as a route origin and route destination, as well as one or more intermediate waypoints between the origin and destination. (*Id.* at 8:23-24 (“A waypoint object 100 is a data structure used to represent a waypoint.”), 8:27-34 (“In order to calculate a route, the route calculation tool 40 requires at least two waypoint objects 100, one that represents the waypoint corresponding to the origin and another that represents the waypoint corresponding to the destination. One or more additional waypoint objects 100 may be provided to the route calculation tool 40 to

represent waypoints corresponding to one or more intermediate locations between the origin and destination.”), 10:12-15 (“Waypoint objects 100 are used to represent the origin of the route, the destination of the route, and any intermediate locations along the route.”), 12:12-18 (“As mentioned above, the waypoint objects 100 provided to the route calculation tool 40 include at least two waypoint objects 100, one that represents an origin and one that represents a destination. Additional waypoint objects 100 may be provided to the route calculation tool to represent intermediate stops that the end-user desires to make along the way between the origin and the destination.”).)

126. Navigation application 47 creates waypoint objects 100 using navigation position objects 56 that contain information about a location (*e.g.*, a street address, a point-of-interest, a crossroad, or some other location representing a desired destination or intermediate waypoint) derived from the user via a user interface 31. (*Id.* at 8:52-65 (“Referring again to FIG. 4, in one embodiment, the navigation application 47 uses some or all of the information in navigation position objects 56 to create the waypoint objects 100. In one embodiment, a geocoding tool 90 creates the navigation position objects 56 which are provided to the navigation application 47. The geocoding tool 90 may create the navigation position objects 56,

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in part, from information 57 provided to it from the navigation application 47. For example, this information 57 may include coordinates or other information derived from input from the end-user via the user interface 31 (of FIG. 1). This input information may include, for example, a street address, a point-of-interest, crossroad, or some other location representing a desired destination, or a desired intermediate location.”), 9:7-15 (“FIG. 9 is a diagram illustrating the structure for a navigation position object 56. Referring to FIG. 9, the navigation position object 56 is a data structure that contains information about a location in terms of data in the geographic database 40. This position may be expressed as a locus data structure 92 (described below). Alternatively, the position may be expressed in various other ways. In addition to the locus data 92, the navigation position object 56 may include geographic coordinate data 93 (e.g., latitude, longitude) associated with the locus 92.”), 9:39-58 (“Referring to FIGS. 4, 9, and 10, the geocoding tool 90, or a similar program, translates origin/destination information into the locus data structure 92, or similar data structure, and provides this locus data 92 in navigation position objects 56 to the navigation application 47. The origin/destination information may be derived from input from the end-user via the user interface 31 (of FIG. 1). For example, the end-user may input a destination of ‘300 South Wacker Drive, Chicago

Ill.’ The geocoding program 90, or some other program that it may utilize, determines that the specified address is located at position Y along segment X and is on the left-hand side of segment X in order to form the locus data structure. The geocoding program 90 stores this locus information 92 in a navigation position object 56 which is provided to the navigation application 47. Once the navigation application 47 receives the locus information 92 in the navigation position object 56, it uses the locus information 92 to create a waypoint object 100 which is provided to the route calculation tool 40 in order to perform a route calculation.”), 10:27-30 (“Using the navigation position objects 56, as well as other information, the navigation application 47 forms at least two waypoint objects 100 which are provided to the route calculation tool 40.”).)

127. After navigation application 47 creates waypoint objects 100 for the destination and any desired intermediate waypoints, navigation application 47 provides the waypoint objects 100 to route calculation tool 40. (*Id.* at 8:21-26 (“As mentioned above in connection with FIG. 4, the route calculation tool 40 receives as input two or more waypoint objects 100. A waypoint object 100 is a data structure used to represent a waypoint. A waypoint refers to a location through which the route to be calculated by the route calculation object 50 is constrained to pass.”), 8:36-38

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(“The waypoint objects 100 are formed or created by the navigation application 47 that provides the waypoint objects 100 to the route calculation tool 40.”), 9:35-38 (“provides navigation position objects 56 to the navigation application 47 which in turn uses navigation position objects 56 to create waypoint objects 100 which are provided to the route calculation tool 40.”), 9:53-58 (“Once the navigation application 47 receives the locus information 92 in the navigation position object 56, it uses the locus information 92 to create a waypoint object 100 which is provided to the route calculation tool 40 in order to perform a route calculation.”), 10:8-10 (“The waypoint object 100 is a data structure provided to the route calculation tool 40.”), 10:27-30 (“Using the navigation position objects 56, as well as other information, the navigation application 47 forms at least two waypoint objects 100 which are provided to the route calculation tool 40.”).)

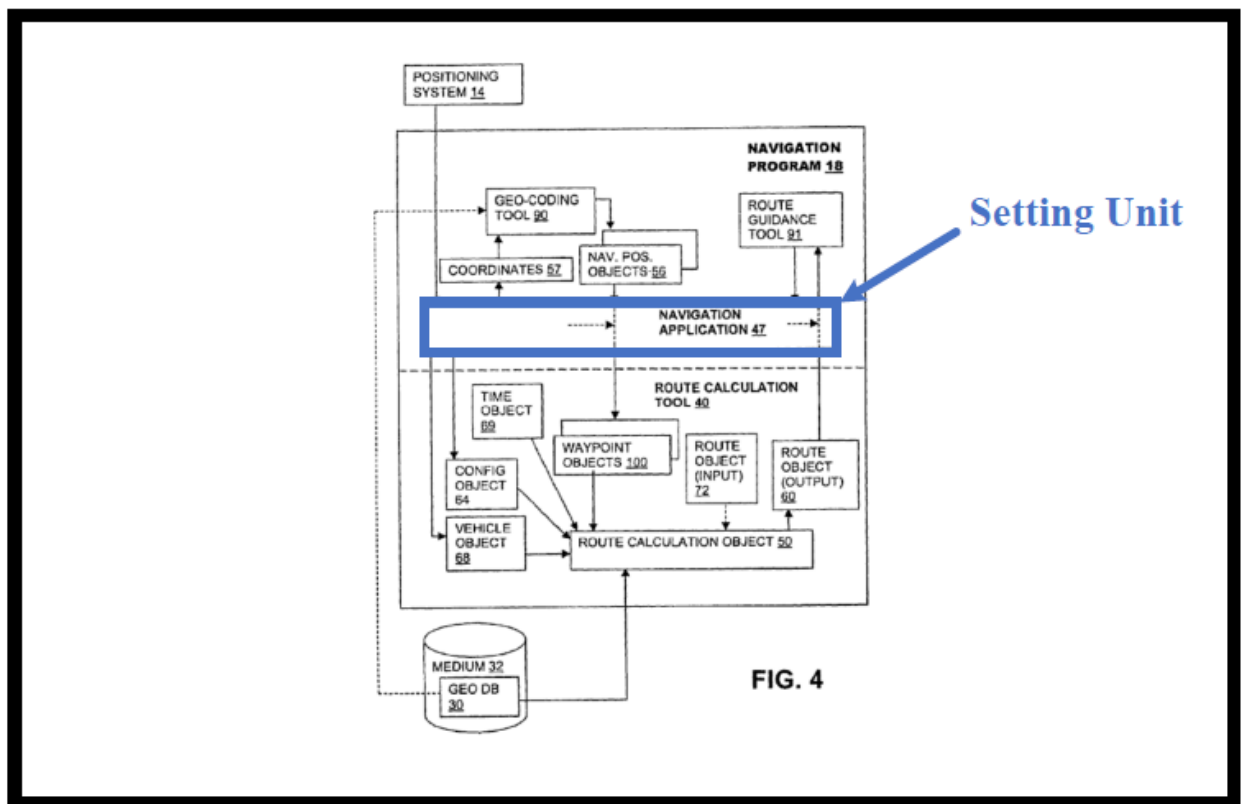
128. Using the provided waypoint objects 100, route calculation tool 40 calculates a route that must pass through the waypoint objects 100 representing the destination and intermediate waypoints. (*Id.* at 6:15-18 (“In one embodiment, the route calculation tool 40 comprises a route calculation object 50. This route calculation object 50 receives as input as least two waypoint objects 100 and provides an output in the form of a route object 60.”), 8:21-34 (“As mentioned above

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in connection with FIG. 4, the route calculation tool 40 receives as input two or more waypoint objects 100. A waypoint object 100 is a data structure used to represent a waypoint. A waypoint refers to a location through which the route to be calculated by the route calculation object 50 is constrained to pass. In order to calculate a route, the route calculation tool 40 requires at least two waypoint objects 100, one that represents the waypoint corresponding to the origin and another that represents the waypoint corresponding to the destination. One or more additional waypoint objects 100 may be provided to the route calculation tool 40 to represent waypoints corresponding to one or more intermediate locations between the origin and destination.”), 9:53-58 (“Once the navigation application 47 receives the locus information 92 in the navigation position object 56, it uses the locus information 92 to create a waypoint object 100 which is provided to the route calculation tool 40 in order to perform a route calculation.”), 10:8-15 (“The waypoint object 100 is a data structure provided to the route calculation tool 40. As mentioned above, the waypoint object 100 represents a location through which the route to be calculated by the route calculation object 50 is constrained to pass. Waypoint objects 100 are used to represent the origin of the route, the destination of the route, and any intermediate locations along the route.”).)

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129. A POSITA would have understood that Khavakh's navigation application 47 is a "setting unit" of navigation system 10 (*i.e.*, the navigation apparatus or device) because navigation application 47 sets, using waypoint objects 100, intermediate waypoints and a destination through which the calculated route must pass.



(Khavakh, EX1005 at FIG. 4 (annotated).)

130. Khavakh further discloses the step of setting, using navigation application 47 (*i.e.*, the setting unit), intermediate waypoints and a destination.

(Khavakh, EX1005 at 9:53-58, 10:8-15, 10:27-30, 12:12-18, 13:56-61, 32:35-54.)

In one example, Khavakh teaches setting a destination and an intermediate waypoint representing a restaurant. (*Id.* at 10:57-60 (“For example, an end-user may desire a route between an origin and a destination which passes through an intermediate waypoint representing a restaurant location.”).)

131. The ‘971 patent discloses that the claimed “setting unit,” “route searching unit,” and “route guidance unit” may be components of a control unit 10 (*e.g.*, a microcomputer) and “can be comprised of an application program that operates under the control of the microcomputer.” (‘971 patent, EX1001 at 4:37-46.) Khavakh’s “setting unit,” “route searching unit,” and “route guidance unit” are similarly components of a navigation software program 18 that is run on a processor 12. (Khavakh, EX1005 at 3:47-60, 4:4-5, FIG. 1, FIG. 4.)

132. Khavakh discloses limitation [19a]. For the reasons discussed above, Khavakh also discloses limitation [1a].

- c) **Khavakh Discloses “searching, by utilizing a route searching unit of the navigation apparatus, for a whole route leading to the destination via the waypoints set by said setting step” And “a route searching unit configured to search for a whole route leading to the destination via the waypoints set by said setting unit.”**

133. Khavakh discloses “searching, by utilizing a route searching unit of the

navigation apparatus, for a whole route leading to the destination via the waypoints set by said setting step” (“limitation [19b]”) and “a route searching unit configured to search for a whole route leading to the destination via the waypoints set by said setting unit” (“limitation [1b]”).

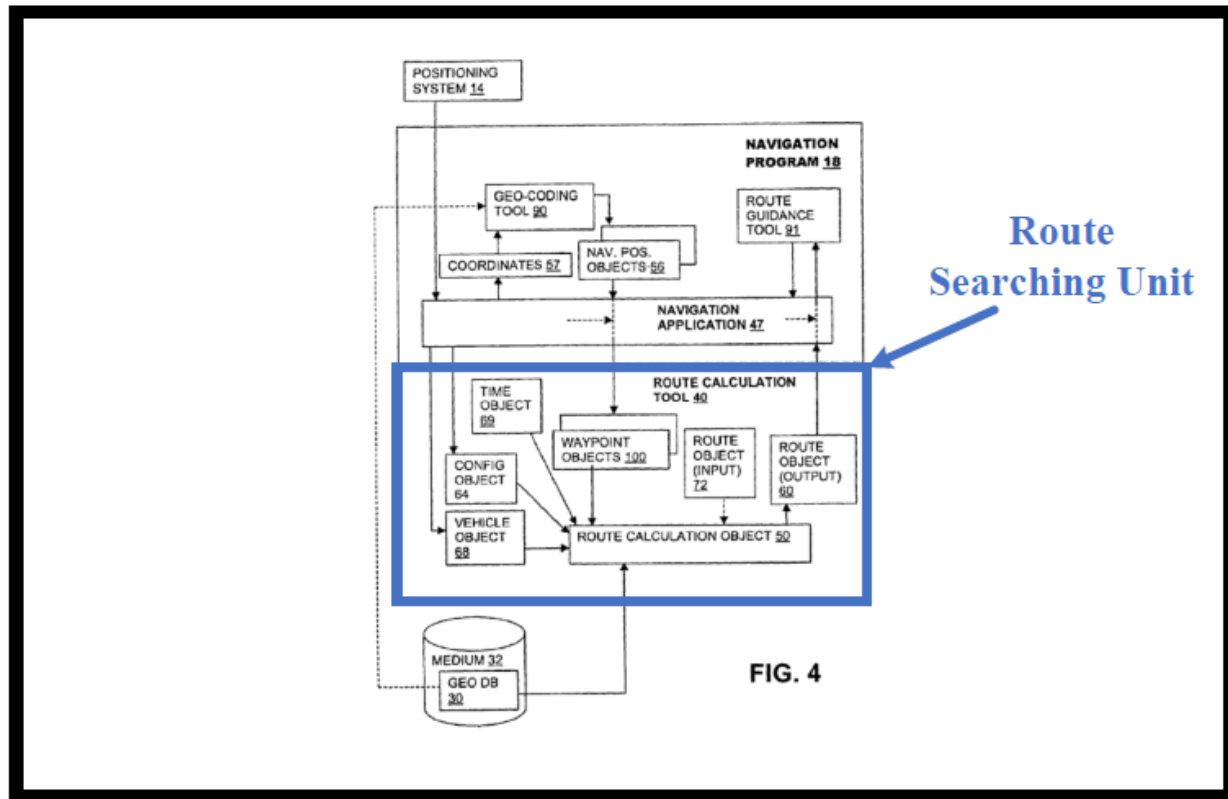
134. Khavakh discloses that navigation program 18, which is part of navigation system 10 (*i.e.*, the navigation apparatus or device), includes a route calculation tool 40 configured to determine routes between specified locations for the vehicle to travel (*i.e.*, to perform route searching). (Khavakh, EX1005 at 5:35-43 (“Referring to FIG. 4, in the navigation software program 18 the route calculation features are provided by a route calculation tool 40. The route calculation tool 40 is a computer program that may be used as part of the navigation software program 18. The route calculation tool 40 determines routes between specified locations. If used with a navigation software program 18 in a navigation system installed in a vehicle, the route calculation tool 40 determines routes for the vehicle to travel.”); *see also id.* at claim 1, 1:17-18, 2:25-29.)

135. Route calculation tool 40 may be implemented as a separate application (or subprogram) of navigation program 18 or may be compiled into an executable module. (*Id.* at 5:25-32 (“The navigation software program 18 may include separate

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applications (or subprograms) that provide these various navigation features and functions. These functions and features may include route calculation, map display, vehicle positioning (e.g., map matching), route guidance (wherein detailed directions are provided for reaching a desired destination), destination resolution capabilities, and other functions.”), 5:59-64 (“In a preferred embodiment, the route calculation tool 40 is provided as a module that is relatively portable and that can be incorporated into different kinds of systems. The route calculation tool may be compiled into an executable module with the navigation application or may be used as a standalone program.”).)

136. A POSITA would have understood that Khavakh’s route calculation tool 40 is a “route searching unit” of navigation system 10 (*i.e.*, the navigation apparatus or device) because route calculation tool 40 is configured to perform route searching.



(Khavakh, EX1005 at FIG. 4 (annotated).)

137. Khavakh also discloses the step of searching, using route calculation tool 40, for a whole route leading to a destination via waypoints set by navigation application 47 (*i.e.*, the setting unit) in the setting step.

138. Navigation application 47 sets a destination and intermediate waypoints using waypoint objects 100 and provides the waypoint objects 100 to route calculation tool 40. (Khavakh, EX1005 at 8:21-34, 8:36-38, 9:35-38, 9:53-58, 10:8-15, 10:27-30, 12:12-18.)

139. Using the provided waypoint objects 100, route calculation tool 40 searches for an “entire route” (*i.e.*, a whole route) leading to the set destination. (*Id.* at 22:66-23:3 (“The list of segments 500 for each of these solution routes between each of the waypoints is stored serially in the route calculation object 50 in order to form the entire solution route that links all the waypoints.”), 23:7-9 (“the route calculation object calculates the legs of the solution route between each waypoint pair for the entire route.”), 32:35-54 (“Another advantageous feature that may be provided by an alternative embodiment of the route calculation tool 40 is the determination of routes passing through multiple intermediate waypoints. To provide for one or more intermediate waypoints, the first intermediate waypoint is treated as a destination waypoint, and a route is determined between the origin waypoint and the first intermediate waypoint according to the method described above. Once a solution route to the first intermediate waypoint is found, the first intermediate waypoint is treated as the origin waypoint and the second intermediate waypoint is treated as a destination waypoint. The route searching method described above is again repeated, and so on, until a solution route is determined between the last intermediate waypoint and the ultimate destination waypoint. At that stage, the route calculation engine 160 concatenates the routes determined between the various

waypoints to provide a single route from the origin waypoint to the destination waypoint passing through all of the intermediate waypoints.”); *see also id.* at 6:15-18, 7:2-16, 8:27-34, 12:12-18, 22:49-66.)

140. Khavakh discloses that the calculated whole route must pass via the intermediate waypoints set by navigation application 47 in the setting step. (*Id.* at 8:21-26 (“As mentioned above in connection with FIG. 4, the route calculation tool 40 receives as input two or more waypoint objects 100. A waypoint object 100 is a data structure used to represent a waypoint. A waypoint refers to a location through which the route to be calculated by the route calculation object 50 is constrained to pass.”), 10:8-15 (“The waypoint object 100 is a data structure provided to the route calculation tool 40. As mentioned above, the waypoint object 100 represents a location through which the route to be calculated by the route calculation object 50 is constrained to pass. Waypoint objects 100 are used to represent the origin of the route, the destination of the route, and any intermediate locations along the route.”); *see also id.* at 13:56-61, 32:35-54.)

141. Khavakh discloses limitation [19b]. For the reasons discussed above, Khavakh also discloses limitation [1b].

- d) **Khavakh Discloses “carrying out, by utilizing a route guidance unit of the navigation apparatus, route guidance according to the whole route which is searched for by said route searching step” And “a route guidance unit configured to carry out route guidance according to the whole route which is searched for by said route searching unit.”**

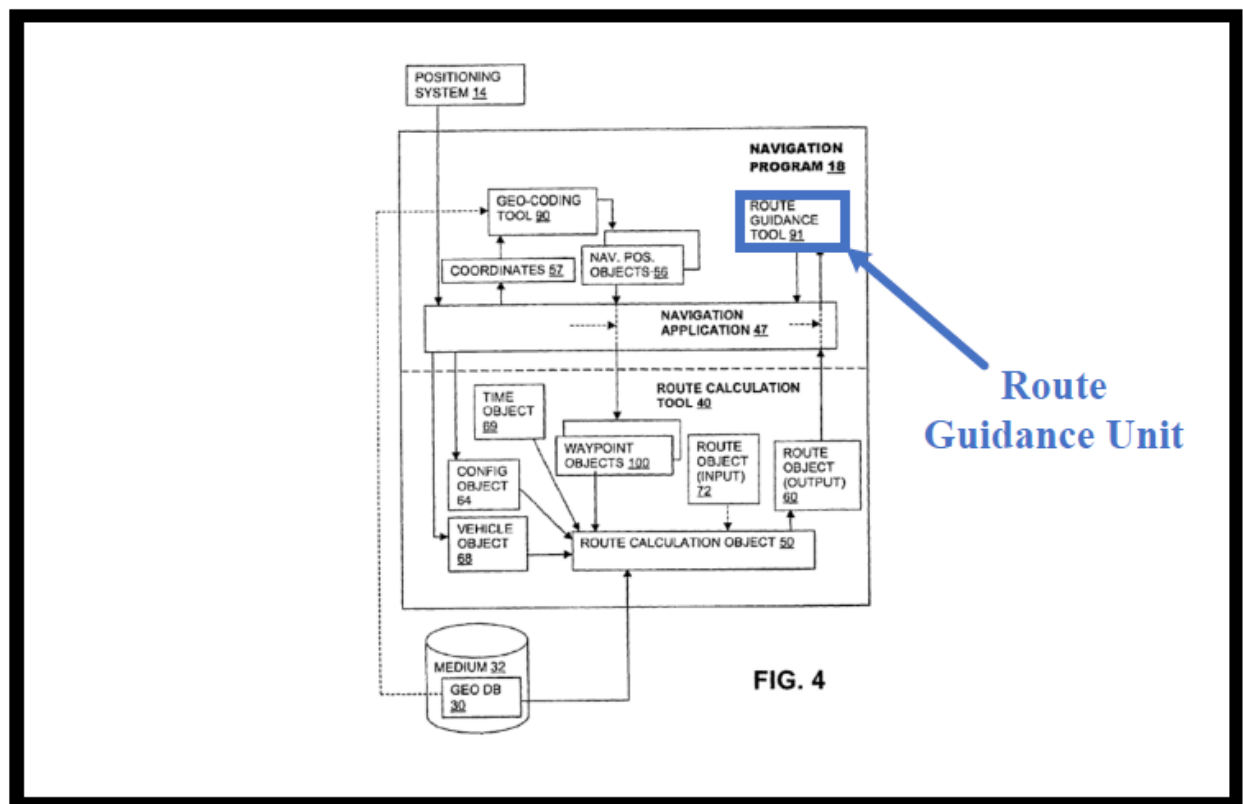
142. Khavakh discloses “carrying out, by utilizing a route guidance unit of the navigation apparatus, route guidance according to the whole route which is searched for by said route searching step” (“limitation [19c]”) and “a route guidance unit configured to carry out route guidance according to the whole route which is searched for by said route searching unit” (“limitation [1c]”).

143. Khavakh discloses that navigation program 18, which is part of navigation system 10 (*i.e.*, the navigation apparatus or device), includes a route guidance tool 91, which is a tool program configured to perform route guidance. (Khavakh, EX1005 at 5:49-58 (“The navigation application 47 may include appropriate programs that provide the remainder of the navigating functions provided by the navigation system 10, such as route guidance, vehicle positioning, the user interface, and so on. Alternatively, the navigation application 47 may operate as a manager that uses other tool programs, such as a geo-coding tool 90, a route guidance tool 91, a map display tool, and so on, to implement one or more of the other various navigation functions.”); *see also id.* at claim 8, 5:25-32, 7:16-22,

17:37-44.)

144. A POSITA would have understood that Khavakh's route guidance tool 91 is a "route guidance unit" of navigation system 10 (*i.e.*, the navigation apparatus or device) because route guidance tool 91 is configured to provide route guidance.

(*Id.*)



(Khavakh, EX1005 at FIG. 4 (annotated).)

145. Khavakh alternatively discloses that a program in navigation application 47 may provide the route guidance functionality. (Khavakh, EX1005 at

5:49-58.) This route guidance program would have also been understood to be a “route guidance unit” because it is likewise a program that performs route guidance. (*Id.*)

146. Khavakh further discloses the step of carrying out, using the route guidance unit (*e.g.*, route guidance tool 91), route guidance according to the whole route searched for by route calculation tool 40 (*i.e.*, the route searching unit) in the route searching step.

147. After route calculation tool 40 calculates a whole route, route calculation tool 40 stores the calculated whole route in an output route object 60 that is provided to navigation application 47. (Khavakh, EX1005 at 17:37-44 (“Assuming all criteria for further searching have been met, the potential solution route from the list 500 is stored in an output route object 60. This route output object 60 is provided to the navigation application 47 which in turn may provide it to another program (such as a maneuver generation program) in the navigation application program 18 from which instructions are provided to the end-user via the user interface.”), 22:49-54 (“Each new solution is placed in the list of potential solutions 500 (in FIG. 15). When the search termination criterion is satisfied, the best solution is copied to the output route object 60. All segment records from both

search trees that lie along the route to the common gate are stored in the route object 60.”), 29:41-43 (“after the route calculation tool 40 determines a solution route and provides the solution route in a route object 60 to the navigation application 47...”); *see also id.* at 22:55-23:3, 32:35-54.)

148. Navigation application 47 may in turn provide output route object 60 to route guidance tool 91. (*Id.* at 5:49-58, 17:37-44.)

149. Route guidance tool 91 (or, alternatively, the route guidance program in navigation application 47) then carries out route guidance (*e.g.*, provides driving instructions) according to the whole route stored in output route object 60. (*Id.* at 7:16-22 (“The output route object 60 is provided to the navigation application 47 that uses the list 60(1) of road segment data records and the waypoint information 60(2) in the route object 60 to provide various navigation functions, such as provide instructions to the driver, generate graphical display maps of the route, and so on.”), 17:37-44 (“Assuming all criteria for further searching have been met, the potential solution route from the list 500 is stored in an output route object 60. This route output object 60 is provided to the navigation application 47 which in turn may provide it to another program (such as a maneuver generation program) in the navigation application program 18 from which instructions are provided to the end-

user via the user interface.”); *see also id.* at claim 8, 5:25-32, 5:49-58, 29:64-30:7.)

150. Khavakh discloses limitation [19c]. For the reasons discussed above, Khavakh also discloses limitation [1c].

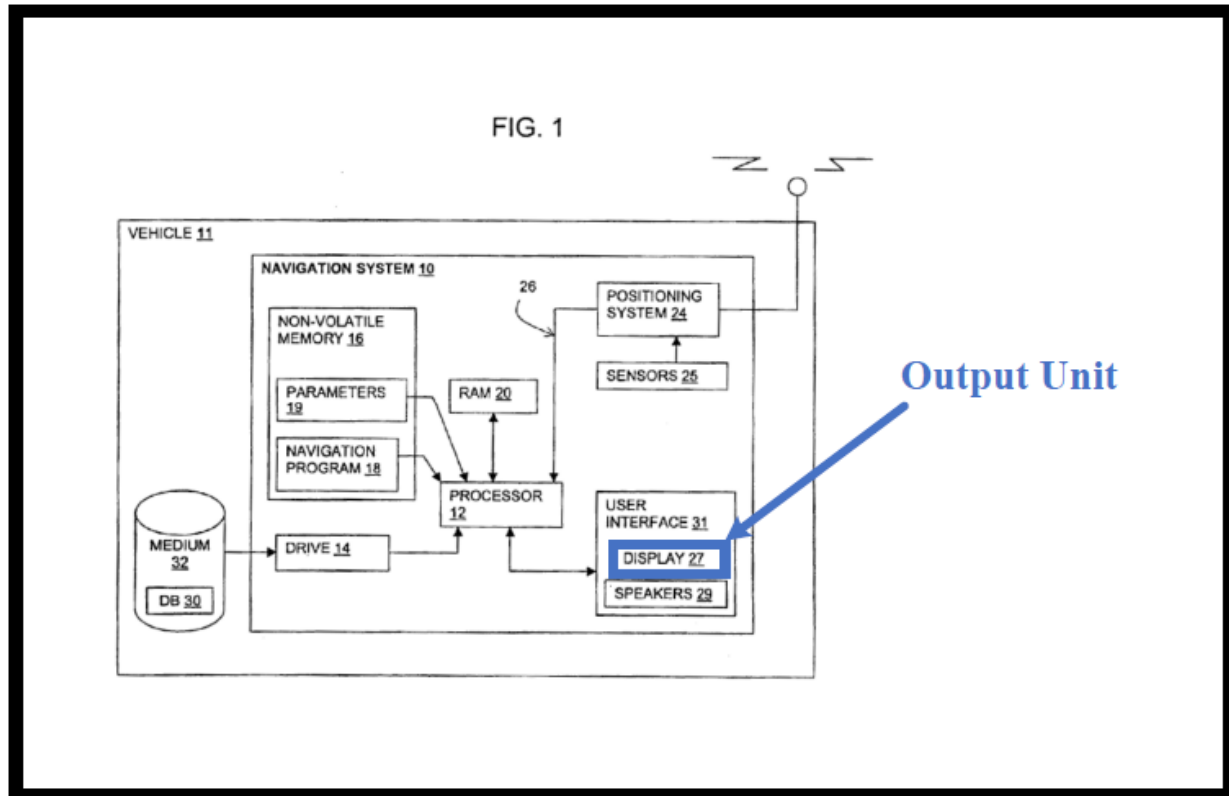
- e) **Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Teaches And Renders Obvious “outputting, by utilizing an output unit of the navigation apparatus, a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when, by said route guidance step, it is determined that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint” And “an output unit configured to output a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when said route guidance unit determines that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint.”**

151. Khavakh in combination with Lefebvre and the knowledge of a POSITA teaches and renders obvious “outputting, by utilizing an output unit of the navigation apparatus, a message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when, by said route guidance step, it is determined that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint” (“limitation [19d]”) and “an output unit configured to output a message

showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading when said route guidance unit determines that the vehicle has deviated from the route to a predetermined distance or more and is traveling along a route after said first next waypoint” (“limitation [1d]”).

152. Khavakh discloses that navigation system 10 (*i.e.*, the navigation apparatus or device) has a user interface 31 that includes equipment that provides information back to the end-user, such as display 27. (Khavakh, EX1005 at 4:19-22 (“The user interface 31 also includes suitable equipment that provides information back to the end-user. This equipment may include a display 27, speakers 29, or other means.”).)

153. A POSITA would have understood that Khavakh’s display 27 is an “output unit” of navigation system 10 because display 27 is configured to output information to the driver. (*Id.*)



(Khavakh, EX1005 at FIG. 1 (annotated).)

154. The ‘971 patent supports that the claimed “output unit” may include a “display.” (EX1001 at claim 8.)

155. A POSITA would have understood that the software and/or hardware (e.g., a graphics card) that produces the images displayed on Khavakh’s display 27 may also be considered part of Khavakh’s “output unit.” (Khavakh, EX1005 at 5:25-32, 5:49-58.)

156. Khavakh in combination with the knowledge of a POSITA further

teaches and renders obvious outputting, using display 27 (*i.e.*, the “output unit”) of navigation system 10, a prompt to the user to indicate whether he or she wants a new route to be calculated when, by the route guidance step, it is determined that the vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading and is traveling along a route after said first next waypoint.

157. Khavakh teaches “an improved rerouting feature” that is activated when it is determined that “the vehicle in which the navigation system is installed departs from the originally calculated solution route as the vehicle is traveling,” such as when “the vehicle position corresponds to a segment record that is not among the records in the solution route (or if the direction of travel is incorrect).” (Khavakh, EX1005 at 29:35-40 (“Another feature provided by a present embodiment of the route calculation tool is an improved rerouting feature. The rerouting feature may be used when the vehicle in which the navigation system is installed departs from the originally calculated solution route as the vehicle is traveling.”), 29:54-62 (“For purposes of this example, it is assumed that the destination has not changed, but that for some reason, intentionally or otherwise, the vehicle is no longer traveling on the roads corresponding to the solution route. The rerouting feature of the route calculation tool 40 is implemented upon detection by the navigation system that the

vehicle is no longer traveling on any of the roads represented by the solution route (or is no longer traveling in the proper direction on the roads represented by the solution route.”), 30:7-14 (“As the map matching program determines which segment record in the map database corresponds to the vehicle position, it compares this segment record to the list of segment records in the solution route. If the vehicle position corresponds to a segment record that is not among the records in the solution route (or if the direction of travel is incorrect), the rerouting feature of the route calculation tool is called.”); *see also id.* at claim 9.)

158. When the rerouting feature is activated, Khavakh’s navigation system “prompts the end-user to indicate whether he or she wants a new route (*e.g.*, a re-route) to be calculated.” (*Id.* at 30:17-20 (“In a one embodiment, a rerouting function in the navigation application 47 prompts the end-user to indicate whether he or she wants a new route (*e.g.*, a re-route) to be calculated.”); *see also id.* at claim 9.)

159. Khavakh at least suggests prompting the driver using Khavakh’s display 27 (*i.e.*, the “output unit”) because display 27 is used to provide information (*e.g.*, route guidance information) back to the end-user or driver (Khavakh, EX1005 at 1:36-40, 4:19-22, 7:16-22, 30:4-7), and a POSITA would have understood that Khavakh’s prompt is consistent with the type of route guidance information that is

output using Khavakh's display 27.

160. Khavakh also teaches prompting the driver when it is determined that the vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading.

161. Khavakh teaches prompting the driver when it is determined that the vehicle has deviated from the originally calculated solution route. (Khavakh, EX1005 at 29:35-40 (“Another feature provided by a present embodiment of the route calculation tool is an improved rerouting feature. The rerouting feature may be used when the vehicle in which the navigation system is installed departs from the originally calculated solution route as the vehicle is traveling.”), 29:54-62 (“For purposes of this example, it is assumed that the destination has not changed, but that for some reason, intentionally or otherwise, the vehicle is no longer traveling on the roads corresponding to the solution route. The rerouting feature of the route calculation tool 40 is implemented upon detection by the navigation system that the vehicle is no longer traveling on any of the roads represented by the solution route (or is no longer traveling in the proper direction on the roads represented by the solution route).”), 30:7-14 (“As the map matching program determines which segment record in the map database corresponds to the vehicle position, it compares

this segment record to the list of segment records in the solution route. If the vehicle position corresponds to a segment record that is not among the records in the solution route (or if the direction of travel is incorrect), the rerouting feature of the route calculation tool is called.”); *see also id.* at claim 9.) A route deviation is detected when, for example, it is determined that the vehicle is on a road that is not part of the solution route or is traveling in the wrong direction for proceeding along the calculated solution route. (*Id.* at 29:54-62, 30:7-14.)

162. Khavakh also teaches that a calculated solution route is a “single route” that must pass through each of the intermediate waypoints in order. (*Id.* at 7:4-6 (“The route object 60 is a data structure generated by the route calculation object 50. The output route object 60 includes a single route determined by the route calculation object 50.”), 8:21-26 (“As mentioned above in connection with FIG. 4, the route calculation tool 40 receives as input two or more waypoint objects 100. A waypoint object 100 is a data structure used to represent a waypoint. A waypoint refers to a location through which the route to be calculated by the route calculation object 50 is constrained to pass.”), 10:8-15 (“The waypoint object 100 is a data structure provided to the route calculation tool 40. As mentioned above, the waypoint object 100 represents a location through which the route to be calculated by the route

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calculation object 50 is constrained to pass. Waypoint objects 100 are used to represent the origin of the route, the destination of the route, and any intermediate locations along the route.”), 13:56-61 (“If no instructions regarding reordering are provided by the navigation application 47 to the route calculation tool 40, the route calculation tool 40 begins to calculate a solution route that visits the intermediate waypoints in the order in which they are provided to the route calculation tool 40.”), 22:55-23:3 (“If there are more than two waypoints, the route calculation object is used to calculate a solution route for each leg of the entire route in the manner described above. Thus, each solution route calculated in this manner forms only a part of the entire final solution route. Therefore, if there is a single intermediate waypoint, a solution route is determined by the route calculation object 50 in the manner described above for the portion of the entire route between the origin and the intermediate waypoint. Then, another solution route is determined by the route calculation object 50 in the manner described above for the portion of the entire route between the intermediate waypoint and the destination waypoint. The list of segments 500 for each of these solution routes between each of the waypoints is stored serially in the route calculation object 50 in order to form the entire solution route that links all the waypoints.”), 32:35-54 (“Another advantageous feature that

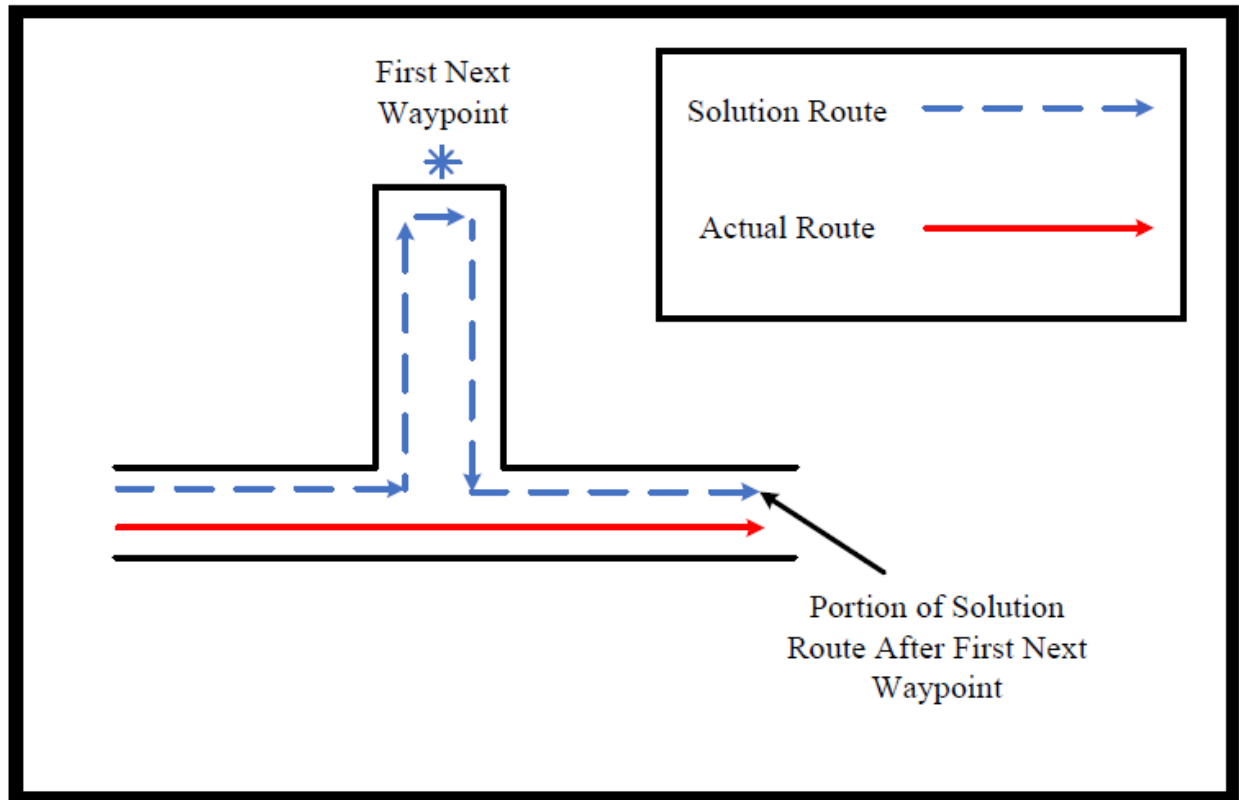
may be provided by an alternative embodiment of the route calculation tool 40 is the determination of routes passing through multiple intermediate waypoints. To provide for one or more intermediate waypoints, the first intermediate waypoint is treated as a destination waypoint, and a route is determined between the origin waypoint and the first intermediate waypoint according to the method described above. Once a solution route to the first intermediate waypoint is found, the first intermediate waypoint is treated as the origin waypoint and the second intermediate waypoint is treated as a destination waypoint. The route searching method described above is again repeated, and so on, until a solution route is determined between the last intermediate waypoint and the ultimate destination waypoint. At that stage, the route calculation engine 160 concatenates the routes determined between the various waypoints to provide a single route from the origin waypoint to the destination waypoint passing through all of the intermediate waypoints.”.)

163. When a vehicle implementing Khavakh’s system and method departs from the solution route leading to an upcoming waypoint (*i.e.*, a first next waypoint) toward which the vehicle has been heading (*e.g.*, by failing to make a required turn toward the waypoint), a deviation is detected and Khavakh prompts the driver because the vehicle is no longer following the originally calculated solution route.

(Khavakh, EX1005 at 29:35-40, 29:54-62, 30:7-14, claim 9.) For example, the vehicle would no longer be traveling on a road that is part of the solution route and/or would be traveling in the wrong direction (*e.g.*, vehicle traveling east when it was supposed to turn north).

164. Khavakh likewise prompts the driver when it is determined that the vehicle has deviated from the route leading to the first next waypoint toward which the vehicle has been heading and is traveling along a route after said first next waypoint.

165. In the below illustrated example, the driver was supposed to make a left turn to travel towards the first next waypoint, but instead continued straight – bypassing the first next waypoint. The driver, by continuing straight, is traveling along a portion of the solution route after said first next waypoint, and Khavakh’s system would prompt the driver because the vehicle has deviated from the originally calculated solution route. (Khavakh, EX1005 at 29:35-40, 29:54-62, 30:7-14, claim 9.) The driver did not make the required left turn toward the first next waypoint and did not pass through the intermediate waypoint that the solution route must pass through. (*Id.* at 8:21-26, 10:8-15.)



166. It would have been obvious to use Khavakh's navigation system 10 in the above scenario.

167. Prior to the alleged invention of the '971 patent, it was commonplace and desirable to use a navigation system to set a route that would require the driver to briefly depart from, and then return to, a main roadway to reach an intermediate waypoint. (*See, e.g.,* RDX, EX1007 at 54; *see also id.* at 73; EP '416, EX1018 at FIGS. 1-2; Mathews, EX1019 at FIG. 6.) It was typical to set an intermediate waypoint down a cul-de-sac (*e.g.,* for briefly stopping at an acquaintance's house),

off a highway exit (*e.g.*, for stopping for gas or food on a road trip), or in a parking lot (*e.g.*, for running an errand). (*Id.*) It was also routine for driver to (accidentally or intentionally) bypass such an intermediate waypoint by failing to make a required turn toward the waypoint (*e.g.*, accidentally missing a highway exit, intentionally skipping a rest stop in favor of one further down the road, etc.), as demonstrated by the breadth of off route technologies and solutions available before the alleged invention of the '971 patent. Thus, it would have been obvious to use Khavakh's navigation system 10 in a scenario where the driver deviates from a route leading to a first next waypoint toward which the vehicle has been heading and is traveling along a route after the first next waypoint.

168. Khavakh also teaches that the determination that the vehicle has deviated from the solution route is made by the route guidance step. Khavakh's route guidance step provides route guidance (*e.g.*, driving instructions) to the driver according to the solution route stored in output route object 60. (Khavakh, EX1005 at 7:16-22, 17:37-44.) Khavakh further teaches that determining whether the vehicle has deviated from the solution route is part of the route guidance process. (*Id.* at 29:35-40, 29:54-62, 30:7-14, claim 9.) A POSITA would have understood that Khavakh's route guidance step determines that a vehicle has deviated from a solution

route.

169. Khavakh also suggests and renders obvious that the route guidance unit in particular determines that the vehicle has deviated from the solution route. Khavakh teaches determining that the vehicle has deviated from the solution route using “a map matching program” that compares the vehicle’s current position to the road segments records for the solution route. (Khavakh, EX1005 at 29:57-64 (“The rerouting feature of the route calculation tool 40 is implemented upon detection by the navigation system that the vehicle is no longer traveling on any of the roads represented by the solution route (or is no longer traveling in the proper direction on the roads represented by the solution route). In one embodiment, this detection is made in a map matching program that is part of the navigation application 18.”); *see also id.* at 29:65-30:10.)

170. Besides detecting route deviations, the map matching program allows the driver to be provided with driving instructions in advance of a maneuver and to see his or her current position on the display. (*Id.* at 30:1-7 (“This may be done for the purpose of providing the end-user with driving instructions in advance of when a maneuver is required as part of the solution route. This may also be done on a continuous basis (or at predetermined intervals) for the purpose of displaying the

position of the vehicle on a computer display that is part of the user interface.”).)

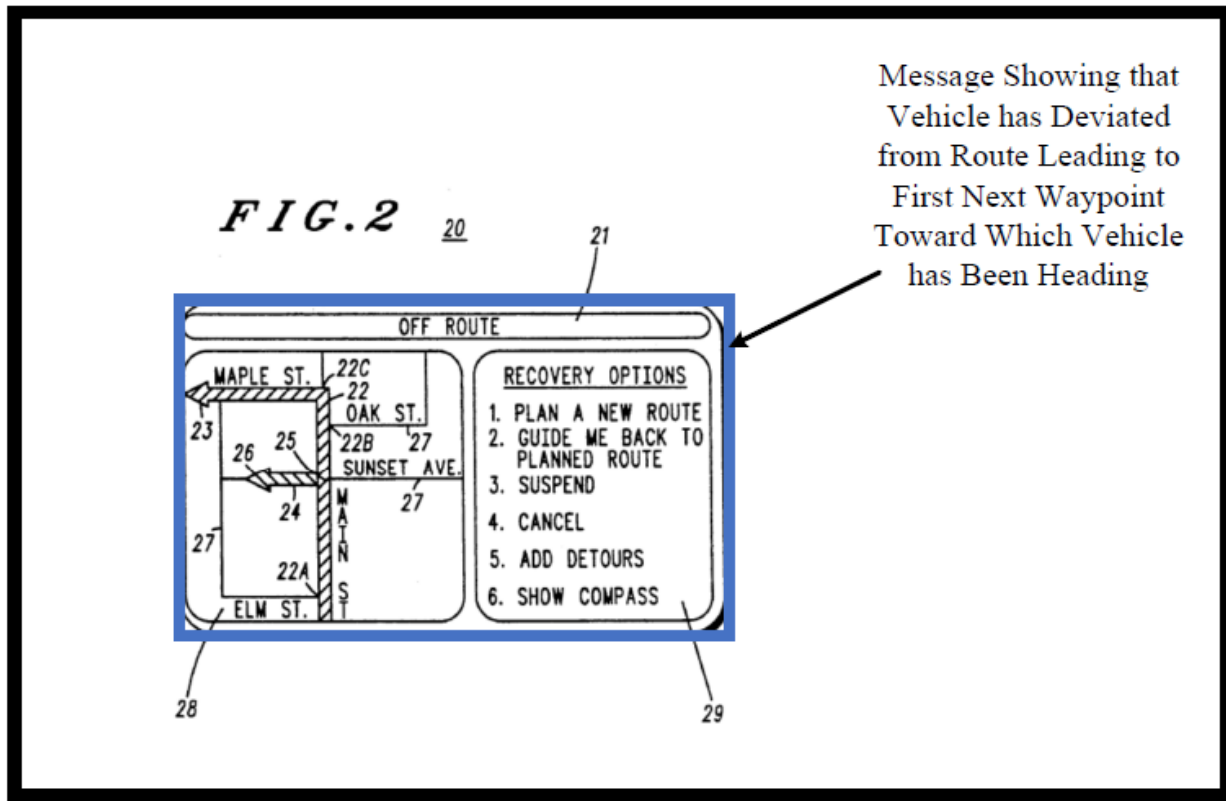
171. Map matching programs (also known as map comparison programs) like Khavakh’s were well-known in the art and were commonly used in route guidance programs/applications to enable desirable route guidance features such as notifying drivers of upcoming maneuvers and detecting route deviations. (*See, e.g.,* Lefebvre, EX1006 at 4:39-40 (“Many prior navigation systems use a map matching technique...”); *see also id.* at 7:9-14, 7:42-65; EP ‘496, EX1017 at 9:35-10:9 (disclosing an off-route application 400 that is part of a route guidance application 252 and uses map matching to provide route guidance and determine whether the user is off route).) Consistent with this knowledge, a POSITA would have found it obvious to implement Khavakh’s map matching program that determines that the vehicle has deviated from the solution route as part of Khavakh’s route guidance unit to enable desirable route guidance features such as notifying drivers of upcoming maneuvers and detecting route deviations. Doing so would have been a simple matter of design choice that would have been trivial to a POSITA to implement. Khavakh discloses that the map matching program is part of the navigation program 18 and leaves it up to a POSITA to decide where specifically in the navigation program 18 to put it. (Khavakh, EX1005 at 29:57-64 (“this detection

is made in a map matching program that is part of the navigation application 18.”.)

172. Khavakh in combination with the knowledge of a POSITA renders obvious outputting, using display 27, a prompt when, by the route guidance step, it is determined that the vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading and is traveling along a route after said first next waypoint.

173. As demonstrated above in Section X(A)(1), a POSITA would have been motivated to modify Khavakh in view of Lefebvre to output, using Khavakh’s display 27, a prompt in the form of Lefebvre’s off route display 20 when, by the route guidance step, it is determined that the vehicle has deviated from the route leading to a first next waypoint toward which the vehicle has been heading to a predetermined distance or more and is traveling along a route after said first next waypoint.

174. As shown below, Lefebvre’s off route display 20 meets the claimed “message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading.”



(Lefebvre, EX1006 at FIG. 2 (annotated).)

175. Lefebvre teaches an off route display 20 that is produced on a display 16 when a navigation computer 11 detects a deviation from a calculated route. (Khavakh, EX1006 at 4:62-64 (“Referring now to FIG. 2, in response to an off route detection by the navigation computer 11, a visual display 20 is produced on the color CRT display 16.”), 7:38-42 (“If the decision block 42 determines that an off route condition exists, then, in accordance with the apparatus 10, control passes to a process block 43 which implements providing an off route visual display such as the

display 20 shown in FIG. 2.”), 8:3-5 (“In response to a determination of an off route condition by the decision block 42, the block 43 produces the visual display 20 in FIG. 2.”).)

176. The off route display 20 includes “an ‘OFF ROUTE’ text heading 21 which identifies the display as an off route display” and “visually indicates to the operator that he is off route.” (*Id.* at 4:64-5:1 (“The major characteristics of the display 20 are an ‘OFF ROUTE’ text heading 21 which identifies the display as an off route display. Thus the existence of the off route text heading 21 visually indicates to the operator that he is off route.”), FIG. 2.)

177. The off route display 20 also includes a map portion 28 that (i) visually indicates “the desired direction of travel along the calculated navigation route”; and (ii) visually indicates, in a contrasting color, the vehicle’s actual travel route “from at least an initially calculated point 25 at which the vehicle deviated from the calculated route to the estimated current vehicle position.” (*Id.* at 5:5-19, 8:5-14.)

178. A POSITA would have understood that Lefebvre’s off route display 20 is a “message showing that a vehicle has deviated from a route leading to a first next waypoint toward which the vehicle has been heading.”

179. According to Lefebvre, the off route display 20 is displayed when the

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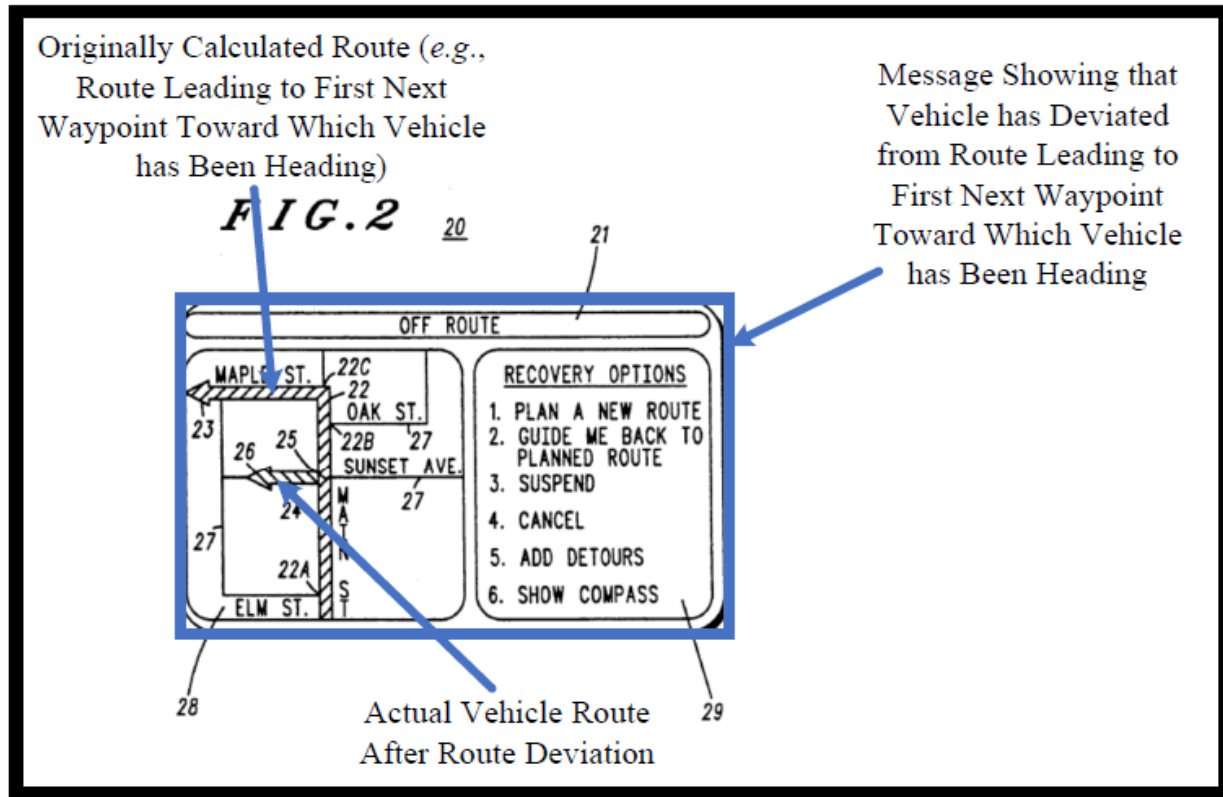
driver deviates from the calculated route and “visually indicates to the operator that he is off route” (*e.g.*, has deviated from the route leading to the first next waypoint toward which the vehicle has been heading) using an “OFF ROUTE” text heading 21 and a map portion 28. (Khavakh, EX1006 at 4:62-5:4 (“Referring now to FIG. 2, in response to an off route detection by the navigation computer 11, a visual display 20 is produced on the color CRT display 16. The major characteristics of the display 20 are an ‘OFF ROUTE’ text heading 21 which identifies the display as an off route display. Thus the existence of the off route text heading 21 visually indicates to the operator that he is off route. This may also be accompanied by a suitable distinctive audible warning produced by the speaker 15. The display 20 preferably is only implemented in response to an off route condition.”), 7:38-53 (“If the decision block 42 determines that an off route condition exists, then, in accordance with the apparatus 10, control passes to a process block 43 which implements providing an off route visual display such as the display 20 shown in FIG. 2. The determination of an off route condition by the decision block 42 can be achieved by map matching techniques in which monitored vehicle position is compared with the road map data stored in the memory 13 such that it can be determined exactly on what road the vehicle is currently located and the position of

the vehicle on that road. If current vehicle position does not correspond to a road segment which is part of the calculated route, or if sensed vehicle heading does not correspond to the correct vehicle heading for proceeding along the calculated route, then an off route condition is determined.”), 8:3-5 (“In response to a determination of an off route condition by the decision block 42, the block 43 produces the visual display 20 in FIG. 2.”).)

180. The map portion 28 of off route display 20 further shows that the vehicle has deviated from the route leading to the first next waypoint toward which the vehicle has been heading by (i) showing the calculated navigation route leading to the first next waypoint in one color and (ii) showing the vehicle’s actual route from the route deviation point in a contrasting color. (*Id.* at 5:5-19 (“The display 20 includes a visual display 22, in one color, of at least a portion of the calculated navigation route which traverses a plurality of road path intersections 22A, 22B, 22C. The display 22 includes a visual indication, in the form of an arrowhead 23, of the desired direction of travel along the calculated navigation route. In addition, the display 20 includes a visual display 24, in a contrasting color, of actual vehicle travel from at least an initially calculated point 25 at which the vehicle deviated from the calculated route to the estimated current vehicle position. In FIG. 2 the estimated

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current vehicle position corresponds to an arrowhead 26 superimposed on and part of the actual vehicle travel display 24. The orientation of arrowhead 24 indicates current sensed vehicle travel direction.”), 8:5-14 (“As previously noted this display includes a visual display 22 of a portion of the desired navigation route along with the arrowhead 23 indicating the desired direction of travel for the navigation route display 22. Also, various road paths 27 within the vicinity of the point 25 at which a deviation from the desired navigation route occurred are illustrated along with a display 24 of the path of actual vehicle travel and an arrowhead display 26 of current vehicle position and the direction of actual vehicle travel.”).)



(Lefebvre, EX1006 at FIG. 2 (annotated).)

181. Khavakh in combination with Lefebvre and the knowledge of a POSITA teaches and renders obvious limitation [19d]. For the reasons discussed above, Khavakh in combination with Lefebvre and the knowledge of a POSITA also teaches and renders obvious limitation [1d].

- f) **Khavakh In Combination With Lefebvre Teaches And Renders Obvious “inputting, by utilizing an input unit of the navigation apparatus, a command indicating whether or not to travel via said first next waypoint in response to the outputted message” And “an input unit configured to input a command indicating whether or not to travel via said first next waypoint in response to the message outputted by said output unit.”**

182. Khavakh in combination with Lefebvre teaches and renders obvious “inputting, by utilizing an input unit of the navigation apparatus, a command indicating whether or not to travel via said first next waypoint in response to the outputted message” (“limitation [19e]”) and “an input unit configured to input a command indicating whether or not to travel via said first next waypoint in response to the message outputted by said output unit” (“limitation [1e]”).

183. Khavakh discloses that navigation system 10 (*i.e.*, the navigation apparatus or device) has a user interface 31 that “includes appropriate equipment that allows the end-user to input information into the navigation system.” (Khavakh, EX1005 at 4:7-10 (“The navigation system 10 also includes a user interface 31. The user interface 31 includes appropriate equipment that allows the end-user to input information into the navigation system.”).) “The equipment used to input information into the navigation system may include a keypad, a keyboard, a microphone, etc., as well as appropriate software, such as a voice recognition

program.” (*Id.* at 4:16-19.)

184. A POSITA would have understood that Khavakh’s keypad, keyboard, or microphone is an “input unit” of navigation system 10 because they function to input user commands (*e.g.*, “a request for a route to a desired destination”) into Khavakh’s navigation system 10. (*Id.* at 4:7-19.)

185. As demonstrated above in Section X(A)(1), a POSITA would have been motivated to combine Khavakh with Lefebvre’s off route display 20.

186. The combination of Khavakh with Lefebvre’s off route display 20 teaches inputting, by utilizing an input unit of the navigation apparatus, a command indicating whether or not to travel via said first next waypoint in response to the outputted message.

187. Lefebvre’s off route display 20 “includes a recovery option table portion 29” that “comprises a table listing of six different recovery option legends numbered 1 through 6.” (Lefebvre, EX1006 at 5:45-49.) “Each of these legends represents a different recovery option which can be selected by the vehicle operator by means of [an] input device 12,” and “[e]ach option represents a different manner of off route navigation recovery which is [] selectable by the vehicle operator.” (*Id.* at 5:49-54.) The recovery option table portion 29 allows the vehicle driver to “select

the recovery option which best suits his needs” in response to the output of Lefebvre’s display 20 (*i.e.*, the claimed “message”). (*Id.* at 8:31-38.)

188. One of the recovery options in Lefebvre’s recovery option table portion 29 is an option to “guide me back to planned route.” (*Id.* at FIG. 2, 9:67-10:4.) Lefebvre teaches that when this option is selected, a start point is set at the vehicle’s current location, a first destination point is set “at the point 25 at which actual vehicle travel deviated from the current navigation route,” and the next destination points for the trip are set to the “previous trip destinations which were not yet reached during previous vehicle travel.” (*Id.* at 10:4-11.) A route is then calculated “which includes getting back to the deviation point 25 and then, using the same trip preferences and detours previously specified, reaching the end destinations that were previously specified.” (*Id.* at 10:12-16.) According to Lefebvre, the “guide me back to planned route” option is desirable when the user “merely [wants to] get back to [the] original route and receive guidance instructions on how to do that.” (*Id.* at 10:16-20.)

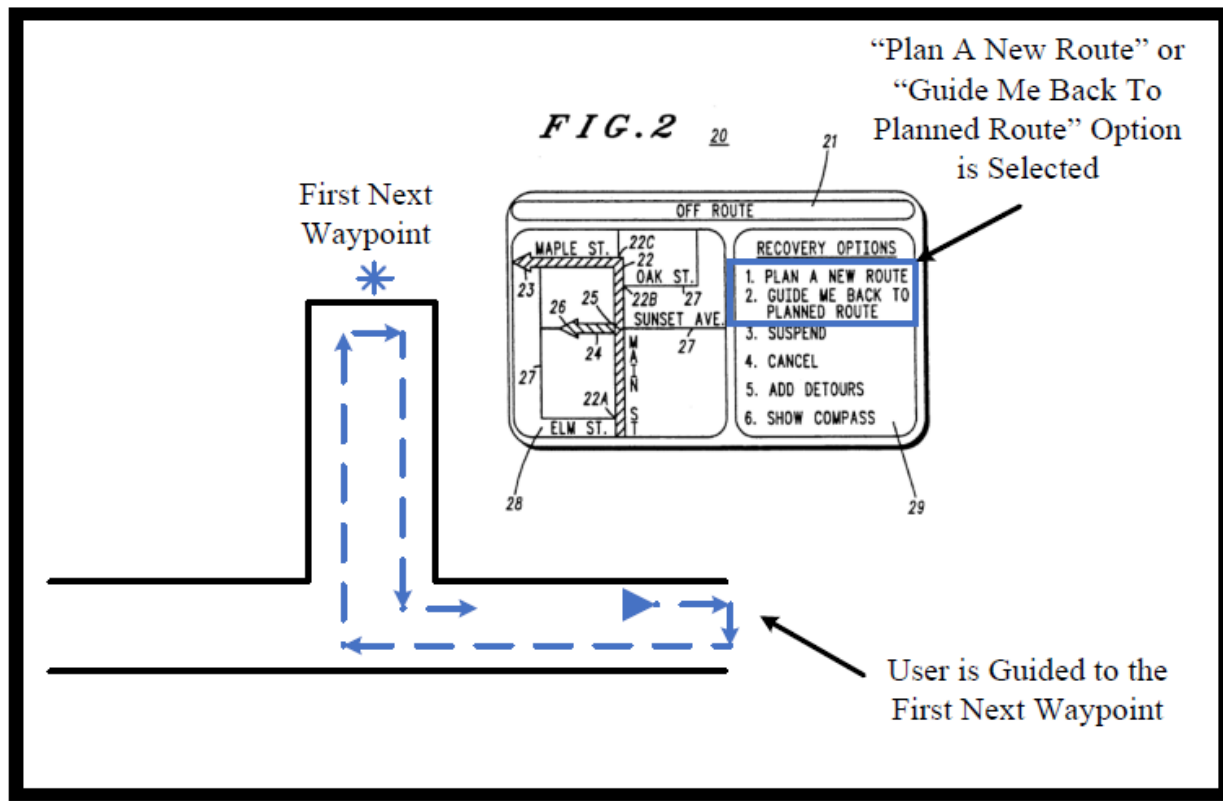
189. Like the “guide me back to planned route” option, Lefebvre teaches that recovery option table portion 29 includes an option to “plan a new route.” (*Id.* at FIG. 2, 9:44-66.) When the “plan a new route” option is selected, a start point is set

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at the vehicle's current location and a new route is calculated to the previously specified destination(s) subject to the originally specified route preferences. (*Id.* at 9:44-66 ("The block 50 essentially asks if the 1st option of planning a new route has been selected. If so, control passes to a process block 51 which sets the start point of a new trip at the vehicle's current location as measured by the sensors 14 in combination with the navigation computer 11. This current location will then replace the original start location held in the memory portion 11A of the computer 11 wherein this original start location resulted in the previous calculation of the navigation route. Then control passes to a process block 52 which cancels the off route display comprising the display 20 and control returns to the terminal 38 and then to the process block 39. What this does is calculate a new navigation route, upon receipt of recovery option 1 selection instructions from the vehicle operator, wherein now the new route is from the vehicle's current position to the previously specified destination. This new route still utilizes the previous destination, route preference and trip detour data that were stored as trip data in the memory portion 11A of the computer 11. The off route display 20 is cancelled by process block 52 since the vehicle is no longer off route because a new route is now calculated for the vehicle from its present position.").)

190. The combination of Khavakh with Lefebvre teaches inputting, using Khavakh's keypad, keyboard, or microphone (*i.e.*, the input unit), a command to execute the "plan a new route" option or the "guide me back to planned route" option in response to the output of Lefebvre's off route display 20 (*i.e.*, the claimed "message"). (Lefebvre, EX1006 at 9:30-42; Khavakh, EX1005 at 3:47-60.)

191. Inputting the command to execute the "plan a new route" option or the "guide me back to planned route" option reads on inputting a command indicating to travel via said first next waypoint because the command to execute either of these options causes the user to be guided to the bypassed first next waypoint by either (i) calculating a new route to the previously specified destination via the previously specified intermediate waypoints, including the first next waypoint (the "plan a new route" option); or (ii) calculating a route that returns to user to the route deviation point and then resumes the originally calculated route, which passes through the first next waypoint (the "guide me back to planned route" option). (Lefebvre, EX1006 at 9:44-10:22; Khavakh, EX1005 at 7:4-6, 8:21-26, 10:8-15, 13:56-61, 22:55-23:3, 32:35-54.)

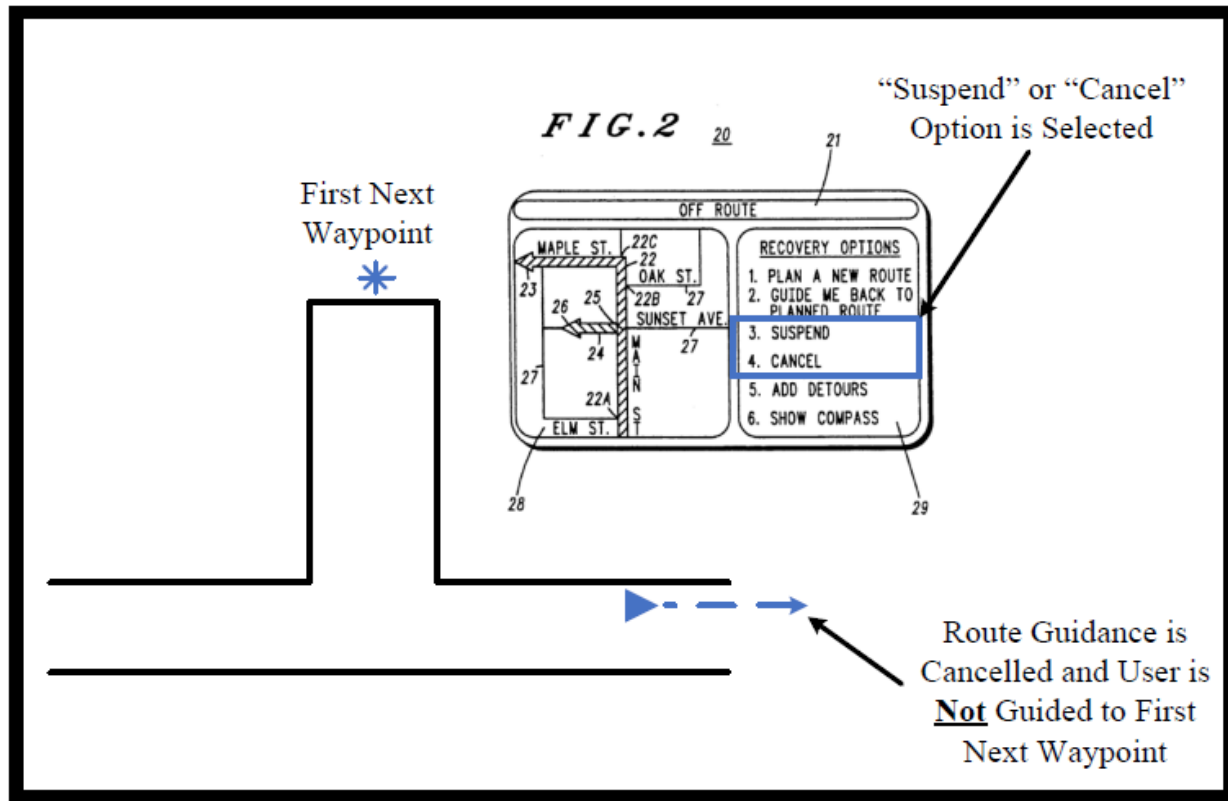


(Lefebvre, EX1006 at FIG. 2 (annotated).)

192. Lefebvre further teaches that two additional recovery options in recovery option table portion 29 are options to “suspend” or “cancel” the route guidance. (Lefebvre, EX1006 at FIG. 2, 10:23-59.) When the driver selects the “suspend” or “cancel” options, route guidance is cancelled and the off route display 20 is removed. (*Id.*) According to Lefebvre, the “suspend” and “cancel” options are useful when the user has intentionally deviated from the originally calculated route. (*Id.*)

193. The combination of Khavakh with Lefebvre also teaches inputting, using Khavakh's keypad, keyboard, or microphone (*i.e.*, the input unit), a command to execute the "suspend" option or the "cancel" option in response to the output of Lefebvre's off route display 20 (*i.e.*, the claimed "message"). (Lefebvre, EX1006 at 9:30-42; Khavakh, EX1005 at 3:47-60.)

194. Inputting the command to execute the "suspend" option or the "cancel" option reads on inputting a command indicating not to travel via said first next waypoint because the command to execute either of these options causes route guidance to be cancelled (*i.e.*, the user is not guided to the first next waypoint) and is used when the driver has intentionally deviated from the originally calculated route. (Lefebvre, EX1006 at 10:23-59.)



(Lefebvre, EX1006 at FIG. 2 (annotated).)

195. Khavakh in combination with Lefebvre teaches and renders obvious limitation [19e]. For the reasons discussed above, Khavakh in combination with Lefebvre also teaches and renders obvious limitation [1e].

3. Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Renders Obvious Dependent Challenged Claims 2, 7-12, And 16-17.

a) Khavakh In Combination With Lefebvre Teaches And Renders Obvious The Additional Limitations of Challenged Claim 2.

196. Khavakh in combination with Lefebvre teaches and renders obvious the

additional limitations of Challenged Claim 2: “The navigation device according to claim 1, wherein when the command is inputted from the input unit, the output unit deletes the message which said output unit outputs and the route searching unit re-searches for a new whole route.”

197. When a command to execute the “plan a new route” option or the “guide me back to planned route” option is inputted from the keypad, keyboard, or microphone (*i.e.*, the input unit), the display 27 (*i.e.*, the output unit) deletes the off route display 20 (*i.e.*, the message which the output unit outputs) and the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route. (Lefebvre, EX1006 at 9:43-66, 10:4-16; Khavakh, EX1005 at 30:17-20, claim 9.)

198. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 2.

b) Khavakh In Combination With Lefebvre Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 7.

199. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 7: “The navigation device according to claim 1, wherein when the command indicating that the vehicle travels via the first next waypoint is inputted, the route searching unit re-searches for a new whole route leading to the destination via said first next waypoint.”

200. When the command indicating that the vehicle travels via the first next waypoint (*i.e.*, a command to execute the “plan a new route” option or the “guide me back to planned route” option) is inputted, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the destination via the first next waypoint. (Lefebvre, EX1006 at 9:43-66, 10:4-16; Khavakh, EX1005 at 8:21-26, 10:8-15, 13:56-61, 22:55-23:3, 30:17-20, 32:35-54, claim 9.)

201. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 7.

c) Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 8.

202. Khavakh in combination with Lefebvre and the knowledge of a POSITA teaches and renders obvious the additional limitations of Challenged Claim 8: “The navigation device according to claim 1, wherein the output unit includes a display unit, and the input unit inputs the command according to either pushing down of a button displayed on a screen of said display unit, or voice.”

203. Khavakh’s output unit includes a display 27 (*i.e.*, a display unit). (Khavakh, EX1005 at 4:19-22.) Further, Khavakh’s input unit includes a microphone and a voice recognition program for inputting the claimed command

according to voice. (*Id.* at 4:16-19.)

204. While Khavakh does not expressly disclose a display that can input a command according to pushing down a button displayed on the screen of the display (*i.e.*, a touch screen), it would have been obvious to modify Khavakh's display 27 to be a touch screen display.

205. Prior to the alleged invention of the '971 patent, touch screen displays were well known and widely used in navigation devices. (*See, e.g.*, Tamai, EX1014 at 2:57-61, 4:53-55; Nimura, EX1015 at 3:40-43, 3:51-62; AVIC-Z1, EX1016 at 25-26; EP '416, EX1018 at [0008].) A POSITA would have been motivated to modify Khavakh's display 27 to be a touch screen because touch screens provide a clear, simple, easy-to-use user interface that saves space by eliminating the need for additional hardware (*e.g.*, a keypad or keyboard) that can be difficult and distracting to use while driving (thus increasing safety). A POSITA would have had a reasonable expectation of success because touch screens were widely used and well understood prior to the alleged invention of the '971 patent, and the proposed modification would have comprised the simple substitution of one piece of well-known hardware for another.

206. Khavakh in combination with Lefebvre and the knowledge of a

POSITA teaches and renders obvious the additional limitations of Challenged Claim 8.

d) Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Renders Obvious The Additional Limitations Of Challenged Claim 9.

207. Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious the additional limitations of Challenged Claim 9: “The navigation device according to claim 1, wherein when the command is not inputted from the input unit even if a predetermined period of time has elapsed after the output unit outputs the message showing that the vehicle has deviated from the route, the output unit deletes the message which said output unit outputs and the route searching unit re-searches for a new whole route.”

208. Lefebvre provides extensive detail regarding what happens after a driver selects one of the recovery options from the recovery option table portion 29 of off route display 20. (Lefebvre, EX1006 at FIG. 3C, 9:43-11:41.) Lefebvre does not specify what happens if the driver fails to notice, or forgets to respond to, the off route display 20. (*Id.*)

209. A POSITA would have recognized that Khavakh itself teaches what to do in the above scenario. Khavakh teaches that a “reroute function can be implemented automatically without waiting for the end-user to request that rerouting

be performed.” (Khavakh, EX1005 at 30:20-22.) When Khavakh’s automatic reroute function is activated, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the bypassed first next waypoint. (*Id.* at 29:40-55, 30:19-20, 30:33-60.)

210. A POSITA would have found it obvious to execute Khavakh’s automatic reroute function when the driver fails to select one of the route recovery options from the recovery option table portion 29 (*i.e.*, fails to input a command using the input unit) after a predetermined period of time has elapsed after the output unit outputs the off route display 20 (*i.e.*, outputs the message showing that the vehicle has deviated from the route).

211. A POSITA would have known that if the driver fails to respond to the off route display 20 after a certain period of time has elapsed, then it is reasonable to assume that the driver has failed to notice, or has forgotten to respond to, the off route display 20. A POSITA also would have known that without some sort of intervention in the above scenario, the driver may unwittingly continue driving further away from the calculated route for an indefinite period.

212. A POSITA would have been motivated to execute Khavakh’s automatic reroute function after a predetermined period of inaction has elapsed to

minimize the extent of the driver's deviation from the calculated route. A POSITA also would have been motivated to delete the off route display 20 when the automatic reroute function is executed so that the driver can see the new driving directions and "since the vehicle is no longer off route because a new route is now calculated for the vehicle from its present position." (Lefebvre, EX1006 at 9:63-66.) Indeed, deleting a navigation system menu if no selection is made within a predetermined time period was well-known in the art. (*See, e.g.*, Kolletzki, EX1022 at 5:24-33, 6:51-54, 7:12-15, 8:48-50; CA '765, EX1023 at 4:4-15, 5:22-28, 11:12-18, claim 2, claim 8.)

213. Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious the additional limitations of Challenged Claim 9.

e) Khavakh In Combination With Lefebvre Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 10.

214. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 10: "The navigation device according to claim 1, wherein when the route guidance unit determines that the vehicle has deviated from the route to the predetermined distance or more in a state in which the output unit outputs the message showing that the vehicle has deviated from the route, the output unit deletes the message which said output unit outputs and the route

searching unit re-searches for a new whole route.”

215. As demonstrated above with respect to limitation [19d], when the route guidance tool 91 or the route guidance program in navigation application 47 (*i.e.*, the route guidance unit) determines that the vehicle has deviated from the route to the predetermined distance or more, the navigation system 10 enters a state in which the display 27 (*i.e.*, the output unit) outputs the off route display 20 (*i.e.*, the message showing that the vehicle has deviated from the route). The output unit then deletes the message and the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route when a command to execute the “plan a new route” option or the “guide me back to planned route” option is inputted from the input unit. (Lefebvre, EX1006 at 9:43-66, 10:4-16, FIG. 3C.)

216. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 10.

f) Khavakh Teaches The Additional Limitations Of Challenged Claim 11.

217. Khavakh teaches the additional limitations of Challenged Claim 11: “The navigation device according to claim 9, wherein the route searching unit re-searches for a new whole route leading to the destination via the first next waypoint.”

218. As demonstrated above with respect to Challenged Claim 9, when

Khavakh's automatic reroute function is activated, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the bypassed first next waypoint. (Khavakh, EX1005 at 29:40-55, 30:19-20, 30:33-60.)

g) Khavakh In Combination With Lefebvre Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 12.

219. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 12: “The navigation device according to claim 10, wherein the route searching unit re-searches for a new whole route leading to the destination via the first next waypoint.”

220. When a command to execute the “plan a new route” option or the “guide me back to planned route” option is inputted, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the destination via the first next waypoint. (Lefebvre, EX1006 at 9:43-66, 10:4-16, FIG. 3C; Khavakh, EX1005 at 29:40-55, 30:19-20, 30:33-60.)

221. Khavakh in combination with Lefebvre teaches and renders obvious the additional limitations of Challenged Claim 12.

h) Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Renders Obvious The Additional Limitations Of Challenged Claim 16.

222. Khavakh in combination with Lefebvre renders obvious the additional limitations of Challenged Claim 16: “The navigation device according to claim 1, wherein when the command is not inputted from the input unit even if a predetermined period of time has elapsed after the output unit outputs the message showing that the vehicle has deviated from the route, the output unit deletes the message which said output unit outputs and the route searching unit re-searches for a new whole route leading to the destination via the first next waypoint, a new whole route leading to the destination via another waypoint when the other waypoint exists forward of said first next waypoint, or a new whole route leading to the destination when no other waypoint exists forward of said first next waypoint.”

223. As demonstrated above with respect to Challenged Claim 9, a POSITA would have found it obvious to delete off route display 20 (*i.e.*, the message showing that the vehicle has deviated from the route) and execute Khavakh’s automatic reroute function when the user fails to select one of the route recovery options from the recovery option table portion 29 (*i.e.*, fails to input a command using the input unit) after a predetermined period of time has elapsed after the output unit outputs

the off route display 20.

224. When Khavakh's automatic reroute function is activated, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the bypassed first next waypoint. (Khavakh, EX1005 at 29:40-55, 30:19-20, 30:33-60.)

225. Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious the additional limitations of Challenged Claim 16.

i) Khavakh In Combination With Lefebvre And The Knowledge Of A POSITA Renders Obvious The Additional Limitations Of Challenged Claim 17.

226. Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious the additional limitations of Challenged Claim 17: "The navigation device according to claim 1, wherein when the command is not inputted from the input unit even if the vehicle travels a fixed distance after the output unit outputs the message showing that the vehicle has deviated from the route, the output unit deletes the message which said output unit outputs and the route searching unit re-searches for a new whole route leading to the destination via the first next waypoint, a new whole route leading to the destination via another waypoint when the other waypoint exists forward of said first next waypoint, or a new whole route

leading to the destination when no other waypoint exists forward of said first next waypoint.”

227. As demonstrated above with respect to Challenged Claim 9, a POSITA would have found it obvious to delete off route display 20 (*i.e.*, the message showing that the vehicle has deviated from the route) and execute Khavakh’s automatic reroute function when the driver fails to select one of the route recovery options from the recovery option table portion 29 (*i.e.*, fails to input a command using the input unit) after a certain inactivity period has elapsed after the output unit outputs the off route display 20. When Khavakh’s automatic reroute function is activated, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the bypassed first next waypoint. (Khavakh, EX1005 at 29:40-55, 30:19-20, 30:33-60.)

228. A POSITA would have recognized that there were only a finite number of known ways to determine when to execute Khavakh’s automatic reroute function (*e.g.*, elapsed time or vehicle driving distance) and that either option would have provided a satisfactory estimate of when intervention is needed due to user inactivity. (*See, e.g.*, Lefebvre, EX1006 at 3:66-4:1 (disclosing an option to resume a previous route “within a specified amount of vehicle travel”).) A POSITA would

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have found it obvious to execute Khavakh's automatic reroute function when the user fails to select one of the route recovery options from the recovery option table portion 29 after the vehicle has traveled a predetermined distance after the output unit outputs the off route display 20.

229. Khavakh in combination with Lefebvre and the knowledge of a POSITA renders obvious the additional limitations of Challenged Claim 17.

B. Ground 2: Khavakh In Combination With Lefebvre, RDX, And The Knowledge Of A POSITA Renders Obvious Challenged Claims 3-4 And 14.

1. Motivation to Combine Khavakh And Lefebvre With RDX.

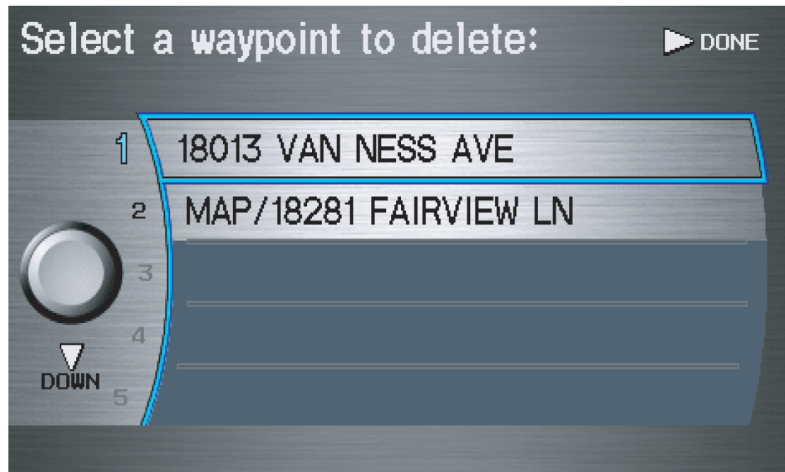
230. Lefebvre discloses that one of the benefits of its off route display 20 is to provide the driver with numerous recovery options. (Lefebvre, EX1006 at 3:63-4:3, 5:43-58, 8:31-37, 11:51-53.) One of Lefebvre's recovery options, the suspend route guidance option, allows the driver to suspend route guidance when the driver intentionally deviates from the calculated route (*e.g.*, to take a side trip). (*Id.* at 10:23-34.) The driver can then later choose to resume route guidance to the previously specified waypoints and destination. (*Id.* at 10:34-45.)

231. An additional recovery option is the add detours option, which allows the user to add "roads or areas to be avoided" to the route. (*Id.* at 10:60-67.) When the add detours option is selected, the navigation system calculates a new route to

the previously set waypoints and destination that avoids the roads and areas the driver specified. (*Id.* at 10:68-11:11.)

232. While Lefebvre recognizes that a driver may desire to intentionally deviate from the calculated route or may desire to avoid a specific area, a POSITA would have recognized that Lefebvre's recovery options do not account for the scenario where the driver intentionally deviates from the calculated route to avoid a waypoint but wants to continue route guidance to the destination without being directed to the bypassed waypoint.

233. In the same field of endeavor, RDX discloses a navigation system that allows the driver to set a destination and one or more intermediate waypoints. (RDX, EX1007 at 5-6, 71.) After the waypoints and destination are set, the navigation system guides the driver to the destination via the waypoints in the order the waypoints were entered. (*Id.* at 71.) RDX's navigation system also allows the driver to delete waypoints using the menu shown below. (*Id.* at 72.) When a waypoint is deleted, the "route is re-calculated to reflect the changes [the driver] made to the waypoint(s)." (*Id.*) In other words, when a waypoint is deleted, the navigation system will re-calculate a route that guides the driver to the originally specified destination without guiding the driver to the deleted waypoint. (*Id.*)



(*Id.*)

234. A POSITA would have been motivated to combine Khavakh and Lefebvre with RDX's waypoint deletion menu, with the waypoint deletion menu being implemented as a sub-menu under either the add detours option or a separate seventh route recovery option.

235. The proposed combination would have beneficially provided the driver with greater off route recovery flexibility, which is consistent with the goal of Lefebvre's off route display 20. (Lefebvre, EX1006 at 5:54-58, 10:20-22.) The proposed combination would have desirably allowed the driver to intentionally bypass a waypoint without cancelling route guidance and without being directed back to the bypassed waypoint. Instead, the driver would simply delete the bypassed waypoint using the waypoint deletion menu, and the system would automatically re-

calculate a route to the original destination without guiding the driver to the bypassed waypoint. (RDX, EX1007 at 72.) This would avoid the unwanted scenario where, when the driver intentionally bypasses a waypoint, the driver is forced to either (i) cancel route guidance and then manually re-enter the waypoints and destination that the driver still wants to travel to, or (ii) continue route guidance and be directed to a waypoint that the driver no longer wants to travel to. Both scenarios are frustrating and time consuming, with the former scenario also being potentially dangerous if the driver attempts to re-enter the destination and waypoints while driving. Thus, a POSITA would have been motivated to combine Khavakh and Lefebvre with RDX to increase off route recovery flexibility, driver convenience and satisfaction, system and route efficiency, and driver safety through minimizing manual driver inputs and leveraging automation.

236. Lefebvre itself also acknowledges that “further modifications and improvements will occur to those skilled in the art” such as “providing additional off route recovery options in addition to those described,” and that “[a]ll such modifications which retain the basic underlying principles disclosed and claimed herein are within the scope of this invention.” (Lefebvre, EX1006 at 12:5-12.) Thus, Lefebvre itself invites a POSITA to make the proposed combination. The proposed

combination would have desirably allowed the driver to avoid not only roads and areas, but waypoints as well, and would have provided greater flexibility to driver that intentionally deviate from a calculated route.

237. A POSITA would have had a reasonable expectation of success in combining Khavakh and Lefebvre with RDX's waypoint deletion menu. A POSITA would have recognized that Khavakh already has software for inputting and modifying waypoints. (Khavakh, EX1005 at 4:7-13, 8:52-65, 13:47-61.) The proposed combination would have merely required routine, straightforward adjustments to the programming in Khavakh's navigation system (*i.e.*, simply adding a new menu option) and would have been well within the skill set of a POSITA.

2. Khavakh In Combination With Lefebvre And RDX Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 3.

238. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 3: "The navigation device according to claim 1, wherein when the command indicating that the vehicle does not travel via the first next waypoint is inputted, the output unit outputs a waypoint list in which a list of the waypoints set by the setting unit is shown, and the route

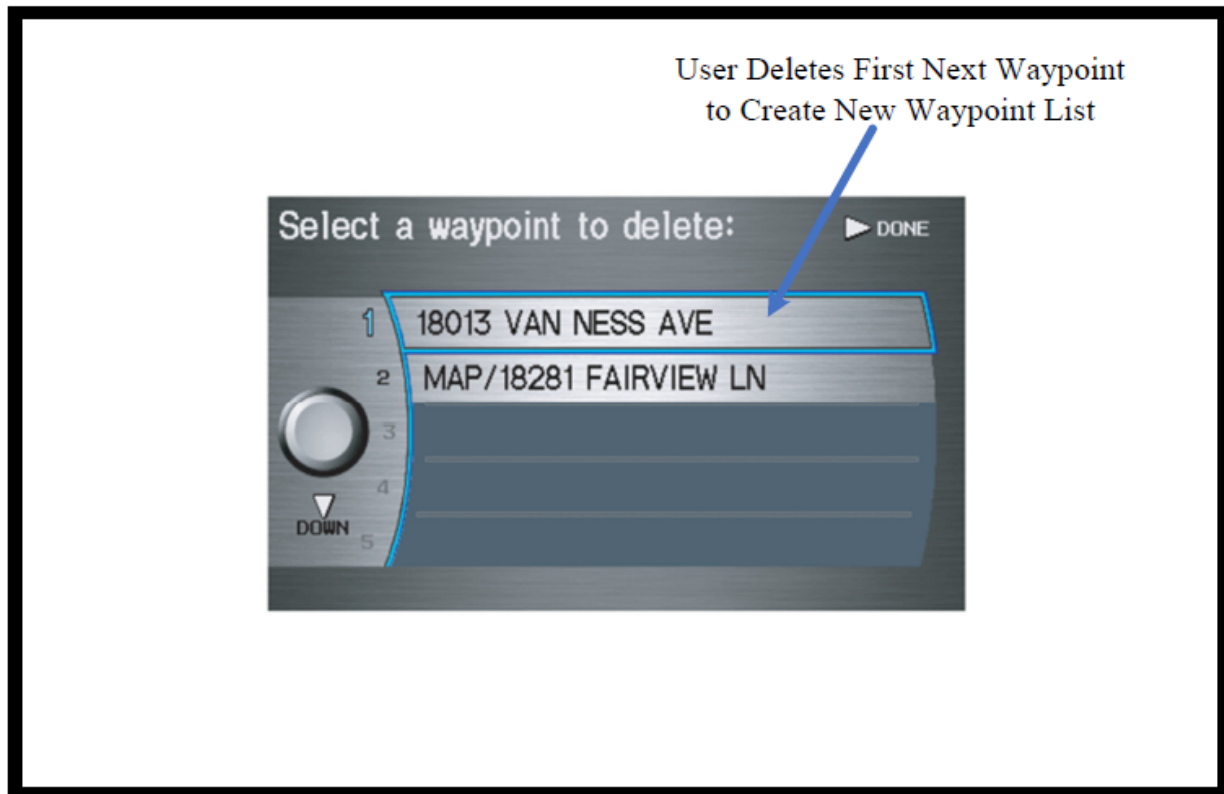
searching unit re-searches for a new whole route according to a new waypoint list which is acquired by changing the waypoint list outputted by said output unit by using said input unit.”

239. As demonstrated above in Section X(B)(1), a POSITA would have been motivated to combine Khavakh and Lefebvre with RDX’s waypoint deletion menu, with the waypoint deletion menu being implemented as a sub-menu under either the add detours option or a separate seventh route recovery option. In the proposed combination, when the driver selects the add detours option (or, alternatively, a separate seventh route recovery option) from the off route display 20, the display 27 (*i.e.*, the output unit) outputs the waypoint deletion menu, which is a list showing all the waypoints set by the setting unit (*i.e.*, a waypoint list). (RDX, EX1007 at 71-72.) The command to bring up the waypoint deletion menu is a command indicating that the vehicle does not travel via the first next waypoint because, as discussed below, the waypoint deletion menu is a menu used to remove waypoints that the driver does not wish to travel to. (*Id.* at 72.)

240. Once the waypoint deletion menu is displayed, the driver can delete the bypassed first next waypoint using Khavakh’s input unit. (RDX, EX1007 at 72.) Deleting the first next waypoint using the input device creates a new waypoint list

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that no longer contains the deleted first next waypoint. (*Id.*) The route calculation tool 40 (*i.e.*, the route searching unit) then re-searches for a new whole route leading to the original destination via the waypoints that remain in the new waypoint list. (*Id.* at 72.)



(RDX, EX1007 at 72 (annotated).)

241. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 3.

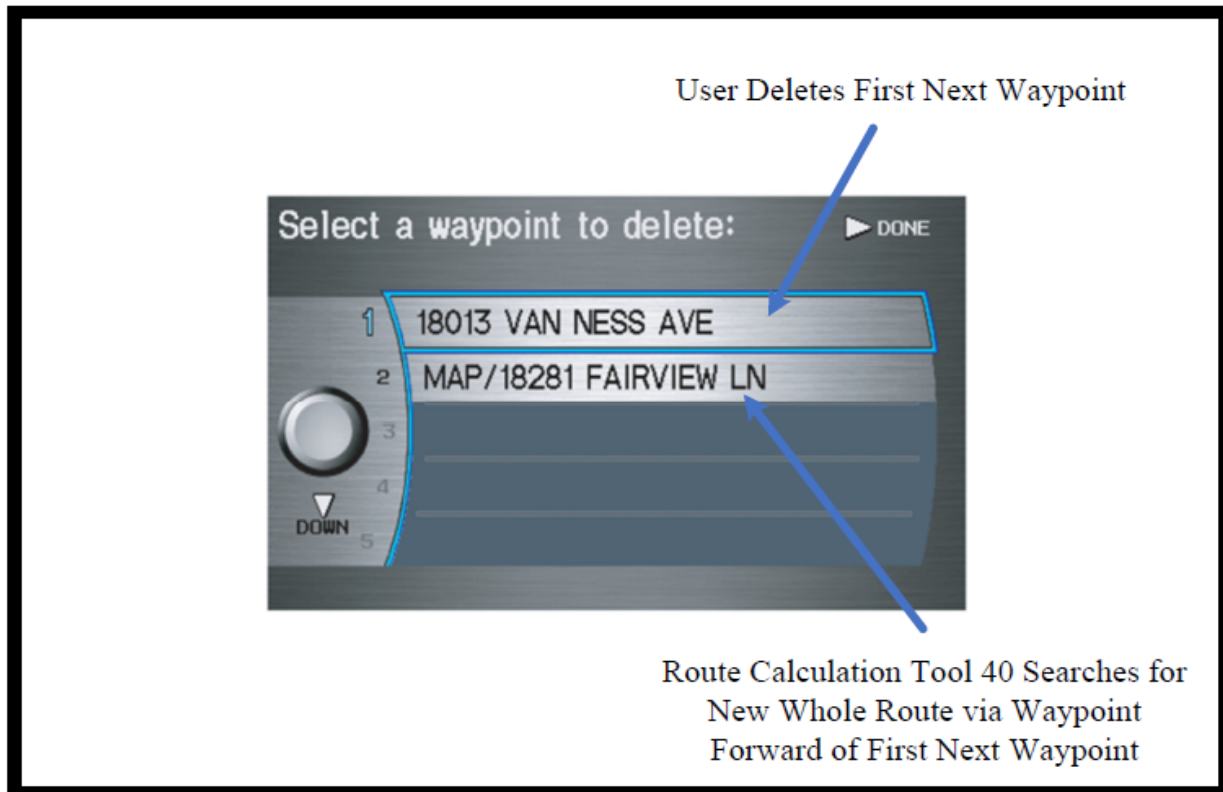
3. Khavakh In Combination With Lefebvre And RDX Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 4.

242. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 4: “The navigation device according to claim 1, wherein when the command indicating that the vehicle does not travel via the first next waypoint is inputted, the route searching unit re-searches for a new whole route leading to the destination via another waypoint when the other waypoint exists forward of the first next waypoint, or re-searches for a new whole route leading to the destination when no other waypoint exists forward of the first next waypoint.”

243. As demonstrated above in Section X(B)(1), a POSITA would have been motivated to combine Khavakh and Lefebvre with RDX’s waypoint deletion menu. In the proposed combination, when the driver deletes the first next waypoint using the waypoint deletion menu, the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the non-deleted waypoint that remains in the waypoint list (*i.e.*, a waypoint forward of the first next waypoint). (RDX, EX1007 at 72; *see also id.* at 71 (“Waypoints are routed to in the order they were entered (number 1 first, etc.)”).) A POSITA would

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have understood that if no waypoint remains after the first next waypoint is deleted (*i.e.*, no other waypoint exists forward of the first next waypoint), then the route calculation tool 40 simply re-searches for a new whole route leading to the original destination. (*Id.* at 71-72.)



(RDX, EX1007 at 72 (annotated).)

244. A POSITA would have understood that inputting a command to delete the first next waypoint using the waypoint deletion menu reads on inputting a command indicating that the vehicle does not travel via the first next waypoint

because, as discussed above, deleting the first next waypoint causes a new route to be calculated that does not include the deleted first next waypoint. (RDX, EX1007 at 72.)

245. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 4.

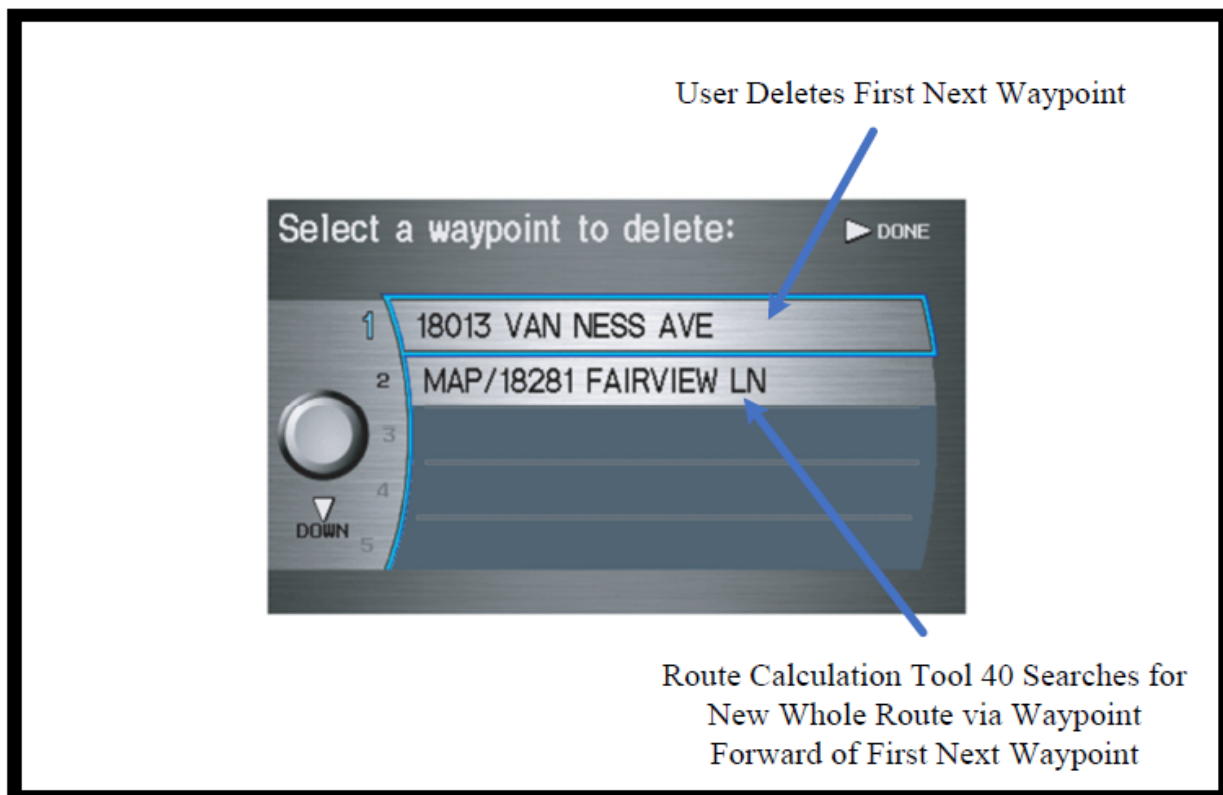
4. Khavakh In Combination With Lefebvre And RDX Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 14.

246. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 14: “The navigation device according to claim 10, wherein the route searching unit re-searches for a new whole route leading to the destination via another waypoint when the other waypoint exists forward of the first next waypoint, or re-searches for a new whole route leading to the destination when no other waypoint exists forward of the first next waypoint.”

247. In the proposed combination, when the driver deletes the first next waypoint using the waypoint deletion menu and selects “done,” the waypoint deletion menu is deleted and the route calculation tool 40 (*i.e.*, the route searching unit) re-searches for a new whole route leading to the original destination via the non-deleted waypoint that remains in the waypoint list (*i.e.*, a waypoint forward of the first next waypoint). (RDX, EX1007 at 72; *see also id.* at 71 (“Waypoints are

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routed to in the order they were entered (number 1 first, etc.)”).) A POSITA would have understood that if no waypoint remains after the first next waypoint is deleted (*i.e.*, no other waypoint exists forward of the first next waypoint), then the route calculation tool 40 simply re-searches for a new whole route leading to the original destination. (*Id.* at 71-72.)



(RDX, EX1007 at 72 (annotated).)

248. Khavakh in combination with Lefebvre and RDX teaches and renders obvious the additional limitations of Challenged Claim 14.

XI. CONCLUSION

- Challenged Claims 1-2, 7-12, 16-17, and 19 are unpatentable and invalid as obvious over Khavakh (EX1005) in combination with Lefebvre (EX1006) and the knowledge of a POSITA; and
- Challenged Claims 3-4 and 14 are unpatentable and invalid as obvious over Khavakh (EX1005) in combination with Lefebvre (EX1006), RDX (EX1007), and the knowledge of a POSITA.

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I have prepared this Declaration based upon my review of the materials referenced and my own personal knowledge, education, skill, and experience. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Date: November 16, 2023

A handwritten signature in black ink, appearing to read "David H. Williams", written over a horizontal line.

David H. Williams