

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. 8,244,465 to Arita

Case No.: IPR2024-00172

DECLARATION OF DAVID H. WILLIAMS

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TABLE OF EXHIBITS

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1001	U.S. Patent No. 8,244,465 (“the ‘465 patent”)
1002	File history of U.S. Patent No. 8,244,465
1003	Declaration of David H. Williams
1004	Curriculum Vitae of David H. Williams
1005	U.S. Patent No. 6,587,787 to Yokota (“Yokota”)
1006	U.S. Patent No. 5,852,791 to Sato et al. (“Sato”)
1007	U.S. Patent No. 6,163,749 to McDonough et al. (“McDonough”)
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1010	Assignment Record Showing Change of Name from Navigation Technologies Corp. to Navteq North America, LLC
1011	Chart comparing the limitations of Challenged Claims 1 and 5 of the ‘465 patent
1012	U.S. Patent No. 6,049,755 to Lou et al. (“Lou”)
1013	U.S. Patent No. 5,121,326 to Moroto et al. (“Moroto”)
1014	U.S. Patent No. 6,061,003 to Harada (“Harada”)
1015	TomTom ONE Manual (“TomTom ONE”)
1016	U.S. Patent No. 7,054,742 to Khavakh et al. (“Khavakh”)
1017	U.S. Patent App. Pub. No. 2004/0243307 to Geelen (“Geelen”)
1018	U.S. Patent No. 6,178,380 to Millington (“Millington”)
1019	International Patent Pub. No. WO2004/076976A1 (“WO ‘976”)
1020	Japanese Patent App. Pub. No. JP2002372909A
1021	Certified English Translation of Japanese Patent App. Pub. No. JP2002372909A (“JP ‘909”)
1022	Japanese Patent App. Pub. No. JPH24285A
1023	Certified English Translation of Japanese Patent App. Pub. No. JPH24285A (“JP ‘285”)
1024	Declaration of Dr. Sylvia Hall-Ellis
1025	Curriculum Vitae of Dr. Sylvia Hall-Ellis
1026	Exhibit C 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.)

Exhibit	Description
1027	Exhibit B to MEL NavIP LLC's Infringement Contentions in <i>MEL NavIP LLC v. General Motors Company et al.</i> , Case No. 23-cv-00175 (E.D. Tex.)
1028	Docket Control Order in <i>MEL NavIP LLC v. Hyundai Motor Company et al.</i> , Case No. 23-cv-00176 (E.D. Tex.)
1029	Dingus, Thomas A. et al., " <i>Human factors engineering the TravTek driver interface</i> ," Vehicle Navigation and Information Systems Conference, pp. 749-755, 1991
1030	Dingus, Thomas A. et al., " <i>Some human factors design issues and recommendations for automobile navigation information systems</i> ," Transportation Research Part C: Emerging Technologies, Volume 1, Issue 2, pp. 119-131, 1993

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 1-3 and 5 (collectively, the “Challenged Claims”) of U.S. Patent No. 8,244,465 (“the ‘465 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 ‘465 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 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 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 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 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 '465 patent generally.

III. INFORMATION CONSIDERED

19. In preparing this Declaration, I have considered the materials and Exhibits discussed and cited herein, including the '465 patent and the prosecution history of the '465 patent. In addition, my opinions are based on my education, training, experience, and knowledge in the relevant field of navigation systems.

IV. RELEVANT LEGAL STANDARDS

20. I am not an attorney and I do not offer 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 '465 patent claims priority to a Japanese patent application filed on April

9, 2007. (EX1001 at [30].) Thus, I understand that the ‘465 patent’s earliest effective filing date is April 9, 2007.

22. I understand that my assessment of the claims of the ‘465 patent must be undertaken from the perspective of what would have been known or understood by a POSITA as of the ‘465 patent’s earliest effective filing date, taking into account the specification and file history for the ‘465 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 9, 2007, for the ‘465 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 '465 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 '465 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, 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 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 ‘465 patent, the prior art cited herein, and the factors described in Section IV(A), a POSITA in the field of the ‘465 patent as of its earliest effective filing date (*i.e.*, April 9, 2007) 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 9, 2007 (*i.e.*, the earliest effective filing date of the ‘465 patent), I was at least one of ordinary skill in the art. When I refer to the understanding of a POSITA, I am referring to the understanding of such a person as of April 9, 2007.

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 ‘465 patent.

VI. SUMMARY OF MY OPINIONS

39. I have been asked to consider the validity of Challenged Claims 1-3 and 5 of the ‘465 patent in view of certain prior art references. As explained below, it is my opinion that:

- (1) Challenged Claims 1-3 and 5 are unpatentable and invalid as obvious over Yokota (EX1005) in combination with the knowledge of a POSITA; and
- (2) Challenged Claims 1-3 and 5 are unpatentable and invalid as obvious over McDonough (EX1007) in combination with Huber (EX1008) and Tanizaki (EX1009).

VII. TECHNOLOGICAL BACKGROUND

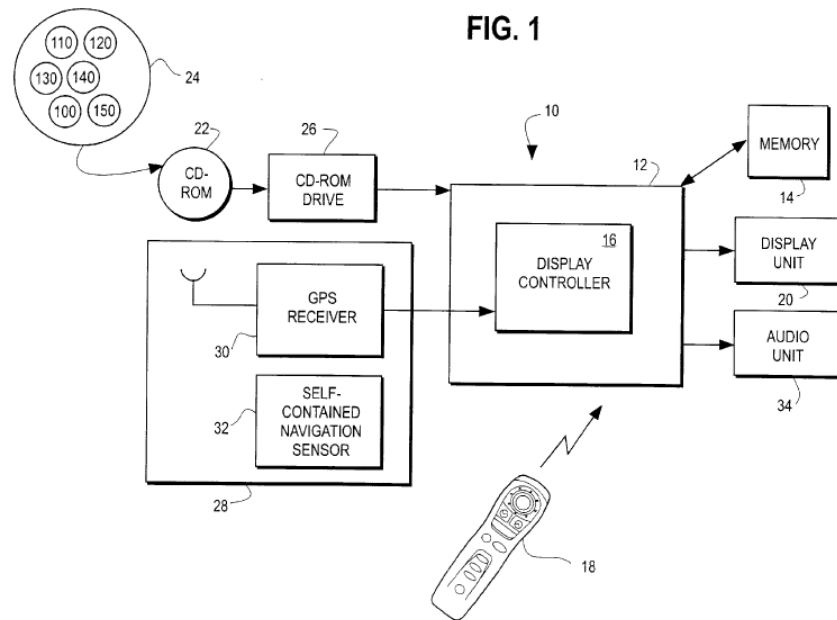
40. The ‘465 patent characterizes its “Technical Field” as generally relating to “a navigation system and a display method of a road network on the same system.”

(EX1001 at 1:7-8.) The ‘465 patent asserts that the navigation system of the ‘465 patent differs from prior art navigation systems in that the claimed navigation system maintains the continuity of the calculated route by preventing the route from being displayed with an “artificial break.” (*Id.* at 7:59-8:3, 8:14-27, 8:28-35, 9:34-45.) The prior art had already addressed displaying a calculated route in a way that maintains continuity at each map scale.

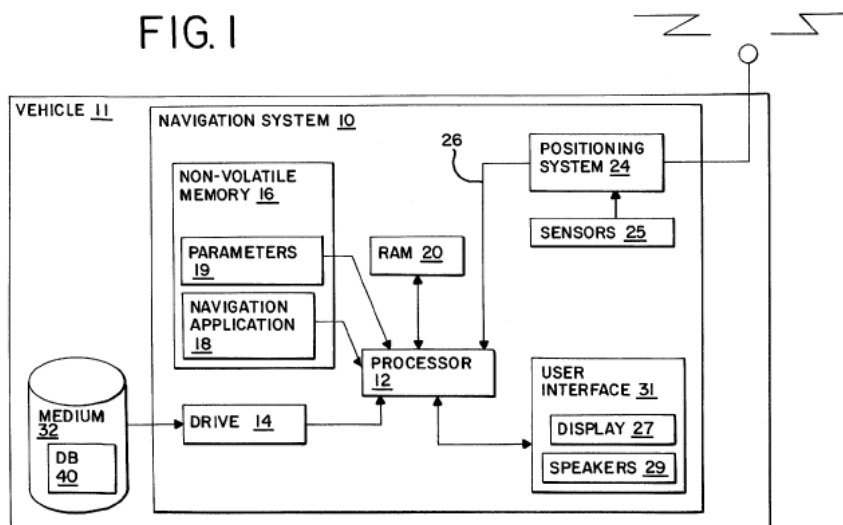
A. Navigation System Architecture.

41. Prior to the alleged invention of the ‘465 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 (*e.g.*, a remote control, a touchscreen, a keypad, etc.).

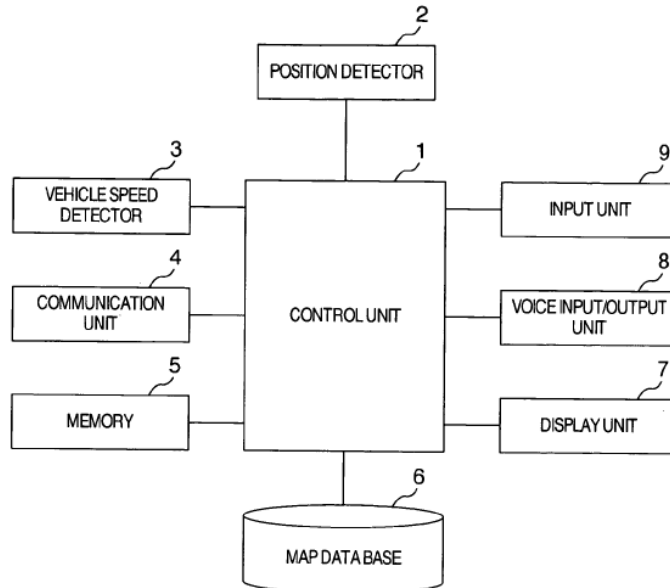
42. Several exemplary navigation systems are illustrated below in block diagram form:



(Yokota, EX1005 at FIG. 1.)



(McDonough, EX1007 at FIG. 1.)

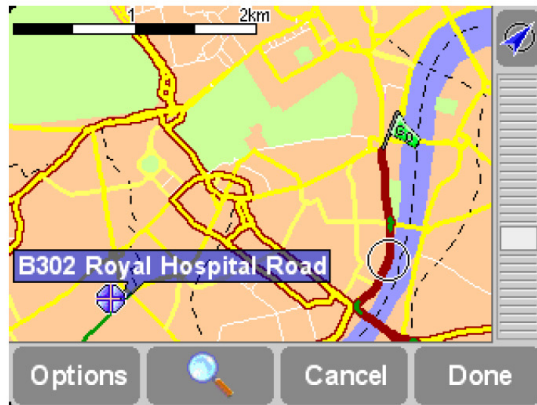


(Tanizaki, EX1009 at FIG. 1.)

43. Prior art navigation systems included a zoom functionality to allow the driver to zoom in and out on the map display using the input device. (*See, e.g.,* Yokota, EX1005 at Abstract, 1:35-43, 6:1-14; Sato, EX1006 at 8:42-50; McDonough, EX1007 at 5:53-60, 5:63-6:33; Huber, EX1008 at Abstract, 1:11-15, 1:26-56, 2:21-23, 4:24-33, 5:51-60; Tanizaki, EX1009 at [0035]-[0037]; TomTom ONE, EX1015 at 10, 19-20, 25, 39, 44-45; Geelen, EX1017 at [0051], FIGS. 5A-E; Millington, EX1018 at 1:59-62.)

44. The TomTom ONE Manual, which I understand was publicly available as of October 2005 (*see* Decl. of Hall-Ellis, EX1024, ¶¶ 18-24), illustrates an example of how a driver could zoom in and out on a map display by dragging a

“zoom control” on a touchscreen:



You can 'drag' the map to scroll it in any direction or drag the zoom control up or down to zoom out or in.

(TomTom ONE, EX1015 at 25.)

45. 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.

46. U.S. Patent No. 7,054,742 to Khavakh et al. (“Khavakh”) taught a navigation program 18 comprising a navigation application 47 for setting intermediate waypoints and a destination, a route 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, EX1016 at FIG. 4, 5:35-43, 5:49-58, 8:35-50.) Khavakh’s navigation program 18 is illustrated below:

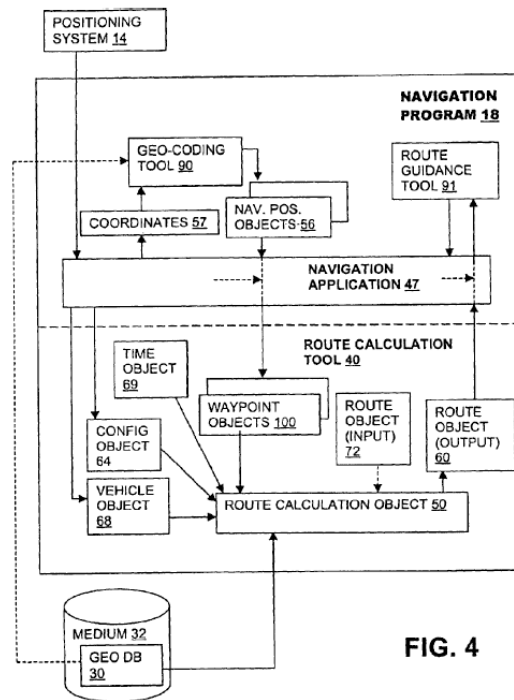
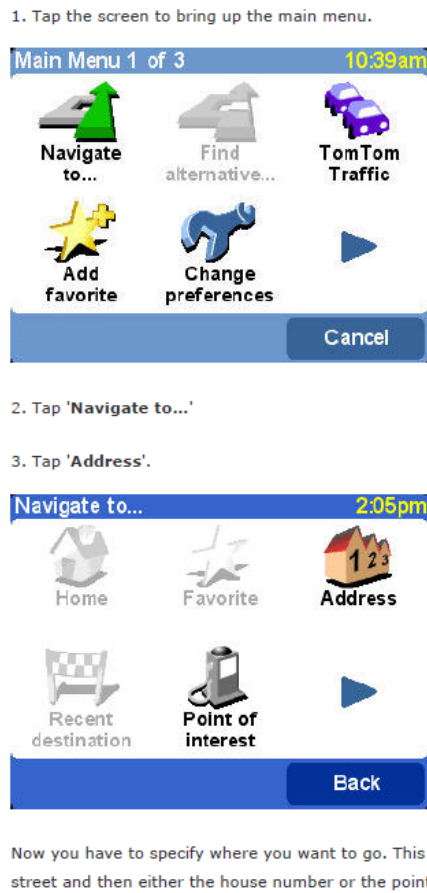


FIG. 4

(*Id.* at FIG. 4.)

47. To begin a route search, the driver would first set the destination using the input device (*e.g.*, a remote control, a keypad, a touchscreen, or the like). (*See, e.g.*, Sato, EX1006 at 1:11-13, 10:14-15; Tanizaki, EX1009 at [0042]; Lou, EX1012 at 3:17-19; Moroto, EX1013 at 5:19-23, 5:28-33; Harada, EX1014 at 7:40-49; TomTom ONE, EX1015 at 7-9; Khavakh, EX1016 at 4:7-19, 9:39-47; Geelen, EX1017 at [0057]; Millington, EX1018 at 3:24-29.)

48. The TomTom ONE Manual provides an example of setting a destination using an address entered on a touchscreen:



(TomTom ONE, EX1015 at 7.)



The route is calculated by your TomTom ONE.



7. When the route has been calculated, tap **Done**. Your TomTom ONE will immediately start giving you instructions for reaching your destination.

(*Id.* at 9.)

49. After the driver set the destination, the navigation system's processor would calculate a route from the vehicle's current position to the destination. (*See, e.g.,* Lou, EX1012 at 1:11-23 ("If the navigation system is installed in a vehicle, the starting point is typically the current position of the vehicle"); Millington, EX1018 at 3:24-29 ("Preferably, the beginning point is the current vehicle location"); *see also* Sato, EX1006 at 10:14-17; Tanizaki, EX1009 at Abstract, [0009], [0028]; Moroto, EX1013 at 9:13-18; Harada, EX1014 at 7:1-5; TomTom ONE, EX1015 at

14, 29, 46; Geelen, EX1017 at [0057].)

50. Prior art navigation systems were also configured to calculate guide routes according to well-known algorithms, such as Dijkstra's algorithm. (*See, e.g.,* Lou, EX1012 at 1:25-40, 3:17-19; TomTom ONE, EX1015 at 11, 18, 29-30, 55; Khavakh, EX1016 at 1:21-34, 6:27-35, 30:66-31:2; Geelen, EX1017 at [0028], pps. 4-5; Millington, EX1018 at 1:22-37; WO '976, EX1019 at 8:1-9; *see also* Harada, EX1014 at 8:21-24 (discussing Dijkstra's algorithm); Khavakh, EX1016 at 19:41-65 (same).) "Depending upon the predetermined algorithm of the navigation system, the navigation system [would] recommend the route with the shortest total length, the lowest total time, or some weighted average of length and time." (Lou, EX1012 at 1:35-40.)

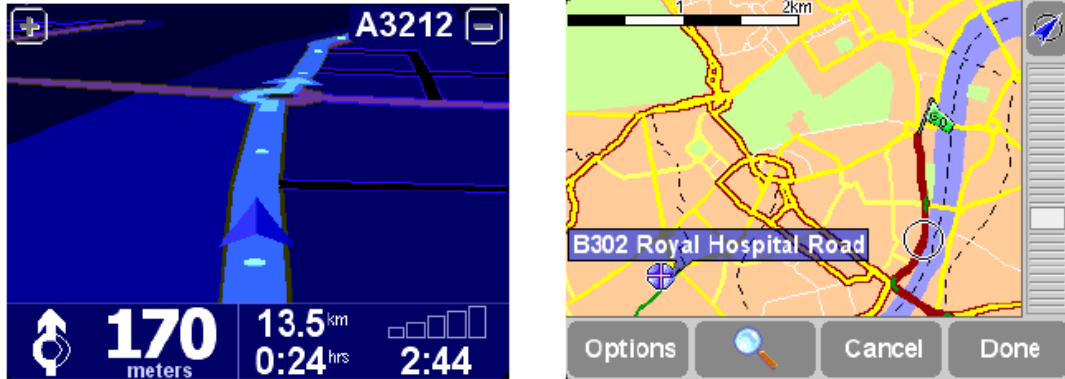
51. Many prior art navigation systems also allowed the driver to incorporate his or her preferences into the route calculation, such as a preference for avoiding tollways. (*See, e.g.,* TomTom ONE, EX1015 at 11, 18, 29-30, 55; Khavakh, EX1016 at 6:27-35; Geelen, EX1017 at [0028], pps. 4-5; WO '976 patent, EX1019 at 7:14-22.) For example, the navigation system described in the TomTom ONE Manual included a "toll charge preferences" option:

Toll charge preferences

'Toll charge preferences'  give you a chance to specify what should happen in the event of your TomTom system considering a toll road in its calculations. Select '**Always avoid toll roads**' to automatically exclude these from future routes, select '**Never avoid toll roads**' to allow a best route to be calculated regardless of any toll charges. Otherwise, simply leave this preference at its default of '**Ask me when it happens**'.

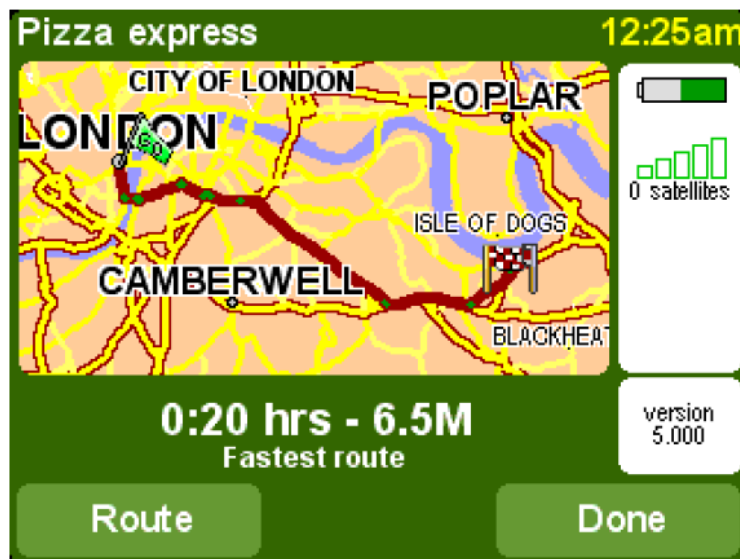
(TomTom ONE, EX1015 at 55.)

52. After the navigation system calculated a route, the navigation system would display the calculated route to the driver by highlighting (or displaying in a different color) the roads in the calculated route. (*See, e.g.*, Lou, EX1012 at 1:41-43; Moroto, EX1013 at 6:24-25; TomTom ONE, EX1015 at 9-10, 21, 25; Geelen, EX1017 at FIGS. 2A-D, 8A-D, 9A-B, 10A, 11A-B; Millington, EX1018 at 1:38-40; WO '976 patent, EX1019 at FIGS. 1-2.) The driver's desired destination would typically be represented with a star or checkered flag icon. (*See, e.g.*, Tanizaki, EX1009 at FIGS. 2A-C; Moroto, EX1013 at FIGS. 4(a)-(b); TomTom ONE, EX1015 at 9-10, 25, 52; Geelen, EX1017 at FIG. 11B.)



(TomTom ONE, EX1015 at 21, 25.)

53. An exemplary route guidance display is illustrated below showing the roads in the guide route highlighted in red and the destination represented as a checkered flag:



(TomTom ONE, EX1015 at 25.)

B. Selecting Roads For Display.

54. To create a map, prior art navigation systems would select the roads to display from the map data. Roads were usually selected based on the road type and the map scale set by the driver. At more “zoomed out” map scales, it was common to display only major roads such as interstates and highways. (*See, e.g.*, JP ‘909, EX1021 at [0003].) At more “zoomed in” map scales, on the other hand, it was common to display all road types. (*Id.*) By limiting the types of roads displayed as the map was “zoomed out,” navigation systems prevented the map display from becoming overly cluttered. (*See, e.g.*, Moroto, EX1013 at 6:5-12.)

55. U.S. Patent No. 6,587,787 to Yokota teaches that each road in the map database is assigned a “road priority level” for each map scale. (Yokota, EX1005 at 9:8-30.) Only interstates are displayed at the most “zoomed out” map scale, while all roads are displayed at the most “zoomed in” map scale:

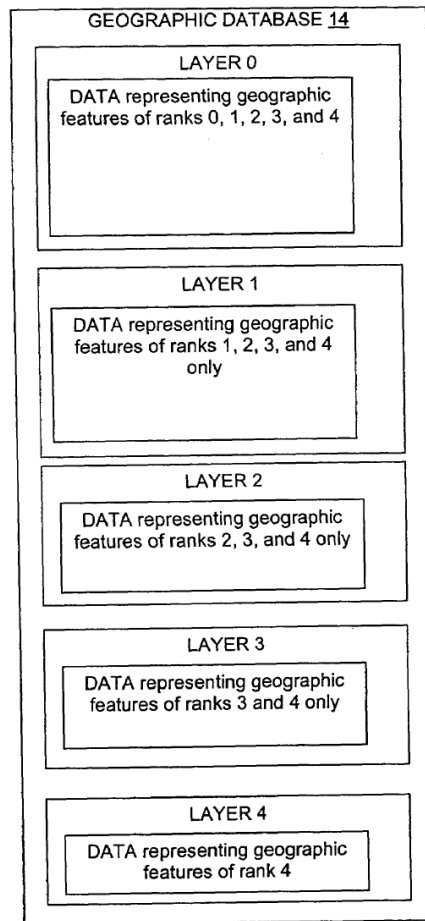
TABLE 3

	Scale				
	Smallest	Small	Medium	Large	Largest
Inter-state	Shown	Shown	Shown	Shown	Shown
Major Hwys	Upgradable	Shown	Shown	Shown	Shown
Minor Hwys	Omitted	Upgradable	Shown	Shown	Shown
Major Roads	Omitted	Omitted	Upgradable	Shown	Shown
Minor Roads	Omitted	Omitted	Omitted	Upgradable	Shown

(*Id.* at 9:17-30 (Table 3).)

56. U.S. Patent No. 7,023,456 to Huber et al. teaches a geographic database 14 wherein each road in the database is assigned a “rank.” (Huber, EX1008 at 3:46-54.) Side streets and alleys may be assigned a lowest rank, while expressways and major arterial roads may be assigned a highest rank. (*Id.* at 3:54-62.) Roads are selected for display based on their ranks and the user-set map scale. (*Id.* at 3:63-4:5.) For example, if the map scale is set to “layer 2,” then only roads having a rank of “2” or higher will be selected for display. (*Id.*)

FIG. 2



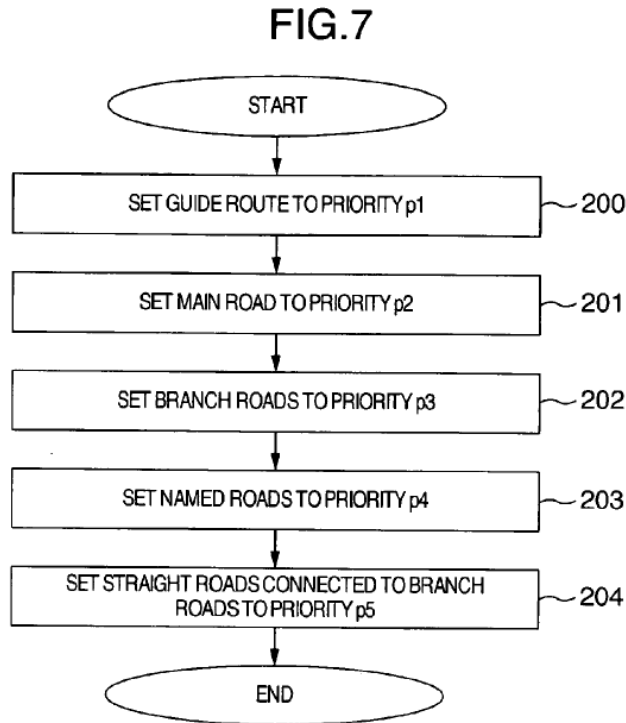
(*Id.* at FIG. 2.)

57. U.S. Patent No. 6,178,380 to Millington teaches a database 28 wherein each road segment in the database had a “rank” associated with it. (Millington, EX1018 at 3:34-35.) Ranks are assigned based on road type, with freeways being assigned the highest rank. (*Id.* at 3:35-43.) Road segments are selected for display based on the ranks and the user-set map scale, with only the highest-ranking road

segments being displayed at the most “zoomed out” map scale. (*Id.* at 6:51-59.)

58. In addition to selecting roads based on ranks/priorities, it was also well-known in the art to select, for a given map display area, all roads that were part of the calculated route so that the route would be displayed as a continuous line regardless of the map scale.

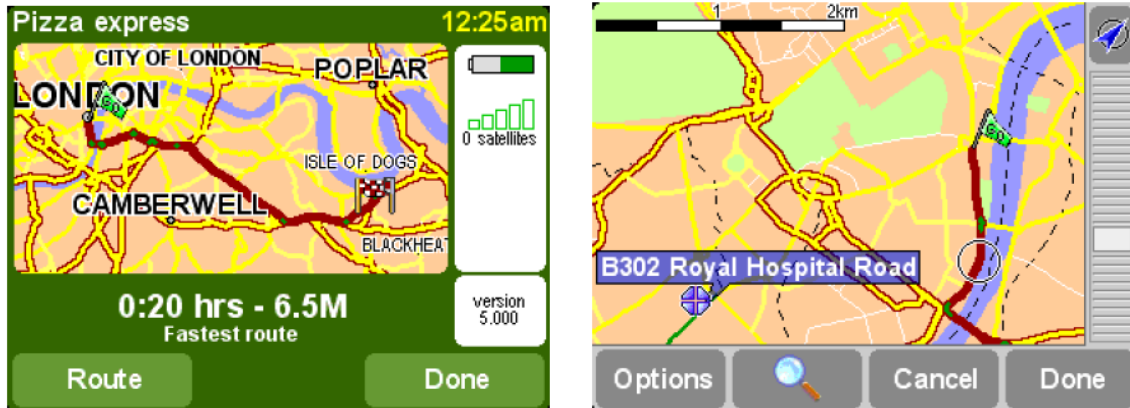
59. U.S. Patent App. Pub. No. 2006/0220923 to Tanizaki et al. discloses assigning a highest “priority” to the roads in the calculated guide route so that all roads in the calculated guide route, regardless of road type, will be selected for display in the designated display area at each map scale. (Tanizaki, EX1009 at FIGS. 2A-C, FIGS. 7-8, [0056], [0057].)



(*Id.* at FIG. 7.)

60. Yokota also teaches creating a map display with a layer that contains the guidance route, and provides a specific example where the displayed guidance route contains a road that would not normally be displayable at the selected map scale. (Yokota, EX1005 at 11:1-17, FIGS. 6D, 6F, 7A-D.)

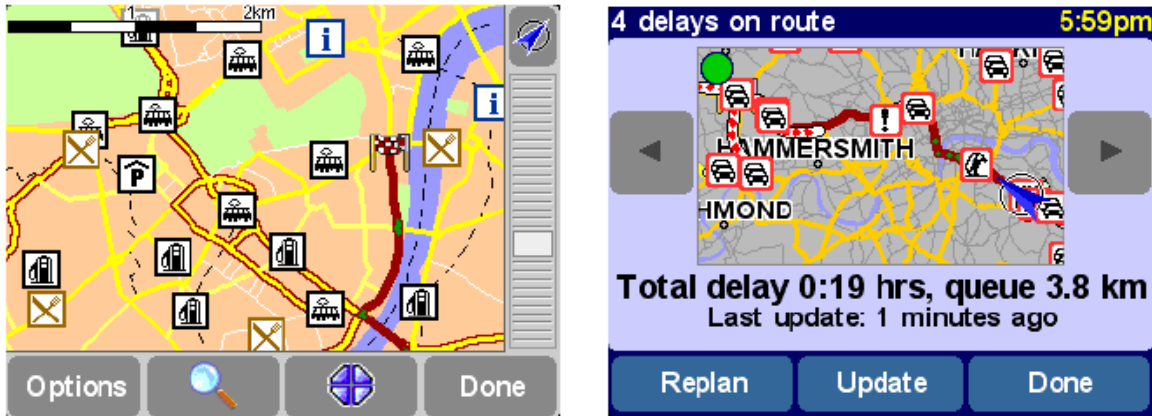
61. The TomTom ONE Manual provides another example where the calculated route is displayed as a continuous line at both a “zoomed out” scale and a “zoomed in” scale, even though the number of displayed roads decreases as the user zooms out. (TomTom ONE, EX1015 at 25; *see also id.* at 44.)



(*Id.* at 25.)

C. Selecting Points Of Interest For Display.

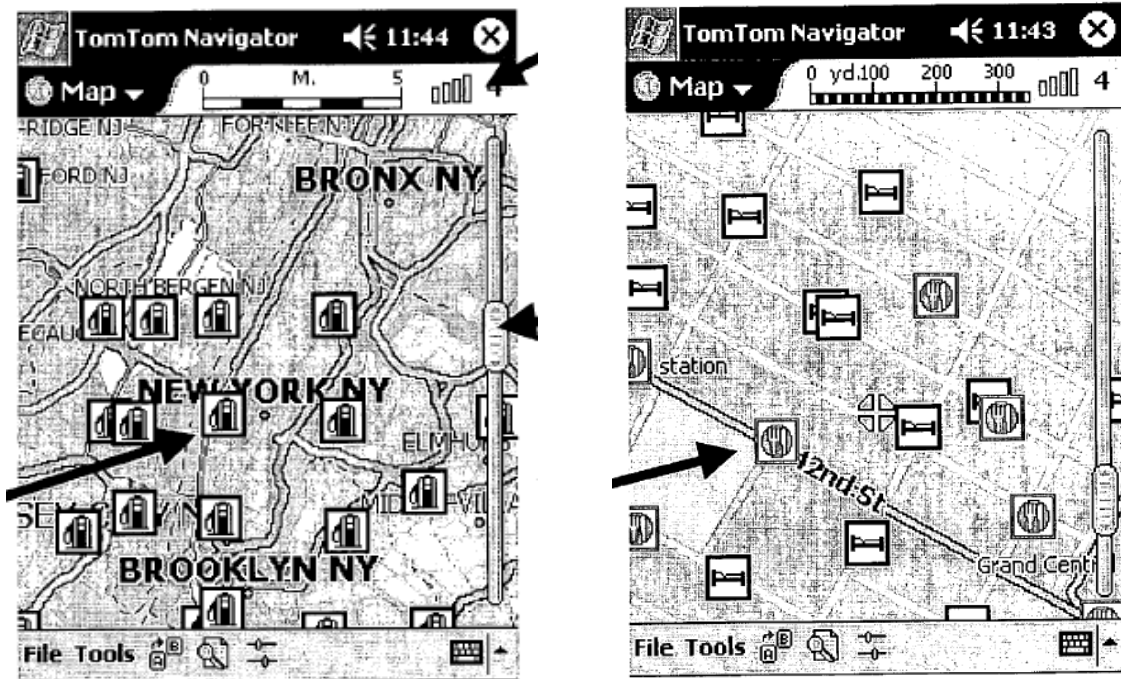
62. In addition to displaying roads, many prior art navigation systems were configured to display points of interest. Common points of interest included cities, gas stations, hotels, restaurants, and the like. Cities were typically identified by placing the city's name in a location on the map representing the city's location. Facilities such as hotels and restaurants were typically identified with point of interest icons. The TomTom ONE Manual provides several exemplary illustrations of map displays including points of interest:



(TomTom ONE, EX1015 at 38, 52.)

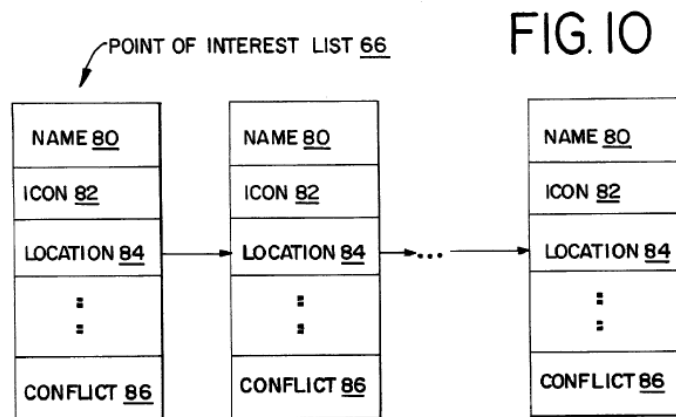
63. To prevent the map from becoming overly cluttered, it was well-known in the art to use ranks to determine which points of interest to display on the map.

64. U.S. Patent App. Pub. No. 2004/0243307 to Geelen teaches using point of interest (“POI”) prioritization to reduce screen clutter. (Geelen, EX1017 at [0051].) Geelen teaches that at the largest map scales only gas station POI icons are displayed. (*Id.* at FIGS. 5A-B, [0051].) As the map scale decreases, hotels, and then restaurants, are displayed. (*Id.* at FIGS. 5C-E, [0051].)



(*Id.* at FIG. 5A, FIG. 5E.)

65. U.S. Patent No. 6,163,749 to McDonough et al. also teaches using a priority list for determining which points of interest to display on a rendered map and to prevent points of interest from overlapping or interfering with each other. (McDonough, EX1007 at 9:5-9, 9:23-28, 15:54-58, 16:57-17:33, 18:14-16.)



(*Id.* at FIG. 10.)

66. Yokota similarly teaches using priorities to determine which cities and other points of interest to display on the map. (Yokota, EX1005 at 5:8-11, 5:25-27, 7:12-25, 8:39-57, 10:6-10.) Yokota teaches that the “name of the most prominent city in the metropolitan area should be displayed,” while other cities may be omitted depending on their population. (*Id.* at 8:39-53.)

VIII. OVERVIEW OF THE ‘465 PATENT

A. Priority Date (Earliest Effective Filing Date).

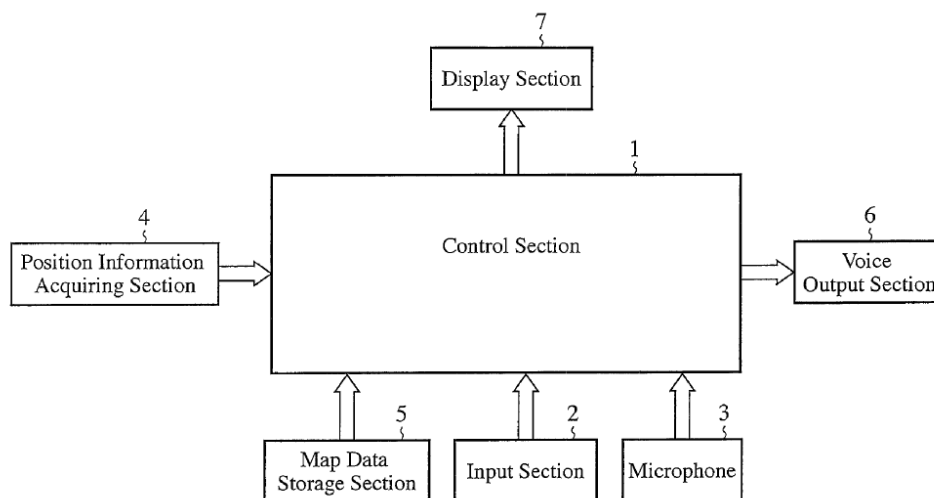
67. I understand from Counsel that the priority date (*i.e.*, the earliest effective filing date) of the ‘465 patent is April 9, 2007. I have applied this date in considering the prior art and the viewpoint of a POSITA.

B. Overview Of The ‘465 Patent.

68. The ‘465 patent “relates to a navigation system and a display method

of a road network on the same system.” (‘465 patent, EX1001 at 1:7-8.) Figure 1, reproduced below, illustrates an example internal configuration of the navigation system of the ‘465 patent:

FIG. 1



(*Id.* at FIG. 1; *see also id.* at 2:33-35.)

69. The navigation system comprises “a control section 1, an input section 2, ... a position information acquiring section 4, a map data storage section 5, ... and a display section 7.” (*Id.* at 3:45-52.) “The control section 1 controls the whole navigation functions the navigation system possesses” and is normally “composed of a microcomputer and a memory, and the microcomputer carries out [navigation] functions by reading and executing programs recorded in the memory.” (*Id.* at 4:26-30.) “The input section 2 has a

function of inputting instructions from a user, and is commonly realized by a touch panel, touch pad, remote control, commander or the like.” (*Id.* at 3:53-57.) “The position information acquiring section 4 detects the position and behavior of the vehicle with a GPS (Global Positioning System) and gyro, and supplies to the control section 1.” (*Id.* at 3:58-61.) “[T]he map data storage section 5 stores the map data consisting of roads necessary for the navigation and display elements including city centers and facilities, together with the road attributes and classes.” (*Id.* at 3:65-4:1.) “The display section 7, which is realized from a liquid crystal display or the like, displays information such as map display and menu display in the navigation system.” (*Id.* at 4:22-25.)

70. “FIG. 2 shows an example of the road attributes and classes to be stored in the map data storage section 5 in a table fashion.” (*Id.* at 4:1-3.) “The table shown [in FIG. 2] is used for deciding whether to display on a particular map scale in accordance with the road attributes and scales of cities. In FIG. 2, blocks including ‘X’ mean that display will be performed on the map scales indicated by the blocks. For example, a road of the road class 1 is an expressway that is displayed on all the map displays from 50 m scale to 100 km scale. As for a road of the road class 4, which is a local road, it means that although it is displayed on the 50 m scale to 250

m scale, it is not displayed on a wider-area map from the 500 m scale and on. Likewise, as for icons of city centers, it means that although a small city with a population less than 20,000 is displayed from the 50 m scale to 1 km scale, it is not displayed in a wider-area map from the 2.5 km scale and on.” (*Id.* at 4:4-17.) Figure 2 of the ‘465 patent is reproduced below:

FIG. 2

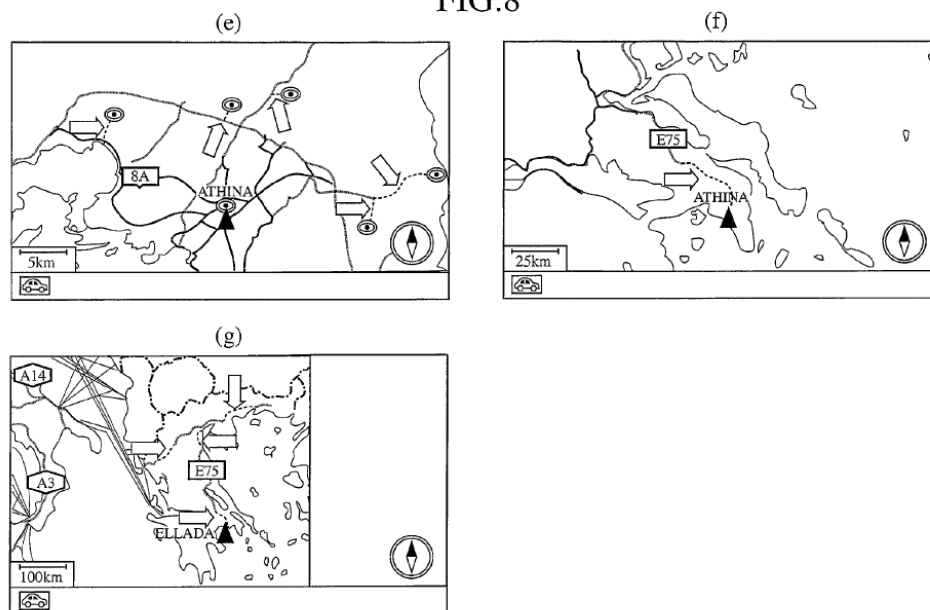
Relationships Between Map And Map Scale										
Map Scale Road Attributes	Map Scale									
	50m	100m	250m	500m	1km	2.5km	5km	10km	25km	100km
Road Class 1	X	X	X	X	X	X	X	X	X	X
Road Class 2	X	X	X	X	X	X	X	X	X	X
Road Class 3	X	X	X	X	X	X	X			
Road Class 4	X	X	X							
Road Class 5	X	X								
District/National Highway Name									X	X
Position Information Icon	X	X	X	X						
Facility Position Icon	X	X	X	X						
Main City Icon : < 20 k People	X	X	X	X	X					
Main City Icon : ≥ 20 k People				X	X					
Main City Icon : ≥ 100 k People				X	X					
Main City Icon : ≥ 500 k People				X	X	X				
Main City Icon : ≥ One Hundred Million People				X	X	X	X	X	X	

(*Id.* at FIG. 2.)

71. In the navigation system of the ‘465 patent, the control section 1 calculates a route from the vehicle’s current position to a driver-designated destination. (*Id.* at 4:58-62, 5:30-37, 6:7-15, 7:28-36.) Then, “according to the map scale designated via the input section 2, the control section 1 selects roads based on their attributes and display elements based on their ranks.” (*Id.* at 4:30-34; *see also*

id. at 5:54-61, 7:7-14.) The control section 1 then selects the roads that are part of the calculated route. (*Id.* at 6:25-28, 7:37-40.) For a given map scale, a road that is included in the calculated route will be displayed even if the road would not normally be displayed at that scale. (*Id.* at 7:59-8:3, 8:14-27, 8:28-35, 9:34-45.) As shown in Figure 8, roads that are not normally displayable at the indicated scale but are included in the calculated guidance route are still displayed on the map with dotted lines:

FIG.8



(*Id.* at FIG. 8; *see also id.* at 3:38-44.)

C. Prosecution History Of The '465 Patent.

72. On December 22, 2011, the Examiner issued a non-final office action

rejecting pending claims 1-6 as obvious over Millington (U.S. Patent No. 6,178,380) in view of Harada (U.S. Patent No. 6,061,003). (‘465 patent Prosecution History, EX1002 at 226.) In response, the Applicant amended the pending claims and argued that the prior art does not disclose the combination of elements set forth in the amended claims. (*Id.* at 238-240, 242.)

73. Regarding Millington, the Applicant argued that while “Millington does suggest that a road segment, which is not normally displayable at the highest zoom-out because of its rank, could be displayed if it is either the current road segment, the previous or next cross street, or a panned road segment,” “Millington does not teach or even suggest choosing to display a road segment which is included in the calculated route, but not indicated as being displayable at the current scale by its rank/attribute, as presently claimed.” (*Id.* at 243.)

74. Regarding Harada, the Applicant argued that the “Harada does not disclose the use of attributes to indicate whether or not roads are displayable according to a particular scale, and thus does not even suggest overriding any such attribute for a road which is part of the calculated route.” (*Id.*)

75. The Examiner subsequently withdrew the rejection of the pending claims and issued a Notice of Allowance. (*Id.* at 248.)

D. The Challenged Claims.

76. I have been asked to analyze Challenged Claims 1-3 and 5 of the ‘465 patent.

77. The Challenged Claims include two independent claims: 1 and 5. (‘465 patent, EX1001 at claims 1, 5.) Challenged Claim 1 is directed to an apparatus (*i.e.*, a “navigation system”), while Challenged Claim 5 is directed to a “display method” performed using the navigation system of Challenged Claim 1. (*Id.*; *see also* ‘465 patent Prosecution History, EX1002 at 243.)

78. Independent Challenged Claims 1 and 5 are reproduced below:

1. A navigation system comprising:

a map data storage section for storing map data together with attributes and classes of the map data, the map data being composed of roads necessary for a route search and display elements including city centers and facilities, and the city centers being a display element each representing a city and indicating a representative position of the city, wherein the attributes are indicative of whether or not each of the roads should be displayed for each of a plurality of map scales;

a display section for displaying the map data;

an input section for inputting an instruction from a user;
and

a control section for carrying out:

a procedure of calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed via the input section,

in accordance with one of the plurality of map scales instructed via the input section, a procedure of displaying a map on the display section by:

selecting the roads indicated by the attributes as being displayable according to the instructed map scale, and by selecting the display elements based on ranks,

further selecting each of the roads that is part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale, and

displaying the selected roads and the selected display elements on the display section as part of the map.

(*Id.* at claim 1.)

5. A display method of a road network in a navigation system having a map data storage section for storing map data, which is composed of roads necessary for a route search and display elements including city centers and facilities, together with attributes and classes of the map data, the attributes being indicative of whether or not each of the roads should be displayed for each of a plurality of map scales, the navigation system also having a position information acquiring section for obtaining position information on a vehicle, a control section including a drawing memory, an input section for inputting an instruction from a user, and a display section for displaying the map data, the display method of the road network in the navigation system comprising:

calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed by the user via the input section;

drawing, according to one of a plurality of map scales designated by the user via the input section, a map on the drawing memory by:

selecting the roads indicated by the attributes as being displayable according to a designed map scale, the selected roads including an own-vehicle position obtained by the position information acquiring section,

drawing the selected roads and one or more of the display elements on the drawing memory;

further selecting each of the roads that is part of the calculated route produced as a result of the route calculation, but not indicated by the attributes as being displayable according to the designated map scale, on the drawing memory; and

displaying the road network drawn on the drawing memory on the display section.

(*Id.* at claim 5.)

E. Claim Construction.

79. I understand that the Challenged Claims are to be read in light of the ‘465 patent’s specification, and that 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.

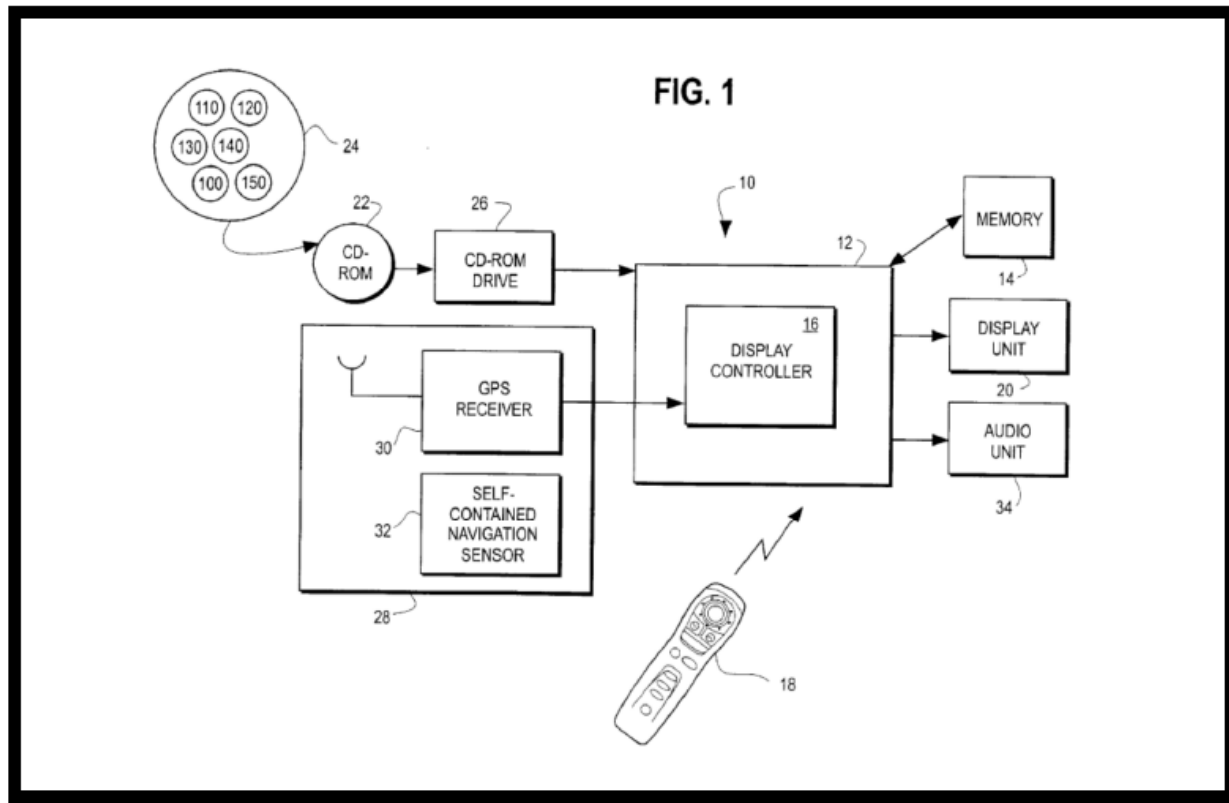
80. For purposes of this IPR, I believe no specific constructions are required. The Challenged Claims use terms and phrases that would have been easily understood by a POSITA, and the prior art discussed herein discloses, teaches, and suggests the limitations of the Challenged Claims under their plain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

IX. OVERVIEW OF THE PRIOR ART

A. Yokota (EX1005).

81. Yokota was issued on July 1, 2003. (Yokota, EX1005 at [45].) I understand that Yokota is prior art to the '465 patent.

82. Yokota is directed to a navigation system 10 comprising, *inter alia*, a microprocessor 12 with a display controller 16, a display unit 20 for displaying a map display, a GPS location system 28, and a map database 24 comprising map data. (Yokota, EX1005 at 4:19-30.) The map database 24 includes a road table 150 comprising information used to display roads in the navigation system. (*Id.* at 5:33-51.) The map database 24 also includes information for displaying cities, restaurants, gas stations, and the like on the map. (*Id.* at 4:42-5:32.)



(*Id.* at FIG. 1.)

83. Yokota's navigation system 10 "selectively displays or does not display any given road based on both display scale and the importance, or priority, of the road." (*Id.* at Abstract.) "The display controller 16 uses the road priority levels to determine the appropriate set of roads to display on a given map display." (*Id.* at 9:8-10.) "For instance, a default road priority level might be to display only interstate highways and roads at exits from interstate highways on very small-scale map displays." (*Id.* at 9:10-12.) "Preferably, there is at least one road priority level

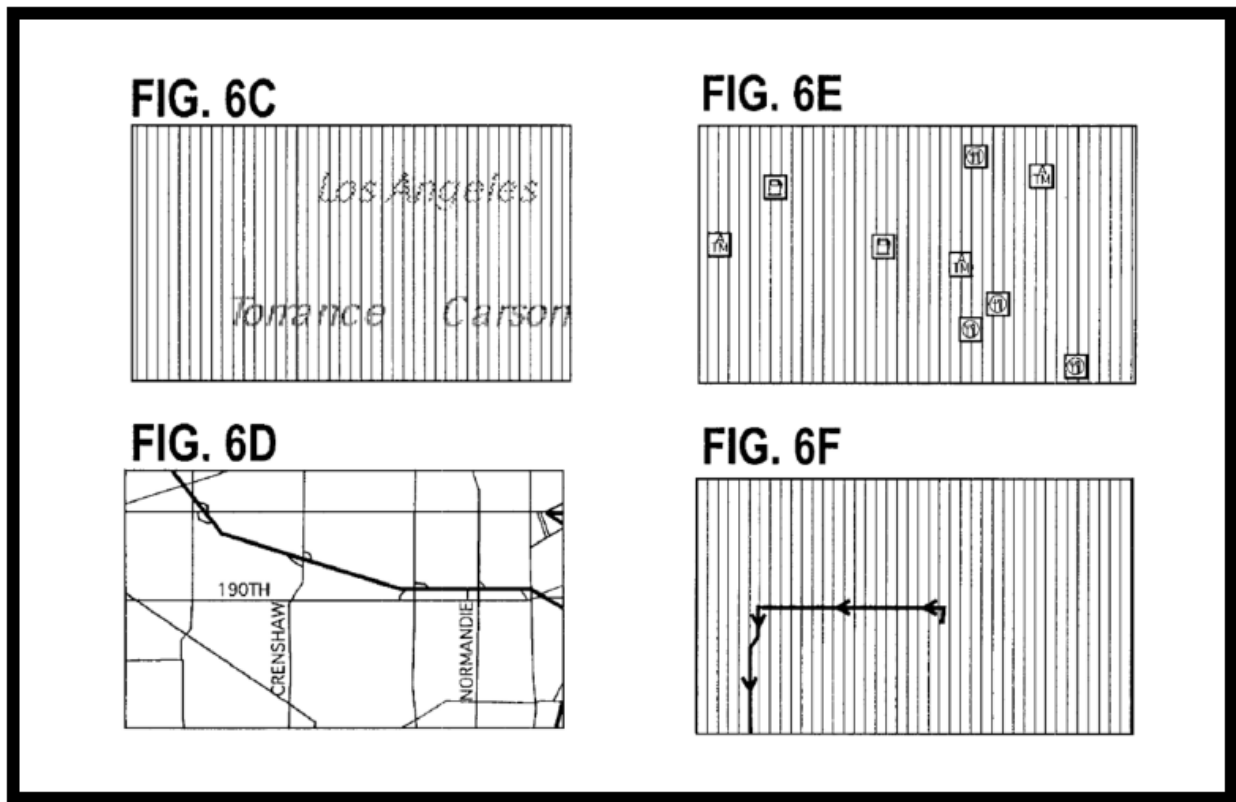
for each map scale level.” (*Id.* at 9:13-14.) Table 3, which is reproduced below, illustrates a “sample set of road priority levels, i.e. when to display certain roads”:

TABLE 3					
	Scale				
	Smallest	Small	Medium	Large	Largest
Inter-state	Shown	Shown	Shown	Shown	Shown
Major Hwys	Upgradable	Shown	Shown	Shown	Shown
Minor Hwys	Omitted	Upgradable	Shown	Shown	Shown
Major Roads	Omitted	Omitted	Upgradable	Shown	Shown
Minor Roads	Omitted	Omitted	Omitted	Upgradable	Shown

(*Id.* at 9:15-30.)

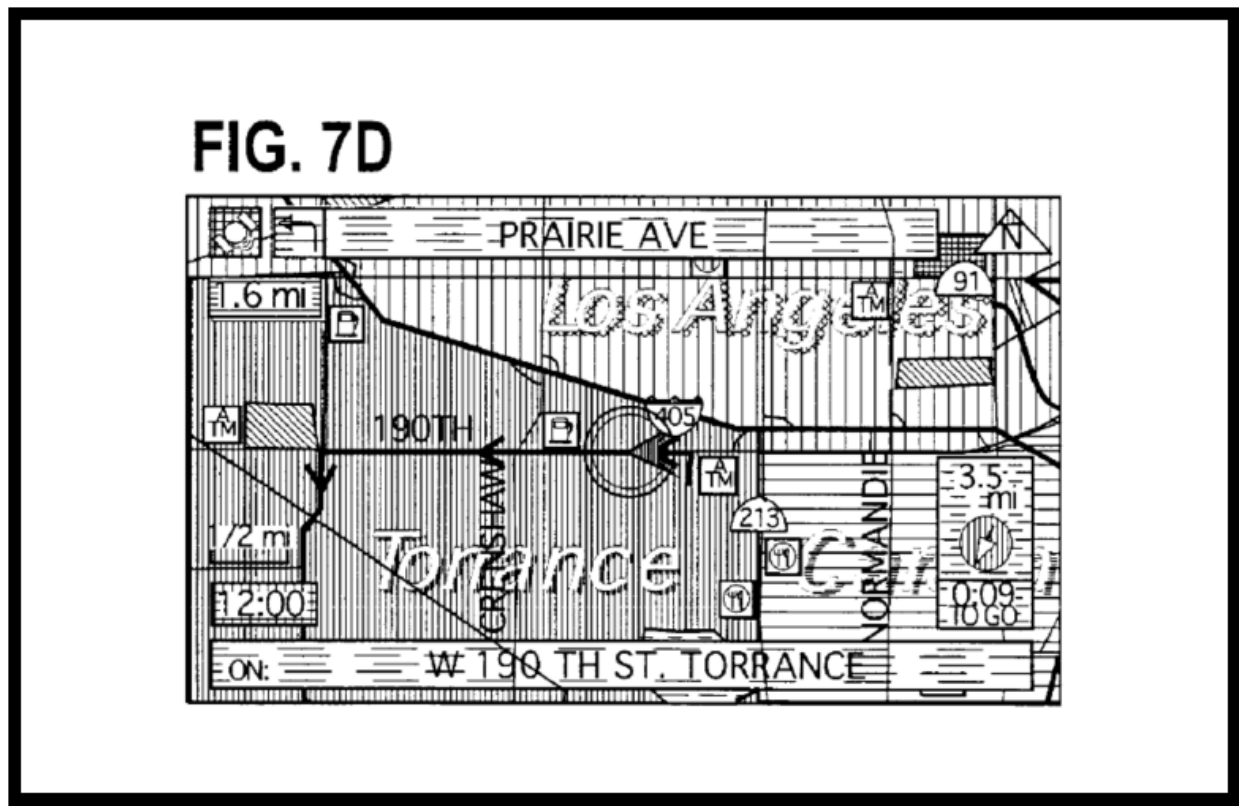
84. Yokota’s navigation system 10 can display maps “at a plurality of scale, or zoom, levels.” (*Id.* at 1:35-43; *see also id.* at Abstract, 6:9-14.) To create a map display for a selected map scale, the display controller 16 draws a plurality of layers. (*Id.* at 11:1-4; *see also id.* at 10:51-67, 13:9-12.) The layers include: (i) roads that are displayable according to the saved road priority levels for the set map scale; (ii)

display elements (*e.g.*, city names, point-of-interest icons, etc.) selected based on saved priorities; and (iii) a guidance route. (*Id.* at 9:8-16, 11:8-17; *see also id.* at 4:56-5:11, 5:22-26.)



(*Id.* at FIGS. 6C-F.)

85. The display controller 16 then synthesizes all the layers into a single map display and sends the single map display to the display unit 20. (*Id.* at 11:1-4; *see also id.* at 10:51-67, 13:9-12.)



(*Id.* at FIG. 7D.)

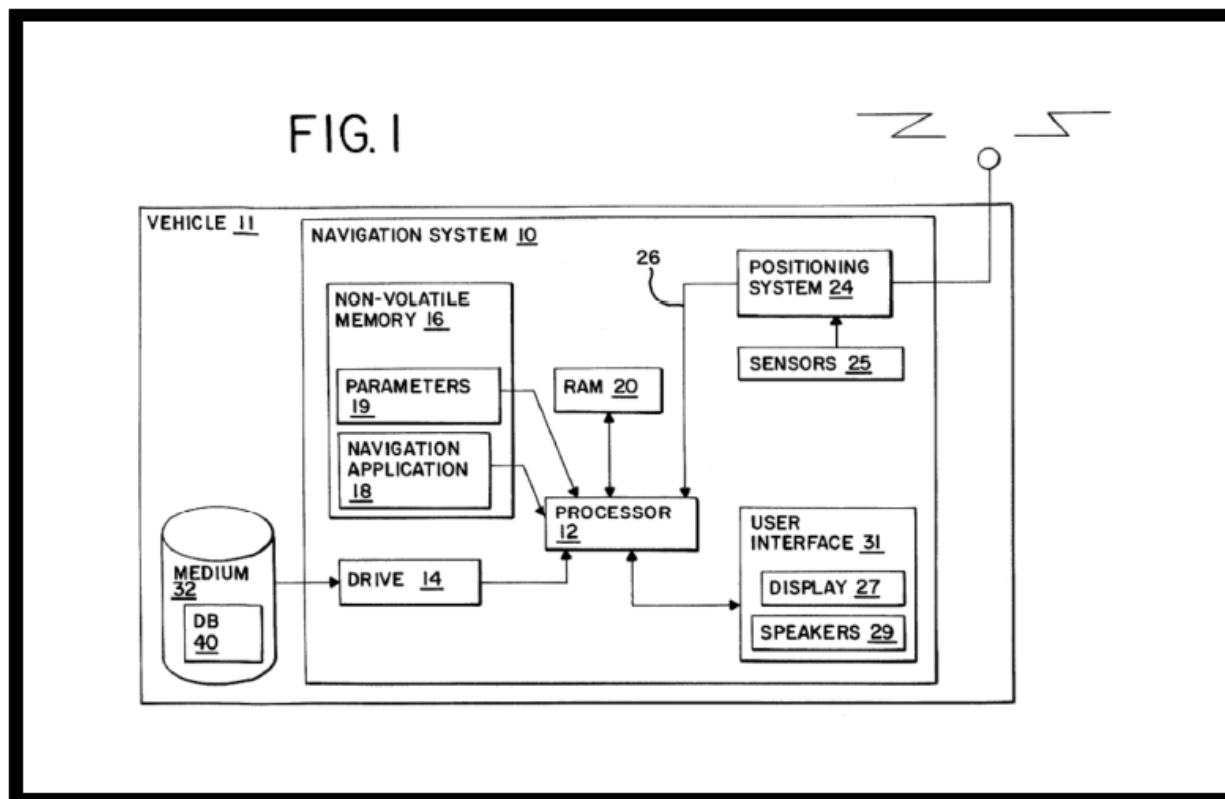
86. Yokota is in the same field of endeavor as the '465 patent: navigation systems. Yokota is also at least reasonably pertinent to a problem addressed by the '465 patent: displaying a guide route with no discontinuities. ('465 patent, EX1001 at 1:7-8, 1:43-50, 2:23-29; Yokota, EX1005 at 4:19-30, 11:1-17, FIGS. 6A-H, FIGS. 7A-D.)

B. McDonough (EX1007).

87. McDonough was issued on December 19, 2000. (McDonough, EX1007 at [45].) I understand that McDonough is prior art to the '465 patent. I

understand that McDonough was not cited during prosecution of the '465 patent.

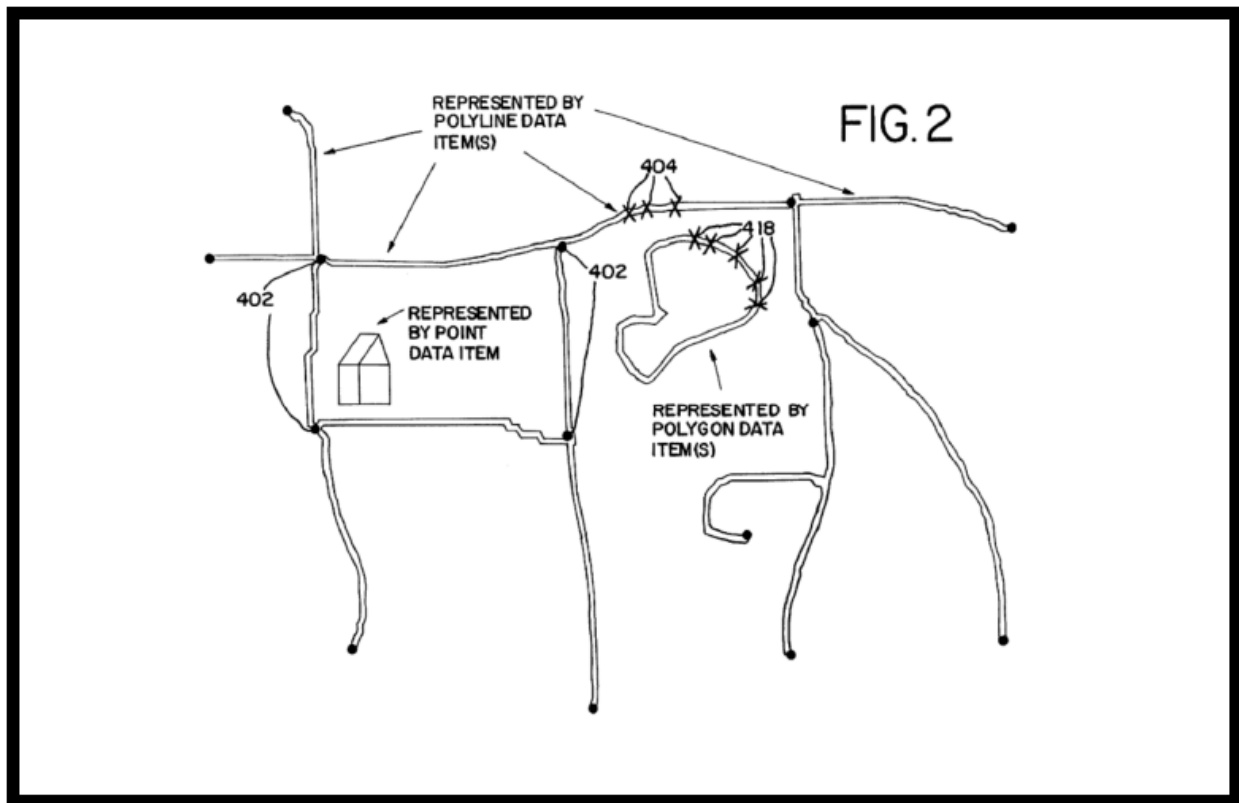
88. McDonough is directed to a navigation system 10 installed in a vehicle, such as a car or truck. (McDonough, EX1007 at 3:20-28.) The navigation system 10 comprises, *inter alia*, a processor 12, a GPS-type positioning system 24, and a navigation software program 18 that runs on the processor 12. (*Id.* at 3:31-37, 3:45-48, 3:55-57.) McDonough's navigation system 10 also comprises a display 27 for displaying a map generated from map data stored in a map database 30. (*Id.* at 4:1-4, 6:59-7:5, 7:54-59; *see also id.* at 1:24-28, 2:3-9, 2:17-19, claim 1.) The navigation system 10 supports a "zooming" function that allows the user to zoom in and out on the displayed map. (*Id.* at 5:54-60, 6:31-33, 8:5-9.)



(*Id.* at FIG. 1.)

89. A map display tool 40 in the navigation software program 18 selects features from the map database 30 (*e.g.*, roads, point of interest icons, etc.) to be included in the displayed map. (*Id.* at 5:53-62, 6:9-33, 6:59-66, 7:1-9, 7:46-59, 8:17-27, 10:7-18, 13:33-38, 15:25-32.) Roads are selected based on whether stored “ranks” for the roads indicate that the roads are displayable according to the set map scale. (*Id.* at 5:63-6:33, 8:17-27, 8:40-43, 8:66-9:3, 10:7-18, 13:53-65.) Points of interest (*e.g.*, cities, restaurants, etc.) are selected based on their “priorities.” (*Id.* at

9:5-9, 16:57-17:11, 18:14-24.) The selected roads and points of interest are drawn to a graphics buffer, and the map, once rendered in the graphics buffer, is sent to display 27. (*Id.* at 6:59-66, 7:6-9, 7:51-59, 12:33-41, 14:30-36, 14:53-56, 15:25-38, 19:31-32.)



(*Id.* at FIG. 2.)

90. McDonough's navigation software program 18 also includes a navigation application 47 that provides "navigation features and functions" such as "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.” (*Id.* at 6:44-55, 7:9-24; *see also id.* at 1:9-28.) Using the navigation application 47, the navigation system 10 can display maps “that outline routes to destinations, the types of maneuvers to be taken at various locations along the routes, locations of certain types of features, and so on.” (*Id.*)

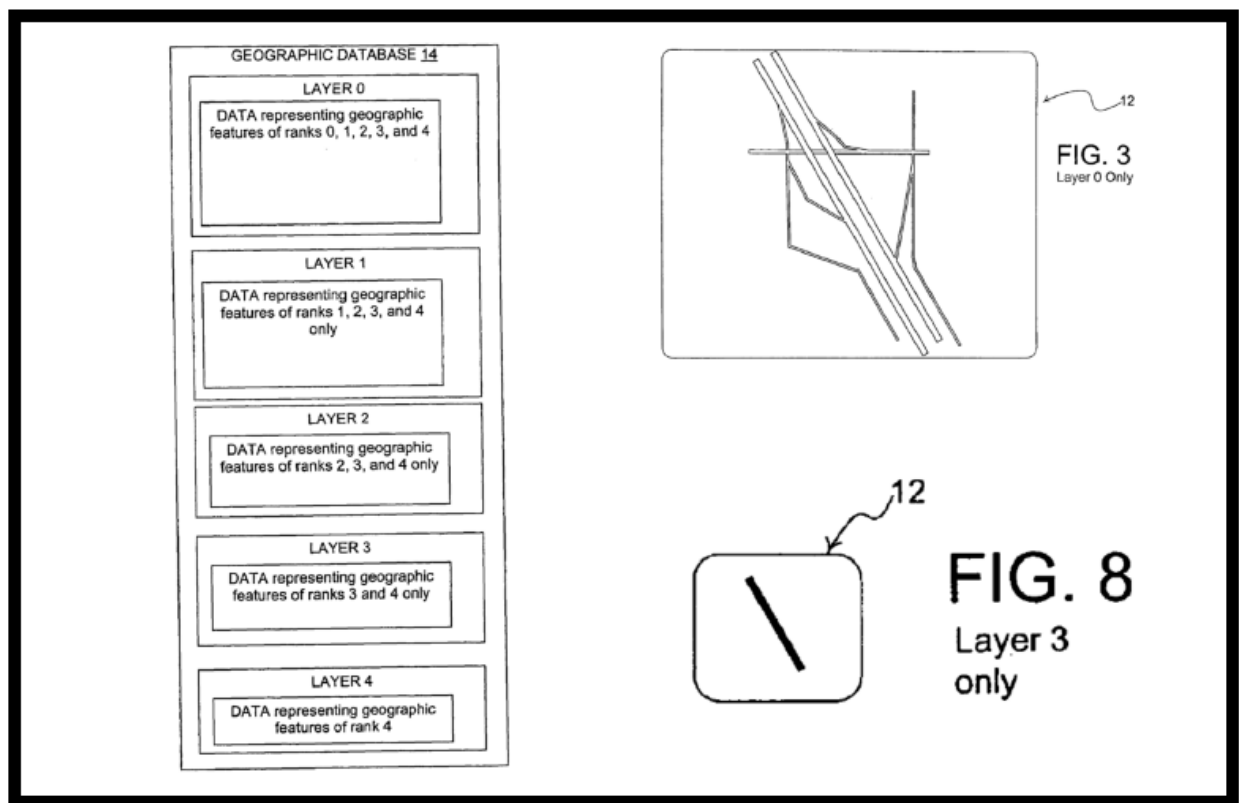
91. McDonough is in the same field of endeavor as the ‘465 patent: navigation systems. (‘465 patent, EX1001 at 1:7-8; McDonough, EX1007 at 3:20-28.)

C. Huber (EX1008).

92. Huber was issued on April 4, 2006. (Huber, EX1008 at [45].) I understand that Huber is prior art to the ‘465 patent. I understand that Huber was not cited during prosecution of the ‘465 patent.

93. Huber is directed to a computing platform 10 in an “in-vehicle navigation system” that displays maps on a display, and “a method for representing geographic features when [the] map display is zoomed in or out.” (Huber, EX1008 at 1:11-15, 2:20-22, 3:14-15, 3:37-45.) Huber incorporates McDonough by reference. (*Id.* at 3:40-45.) Huber also relies on McDonough’s disclosure to teach “display[ing] maps using data from a geographic database.” (*Id.*) Huber’s teachings

relating to zooming (*e.g.*, organizing map data into layers and controlling the level of detail displayed at each map scale by assigning ranks to different road types) are virtually identical to, and complement, McDonough's teachings regarding zooming. (*Compare id.* at 3:46-62, 3:63-4:5, 5:36-50 with McDonough, EX1007 at 5:53-60, 5:63-6:8, 6:9-33.) Huber provides additional details and context regarding McDonough's zoom functionality. (*Id.*)



(Huber, EX1008 at FIGS. 2-3 and 8.)

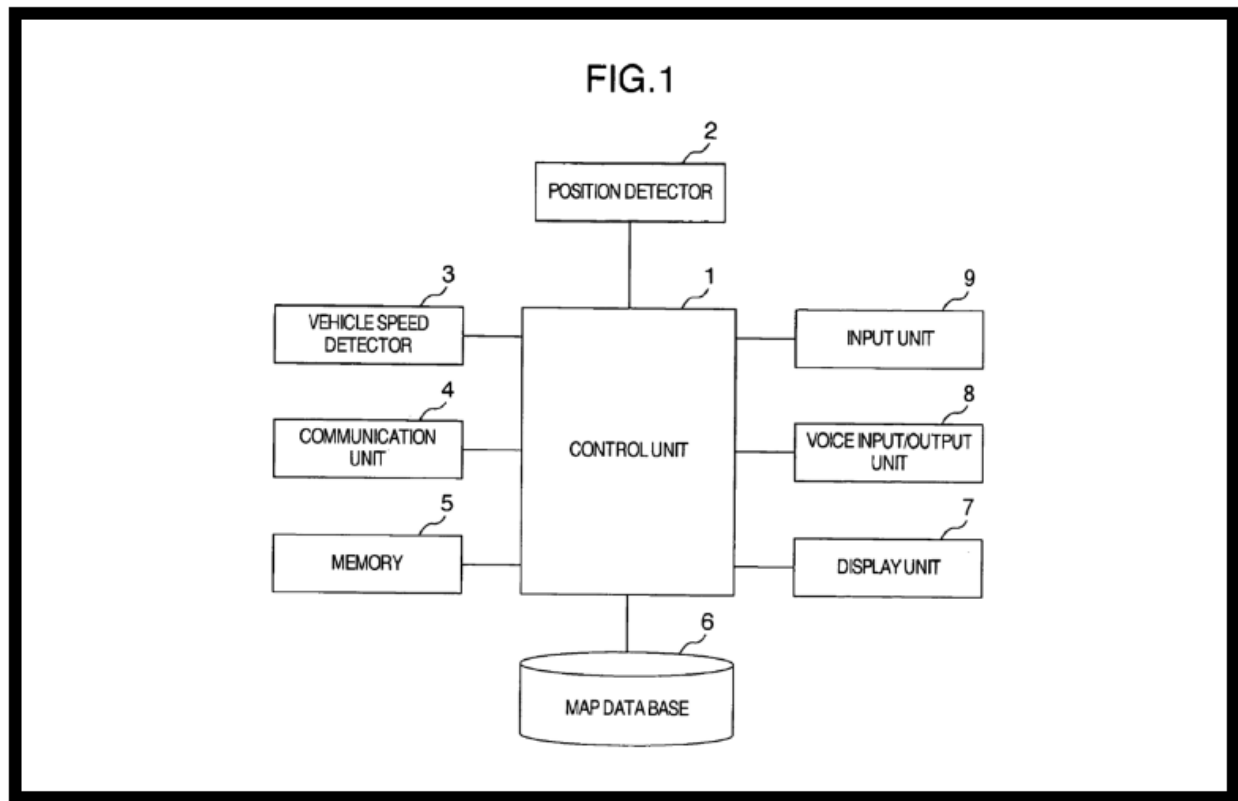
94. Huber is in the same field of endeavor as the '465 patent: navigation

systems. ('465 patent, EX1001 at 1:7-8; Huber, EX1008 at 3:15-19.)

D. Tanizaki (EX1009).

95. Tanizaki was filed in the US on August 18, 2004, and published on October 5, 2006. (Tanizaki, EX1009 at [22], [43].) I understand that Tanizaki is prior art to the '465 patent. I understand that Tanizaki was not cited during prosecution of the '465 patent.

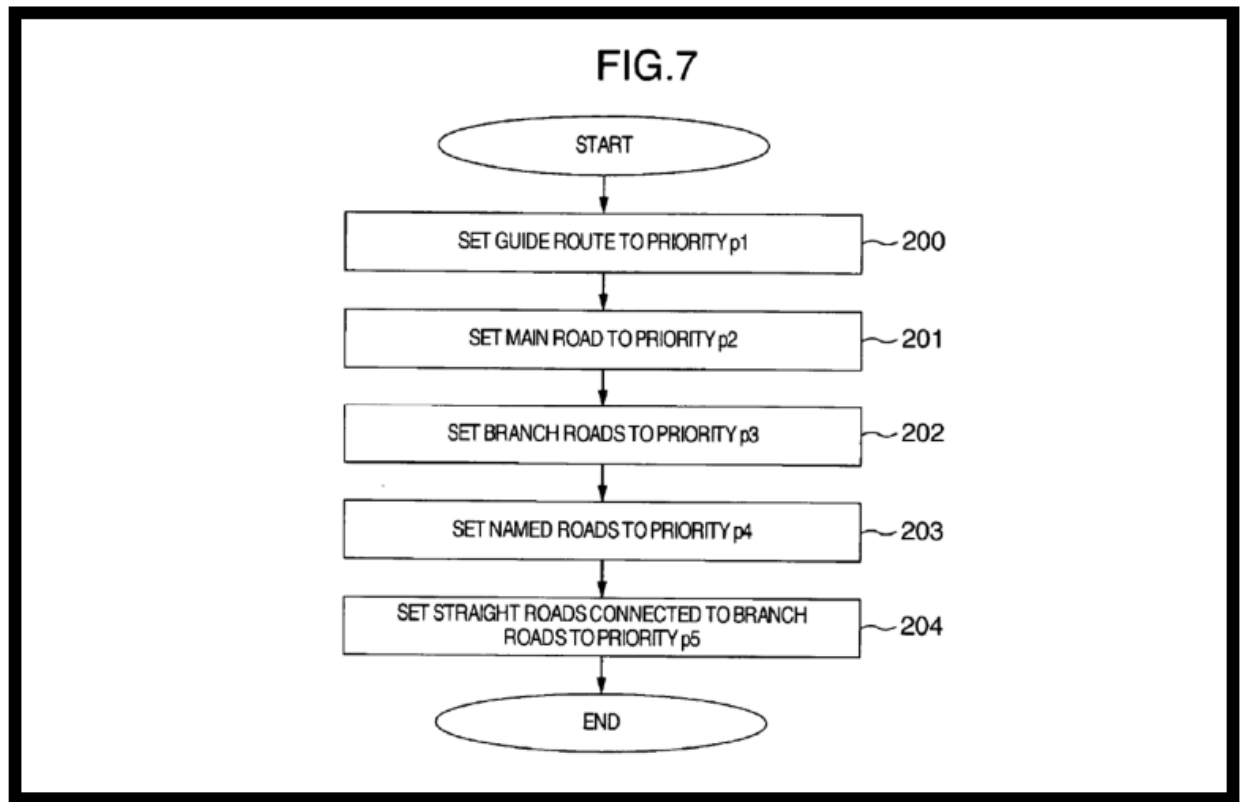
96. Tanizaki is directed to “a car navigation apparatus” comprising, *inter alia*, a position detector 2, a map database 6, and a display unit 7 with a display screen 10. (Tanizaki, EX1009 at [0014], [0027], FIG. 1.) The map database 6 includes road data and display element data (*e.g.*, names and icons for facilities) that is read from the database to create a road map displayed on display unit 7. (*Id.* at [0016], [0019].) The displayed road map includes a vehicle guide route 12, a destination 13, and roads other than the guide route 14. (*Id.* at [0022], [0027].) The road map can be displayed at a plurality of different map scales, wherein the amount of detail displayed is decreased as the map is zoomed out. (*Id.* at [0023]-[0026], [0036], [0053].)



(*Id.* at FIG. 1.)

97. To display the guide route 12, Tanizaki's navigation apparatus first receives a current vehicle position 11 from position detector 2 and a user-specified destination 13 from input unit 9, and then calculates a route from the vehicle position 11 to the destination 13 using "predetermined conditions." (*Id.* at [0042], [0044]; *see also id.* at FIG. 4 (reference numerals 100-102), FIG. 9 (same).) Priorities are then set for the roads in map database 6. (*Id.* at [0054]-[0056], [0058]-[0059], FIGS. 7-8, claim 3.) The roads in the guide route 12 are set to the highest priority, while

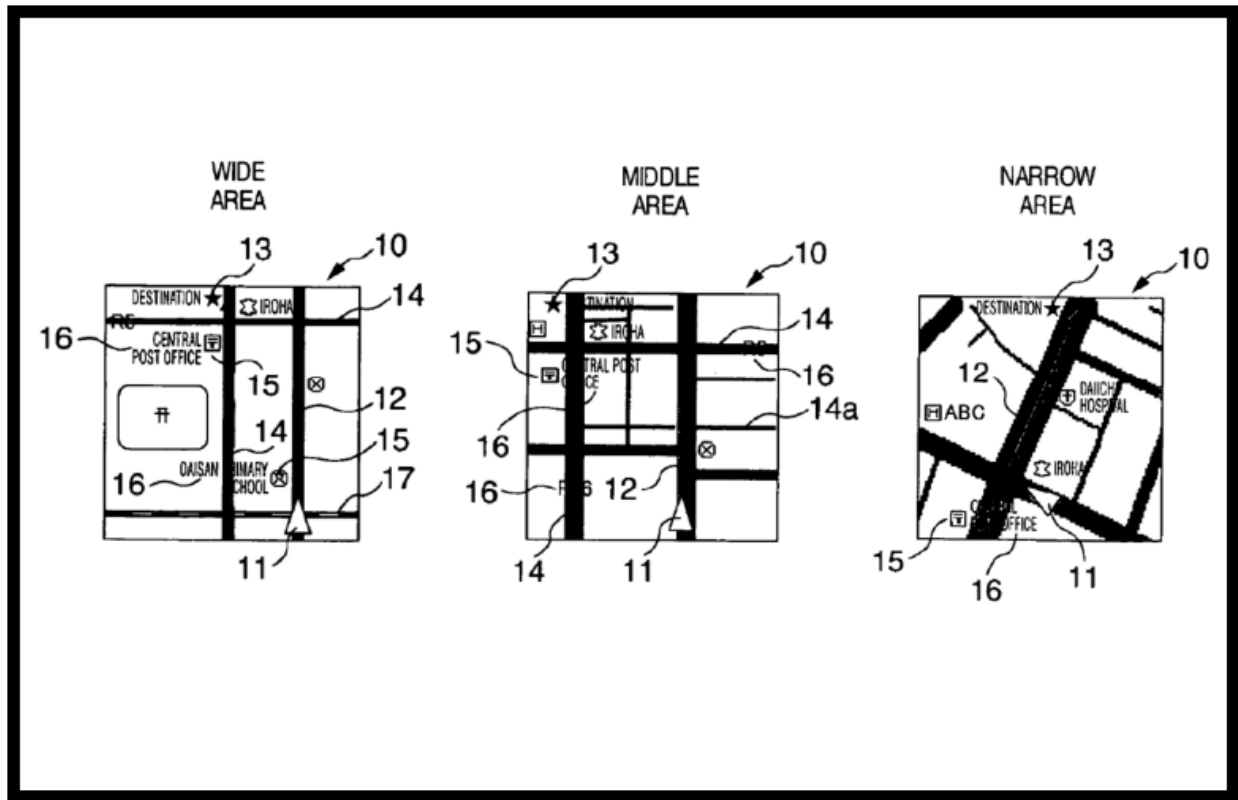
roads that are not in the guide route are set to lower priorities based on road type (e.g., main roads are set to the second-highest priority, branch roads are set to a next highest priority, etc.). (*Id.*)



(*Id.* at FIG. 7.)

98. Roads in map database 6 are then selected for display in “descending order of priority.” (*Id.* at [0054], [0072], claim 3.) Because all roads in guide route 12 are set to the highest priority irrespective of road type, the map “is displayed on the display screen 10 in such a manner as to include the guide route from the present

vehicle position to the destination” regardless of the map scale. (*Id.* at [0028]; *see also id.* at [0029]-[0031], [0077], FIGS. 2A-C (displaying roads included in guide route 12 regardless of map scale), FIGS. 3A-C (same), claims 1 and 9.)



(*Id.* at FIGS. 2A-C.)

99. Tanizaki is in the same field of endeavor as the ‘465 patent: navigation systems. Tanizaki is also at least reasonably pertinent to a problem addressed by the ‘465 patent: displaying a guide route with no discontinuities. (‘465 patent, EX1001 at 1:7-8, 1:43-50, 2:23-29; Tanizaki, EX1009 at [0014], [0028]-[0031], [0077],

FIGS. 2A-C and 3A-C, claims 1 and 9.)

X. ANALYSIS

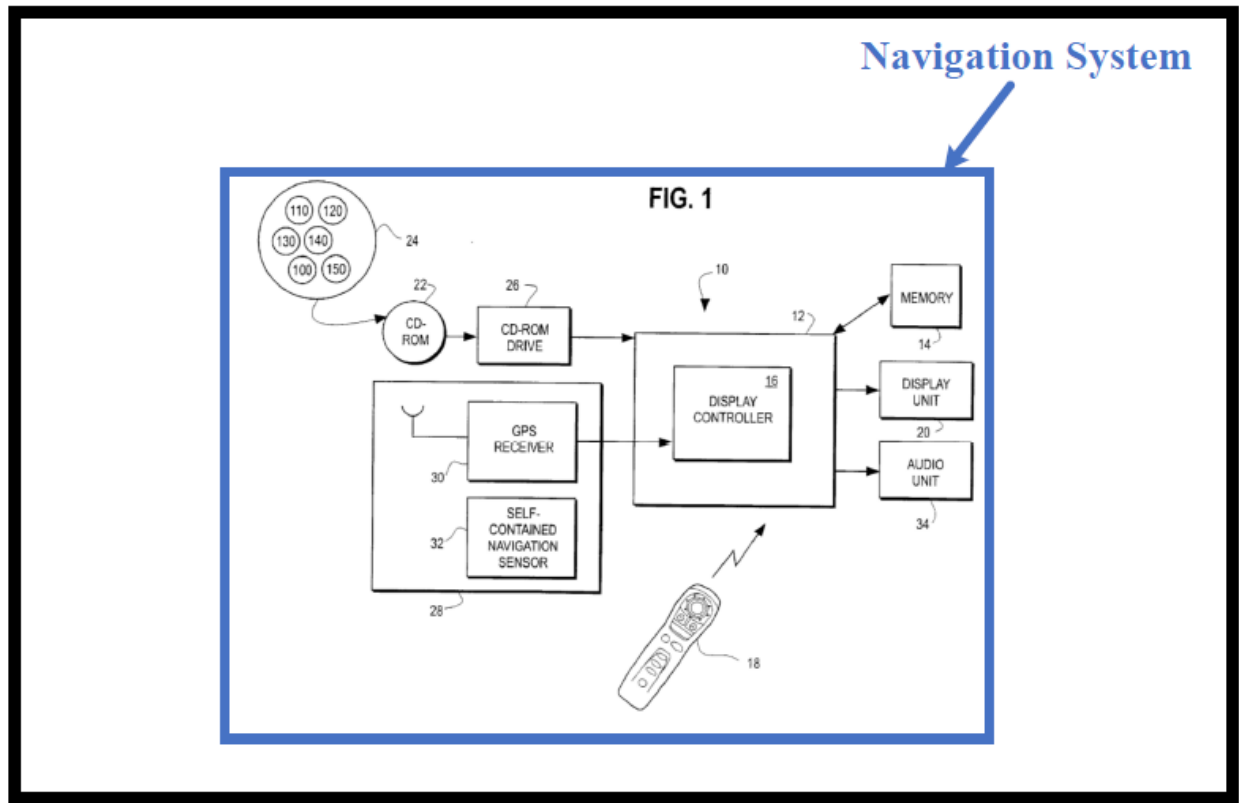
A. Ground 1: Yokota In Combination With The Knowledge Of A POSITA Renders Obvious Challenged Claims 1-3 And 5.

1. Challenged Claim 1.

a) Yokota Teaches “A navigation system.”

100. Regardless of whether the preamble is limiting, Yokota teaches a “navigation system” (“limitation [1-PRE]”).

101. Yokota teaches a “navigation system 10.” (Yokota, EX1005 at 3:56-57 (“FIG. 1 is a diagram of a navigation system in accordance with the present invention”), 4:19-20 (“FIG. 1 shows a navigation system 10 in accordance with the present invention.”); *see also id.* at Abstract, 1:10-14, claim 23.)



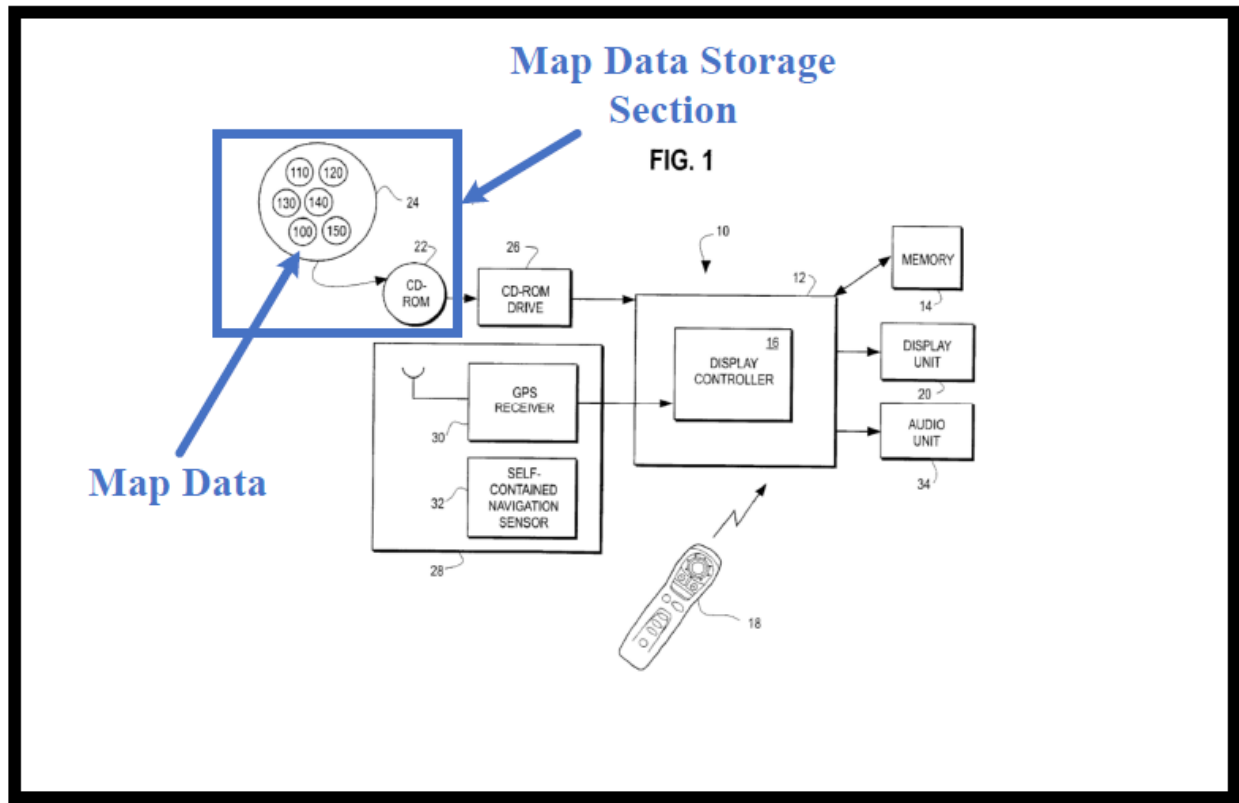
(Yokota, EX1005 at FIG. 1 (annotated).)

- b) **Yokota Teaches “a map data storage section for storing map data together with attributes and classes of the map data, the map data being composed of roads necessary for a route search and display elements including city centers and facilities, and the city centers being a display element each representing a city and indicating a representative position of the city, wherein the attributes are indicative of whether or not each of the roads should be displayed for each of a plurality of map scales.”**

102. Yokota teaches “a map data storage section for storing map data together with attributes and classes of the map data, the map data being composed

of roads necessary for a route search and display elements including city centers and facilities, and the city centers being a display element each representing a city and indicating a representative position of the city, wherein the attributes are indicative of whether or not each of the roads should be displayed for each of a plurality of map scales” (“limitation [1a]”).

103. Yokota teaches “map data 24” that is stored on a CD-ROM 22 or, alternatively, “a DVD, a hard disk, a non-volatile memory chip,” or a similar storage device (*i.e.*, a map data storage section). (Yokota, EX1005 at 4:24-28 (“The navigation system 10 comprises ... a compact disk read-only memory (CD-ROM) 22 for storing map data; a map database 24 on the CD-ROM 22; a CD-ROM drive 26 to read the map data 24 on the CD-ROM 22”), 4:33-36 (“Rather than the CD-ROM 22 and the CD-ROM drive 26, a DVD, a hard disk, a non-volatile memory chip, and other like storage devices, and readers for same, can also be used advantageously in the present invention.”), 10:51-56 (“Once the display controller 16 has a position of the vehicle, the display controller 16 obtains the map data for that position and the surrounding area from the map database 24 on the CD-ROM 22 via the CD-ROM drive 26 in the well-known manner.”).)



(*Id.* at FIG. 1 (annotated).)

104. Yokota teaches that map data 24 includes a “road data table 150” which comprises the “road data” “used in displaying roads in the vehicle navigation system” (*i.e.*, the roads necessary for a route search). (Yokota, EX1005 at 4:39-41 (“The map database 24 stored on the CD-ROM 22 comprises at least a geo-feature polygon table 100 and a road data table 150, as described below.”), 5:33-51 (“The road table 150 comprises information fields used in displaying roads in the vehicle navigation system hereof, such as: location, e.g. state, county, and/or city name;

street name strings, e.g. name of the road, route number, and/or aliases; address number range; street class, e.g. freeway, highway, local, ramp, ferry route, etc.; street type, e.g. divided or undivided, paved or unpaved, etc.; speed limit; number of lanes; supplemental attributes, e.g. width, existence of bike route and/or sidewalk, etc.; shape, e.g. geometry, length, etc; connectivity, e.g. links to other street segments, turn restrictions, one-way or two-way, etc.; traffic controls, e.g. stop signs, traffic signals, railroad crossings, drawbridges, etc.; conditions, e.g. public or private or restricted, under construction, seasonal closure, etc.; limitations, e.g. height clearance, weight restrictions, carpool lane, slope grade, etc.; sign text, e.g. destinations, distances, directions, etc., e.g. ‘I-5 N to San Francisco’; and priority, which is a combination of all or most of the above-described road data table information fields.”), 5:52-62 (“Road data may be contained in a single road data table 150, or separate road data tables may be used for each separate field or group of fields described above. If multiple tables are used, they are linked to each other in the well-known manner. Further, one or more separate road data tables may be used for each map scale, to improve efficiency of data retrieval for display. A supplemental set of road data tables may be used for user preference upgrading situations, as described below, again for efficiency of data retrieval for display.”),

12:44-53 (“In step 204, information is stored in the raw database, the information comprising types of geographic areas; names of geographic areas; populations of geographic areas; boundaries of geographic areas; distinct visual styles for each type of geographic area; colors for each geographic area such that no adjacent geographic areas have the same color; layouts of roads; service availability for each geographic area; at least one icon for each geographic area above certain thresholds; and types of roads.”); *see also id.* at claims 1, 18, and 22; *id.* at FIGS. 6F, 7A-D (displaying roads from a route search).)

105. Yokota’s map data 24 includes displayable names and icons (*i.e.*, display elements) for cities (*i.e.*, city centers), as well as locations for the names/icons to indicate the representative positions of the cities. (*Id.* at 2:59-64 (“According to the present invention, the first object is achieved by storing the names of geographic areas (e.g. municipalities, counties, states, ZIP code zones, telephone area codes, and the like) in a map database, and displaying the names of municipalities, counties, and/or states depending on display scale and display criteria.”), 4:42-55 (“The geo-feature polygon table 100 comprises information on geographic features, such as lakes, malls, parks, and the like; the information comprises such fields as size, shape, location, and name. The geo-feature polygon

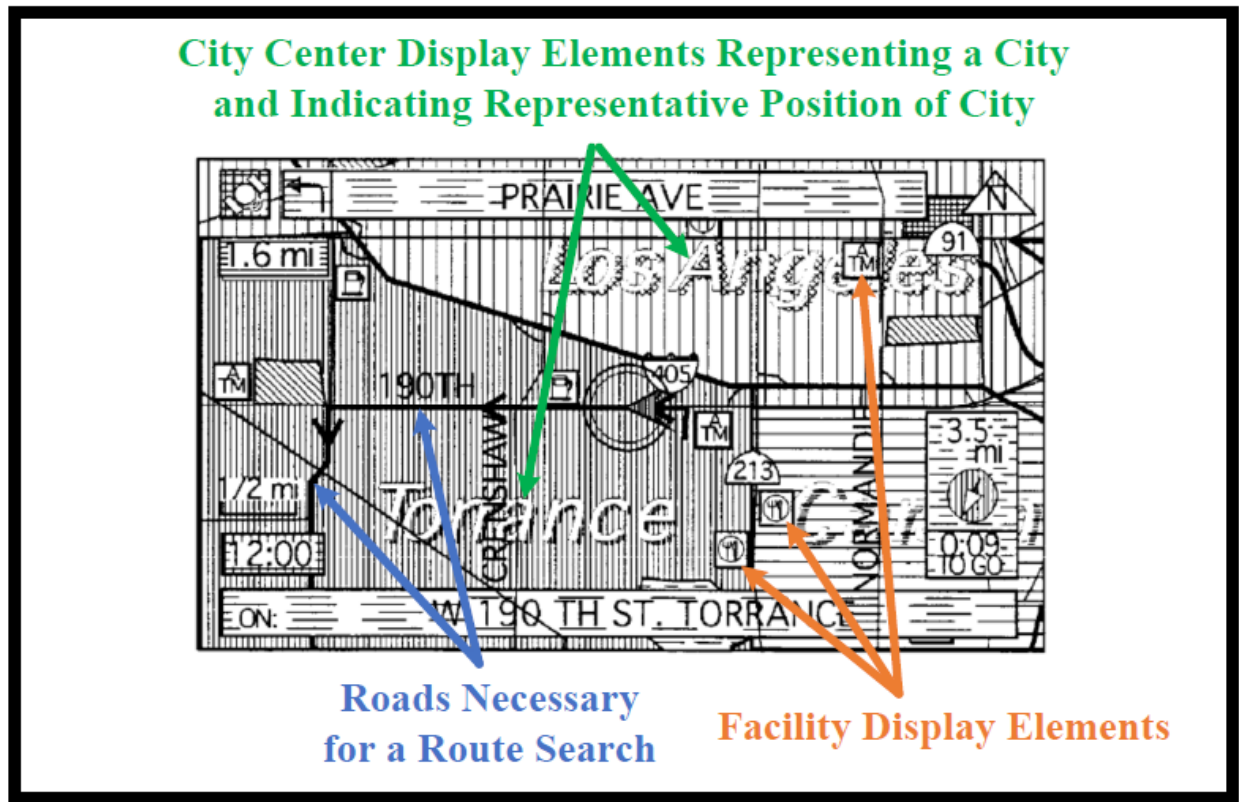
table 100 may further comprise data on large geographic areas, such as countries, states, and counties; alternatively, these may be in a separate state and urban area polygon table 110, as described below. The geo-feature table 100 may further comprise state and/or urban area polygons and urban area names, i.e. polygons that are generally in the shape of a state and/or an urban area, such as a large city, and the names thereof; alternatively, these may be in the state and urban area polygon table 110 and/or a separate state and urban area name table 120, as described below.”), 4:56-5:11 (“The state and urban area polygon table 110 comprises information fields used in displaying large geographic areas, such as countries, states, counties, urban areas, and the like, in the vehicle navigation system hereof, such as: display type, e.g. meshed polygon, solid polygon, icon, dot, etc.; color, e.g. a unique color for each municipality such that no adjacent municipalities have the same color, else a single color for all municipalities; color fill position, i.e. a point within the polygon at which to start filling in with color; shape, e.g. a pointer to a geometry table of either absolute coordinates or coordinates relative to a representative position; pattern, e.g. solid fill, preset hatch patterns, or an icon design ID; geographic size of the urban area; population of the urban area; display size, e.g. a size factor for the icon or other display that is generally proportional to the

geographic size or population of the urban area; road network pattern, e.g. a pointer to an appropriate entry in the major road geometry table; entity type, e.g. country, state, county, city, community, zip code area, etc.; availability of predetermined services in the entity, and icons for same; and priority, e.g. applicable map scales on which to display the particular entity, detail level for user preference setting, overlap priority, etc.”), 5:12-21 (“The state and urban area name table 120 comprises information fields used in displaying smaller geographic areas, such as urban areas, cities, communities, ZIP code zones, telephone area codes, statistical areas, census tracts, and the like, in the vehicle navigation system hereof, such as: label position; name string; font size, e.g. small, large, or size value; and font style, e.g. typeface, capitalization, Roman, Italic, bold, etc. Alternatively, these information fields may be contained in the state and urban area polygon table 110.”), 5:22-32 (“A city polygon table 130 contains a subset of the information fields in the state and urban area polygon table 110, and is preferably used for large-scale maps. Information fields in the city polygon table 130 include position, shape, color, entity type, priority, and name, all as described above. A city name table 140, used in conjunction with the city polygon table 130, contains the same information fields as does the state and urban area name table 120. Alternatively, the information fields

in the city name table 140 may be incorporated into the city polygon table 130.”); *see also id.* at 12:44-53, claims 7-8, FIGS. 4A-D, 7A-D, 8A-D.)

106. Map data 24 further includes displayable icons (*i.e.*, display elements) for malls, restaurants, gas stations, and the like (*i.e.*, facilities). (*Id.* at 4:42-45 (“The geo-feature polygon table 100 comprises information on geographic features, such as lakes, malls, parks, and the like; the information comprises such fields as size, shape, location, and name.”), 5:7-8 (“availability of predetermined services in the entity, and icons for same”), 10:6-21 (“Similarly, point-of-interest icons, or service icons, for certain basic services that are useful to the driver, such as gas stations, restaurants, and lodging, can also be upgraded to appear on a map at a scale that would otherwise hide such icons, as shown in views c) and d) of FIG. 4. Such upgraded service icons preferably represent a municipality, or a non-municipal locale along a highway, in which such basic services are available. The decision-making process for identifying and displaying, or rendering, point-of-interest icons is shown in FIG. 11. While regular point-of-interest icons are typically limited to the largest map scales to avoid overcrowding in urban areas, upgraded point-of-interest icons can appear in any map scale as long as the mapped area remains relatively sparse. Each type of service may be identified with a distinct icon design, or a

number of types of services may share a single icon design.”), 10:26-27 (“service icons are preferably used to identify locales that have available predetermined services”); *see also id.* at 3:37-44, claim 20, FIGS. 4C-D, 7A-D, 8A-D.)



(*Id.* at FIG. 7D (annotated).)

107. Yokota also teaches that its map data storage section stores, for each road in the road data table 150, a road type (*e.g.*, highway, major road, etc.) and a “priority” for the road based on the road type. (Yokota, EX1005 at 5:33-51 (“The road table 150 comprises information fields used in displaying roads in the vehicle

navigation system hereof, such as: location, e.g. state, county, and/or city name; street name strings, e.g. name of the road, route number, and/or aliases; address number range; street class, e.g. freeway, highway, local, ramp, ferry route, etc.; street type, e.g. divided or undivided, paved or unpaved, etc.; speed limit; number of lanes; supplemental attributes, e.g. width, existence of bike route and/or sidewalk, etc.; shape, e.g. geometry, length, etc; connectivity, e.g. links to other street segments, turn restrictions, one-way or two-way, etc.; traffic controls, e.g. stop signs, traffic signals, railroad crossings, drawbridges, etc.; conditions, e.g. public or private or restricted, under construction, seasonal closure, etc.; limitations, e.g. height clearance, weight restrictions, carpool lane, slope grade, etc.; sign text, e.g. destinations, distances, directions, etc., e.g. 'I-5 N to San Francisco'; and priority, which is a combination of all or most of the above-described road data table information fields.”), 12:53-61 (“In step 206, a priority is assigned to each road in the raw database based at least in part on the type of road and stored in an intermediate database from which a final map database is derived. In step 208, a first set of road display criteria is established for displaying a standard collection of roads, and a second set of criteria is established for including upgradable roads among those displayed. In step 210, roads in the intermediate database that meet these criteria are

stored on the final map database.”); *see also id.* at FIG. 10 (reference numeral 206), 6:61-7:3, claims 18 and 22.) Yokota teaches that there is preferably “at least one road priority level for each map scale level.” (*Id.* at 9:13-14; *see also id.* at 12:53-13:3.)

108. Yokota’s Table 3, which illustrates a “sample set of road priority levels, i.e. when to display certain roads” (*id.* at 9:15-16), is reproduced below:

TABLE 3					
	Scale				
	Smallest	Small	Medium	Large	Largest
Inter-state	Shown	Shown	Shown	Shown	Shown
Major Hwys	Upgradable	Shown	Shown	Shown	Shown
Minor Hwys	Omitted	Upgradable	Shown	Shown	Shown
Major Roads	Omitted	Omitted	Upgradable	Shown	Shown
Minor Roads	Omitted	Omitted	Omitted	Upgradable	Shown

(*Id.* at 9:17-30 (Table 3).)

109. Yokota teaches that the road priority levels indicate whether or not each

of the roads in the road data table 150 should be displayed for each of a plurality of map scales. (*Id.* at 9:8-16 (“The display controller 16 uses the road priority levels to determine the appropriate set of roads to display on a given map display. For instance, a default road priority level might be to display only interstate highways and roads at exits from interstate highways on very small-scale map displays. Preferably, there is at least one road priority level for each map scale level. A sample set of road priority levels, i.e. when to display certain roads, is given in Table 3...”); *see also id.* at Abstract, 9:17-30 (Table 3), claims 18 and 22.) An “Upgradable” road priority level indicates that the road should not be displayed unless certain criteria are met (*e.g.*, the road is in a rural area where there are only a few higher-priority roads nearby). (*Id.* at FIG. 5, 9:33-10:5.) A POSITA would have understood that Yokota’s road priority levels are “attributes” indicative of whether or not each of the roads should be displayed for each of a plurality of map scales.

110. Yokota also teaches that its map data storage section stores classes of the map data 24. The map data storage section stores the “street class, *e.g.* freeway, highway, local, ramp, ferry route, etc.” for each of the roads in the road table 150. (Yokota, EX1005 at 5:33-39 (“The road table 150 comprises information fields used in displaying roads in the vehicle navigation system hereof, such as: location, *e.g.*

state, county, and/or city name; street name strings, e.g. name of the road, route number, and/or aliases; address number range; street class, e.g. freeway, highway, local, ramp, ferry route, etc.; street type, e.g. divided or undivided, paved or unpaved, etc.”); *see also id.* at 9:17-30 (Table 3), 12:44-53, claims 18, 20, and 22.)

111. The map data storage section also stores the population and type (*e.g.*, large city, small city, etc.) for each of the city centers in the map data 24. (*Id.* at 5:1-7 (“The state and urban area polygon table 110 comprises information fields used in displaying large geographic areas, such as countries, states, counties, urban areas, and the like, in the vehicle navigation system hereof, such as: ... geographic size of the urban area; population of the urban area; ... entity type, *e.g.* country, state, county, city, community, zip code area, etc.”), 5:23-27 (“A city polygon table 130 contains a subset of the information fields in the state and urban area polygon table 110, and is preferably used for large-scale maps. Information fields in the city polygon table 130 include position, shape, color, entity type, priority, and name, all as described above.”), 8:10-22 (“each aggregated city is classified as to its being large, medium, or small”); *see also id.* at 7:15-25 (Table 1), 8:26-34 (Table 2), 8:38-57, 12:44-53, claims 2, 5, and 7-8.)

112. The map data storage section additionally stores a service type (*e.g.*,

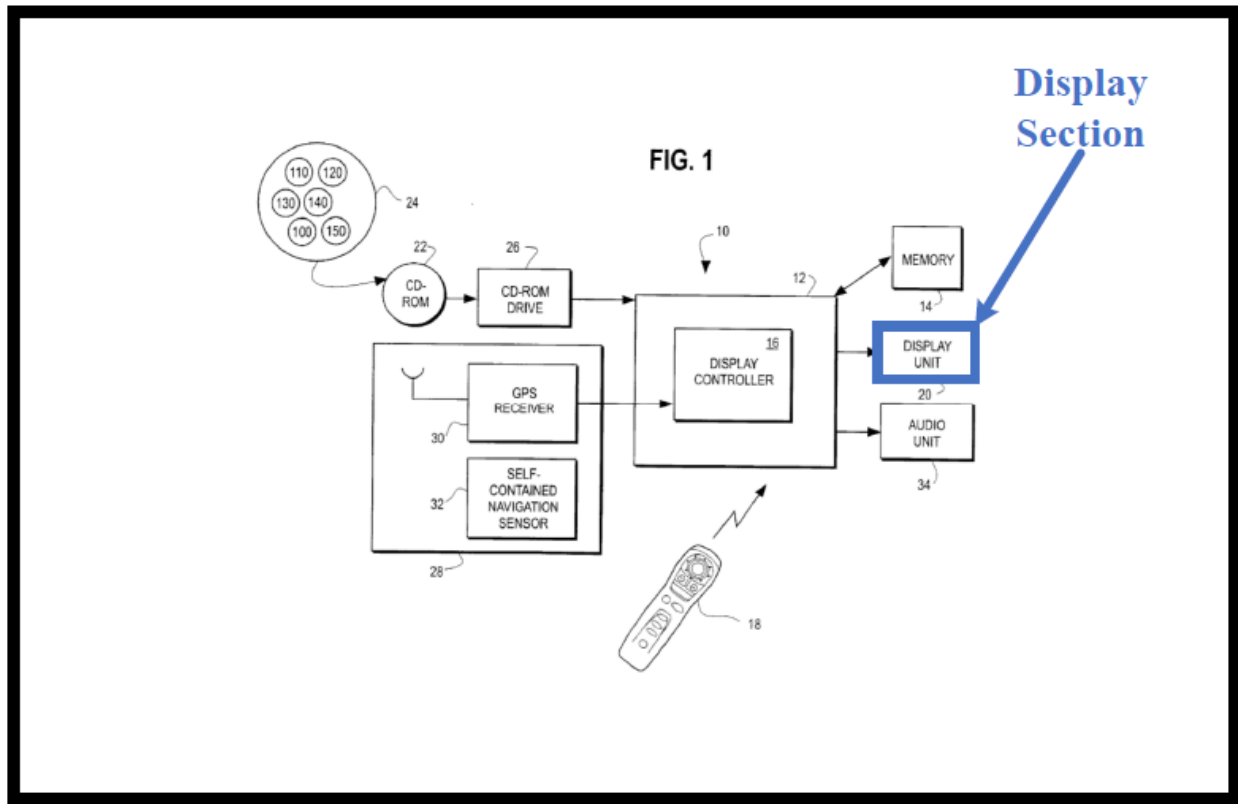
restaurant, gas station, etc.) for each of the facilities in the map data 24. (*Id.* at 3:37-44 (“According to the present invention, the seventh object is achieved by identifying locales of applicable sizes and situations (relative importance within the region) in the map database; storing an icon for each type, and/or for all types combined, of predetermined services available within the locale; and displaying an icon representing the locale where a service or services are available, depending on the display scale and situation.”), 10:6-21 (“Similarly, point-of-interest icons, or service icons, for certain basic services that are useful to the driver, such as gas stations, restaurants, and lodging, can also be upgraded to appear on a map at a scale that would otherwise hide such icons, as shown in views c) and d) of FIG. 4. Such upgraded service icons preferably represent a municipality, or a non-municipal locale along a highway, in which such basic services are available. The decision-making process for identifying and displaying, or rendering, point-of-interest icons is shown in FIG. 11. While regular point-of-interest icons are typically limited to the largest map scales to avoid overcrowding in urban areas, upgraded point-of-interest icons can appear in any map scale as long as the mapped area remains relatively sparse. Each type of service may be identified with a distinct icon design, or a number of types of services may share a single icon design.”); *see also id.* at FIG.

6E (showing facility icons of different types).)

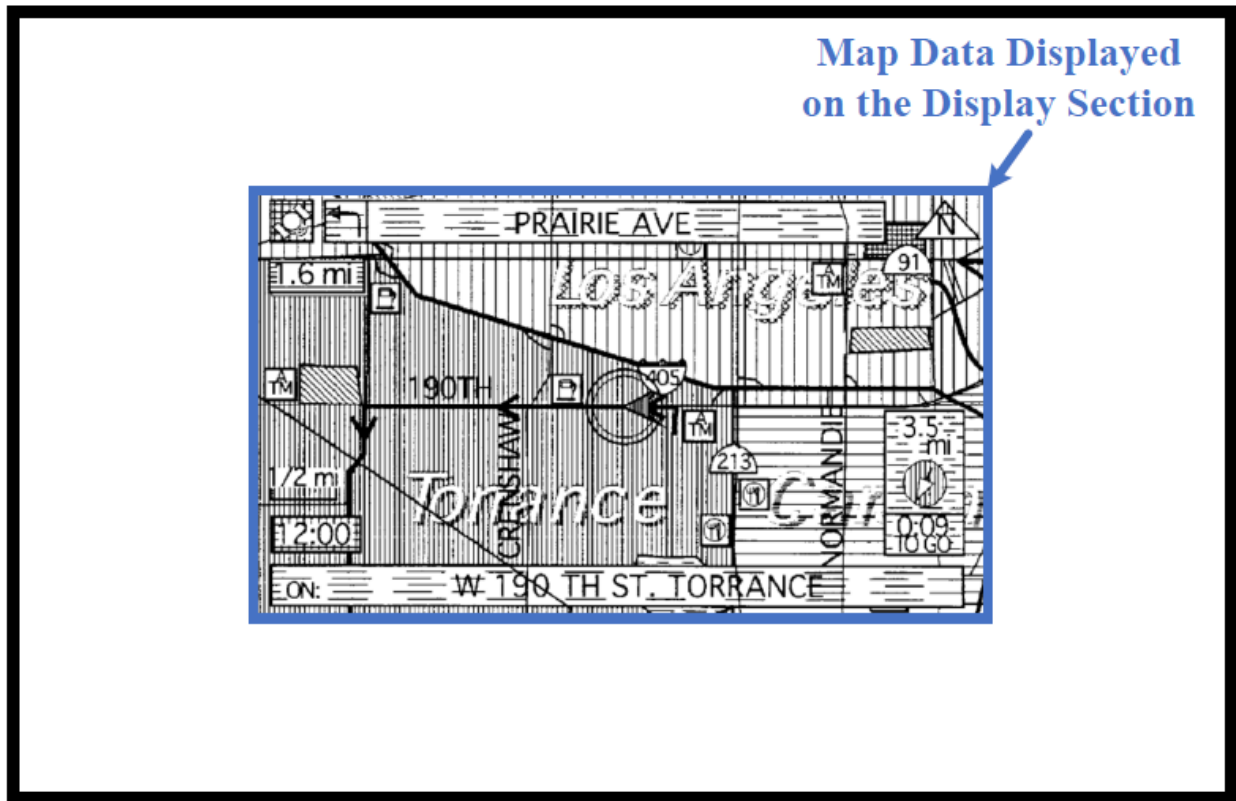
c) Yokota Teaches “a display section for displaying the map data.”

113. Yokota teaches “a display section for displaying the map data” (“limitation [1b]”).

114. Yokota teaches that navigation system 10 comprises a display unit 20 (*i.e.*, a display section) for displaying the map data 24. (Yokota, EX1005 at 4:24 (“The navigation system 10 comprises ... a display unit 20 for displaying a map display...”), 6:40-44 (“The display unit 20 is of any well-known type, and is controlled by the display controller 16. The display unit 20 is generally of a size and shape adapted to fit into a dashboard of an automobile or other vehicle for ready viewing by a driver of the vehicle.”); *see also id.* at Abstract, 10:50-56, 11:1-4, 13:9-12.)



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



(*Id.* at FIG. 7D (annotated).)

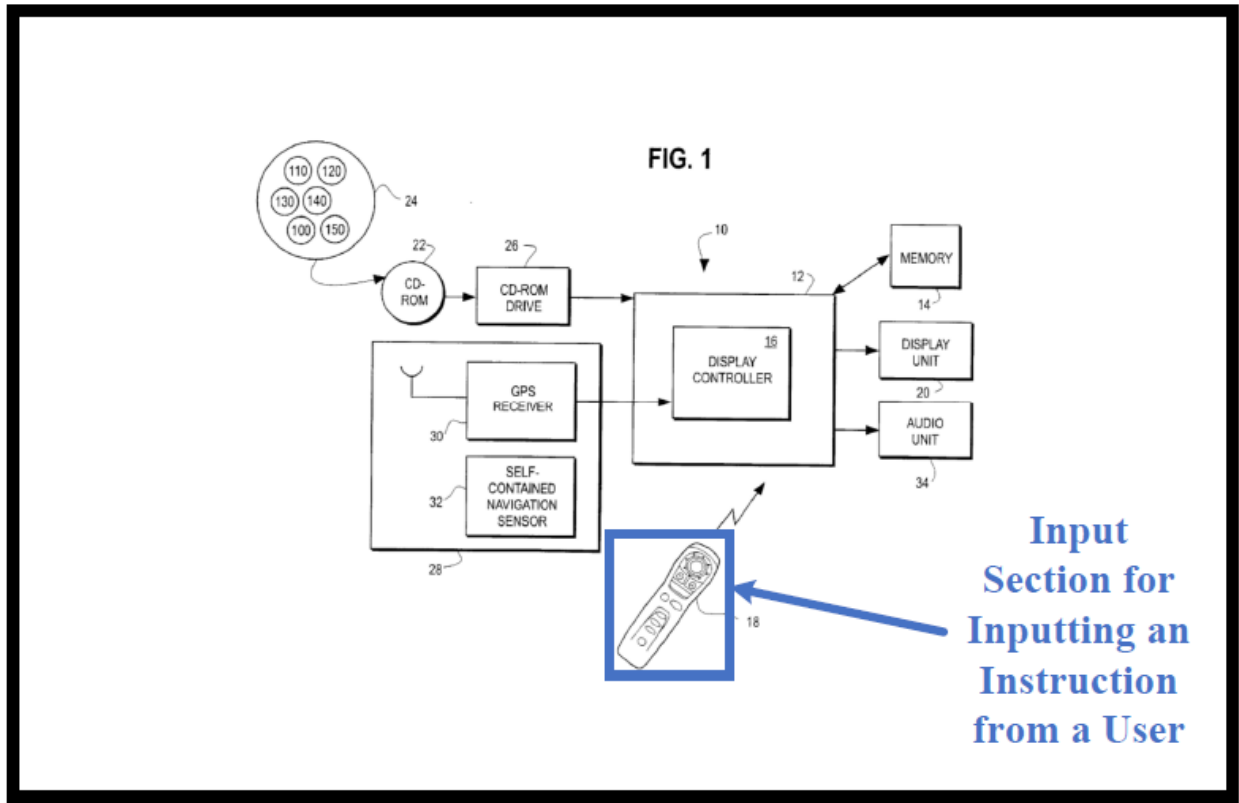
d) Yokota Teaches “an input section for inputting an instruction from a user.”

115. Yokota teaches “an input section for inputting an instruction from a user” (“limitation [1c]”).

116. Yokota teaches that navigation system 10 comprises a user input device 18 (*i.e.*, an input section), such as a remote controller. (Yokota, EX1005 at 4:22-24 (“The navigation system 10 comprises ... an operating unit or remote controller or user input device 18 for accepting input from a user of the system...”), 6:2-4 (“The

remote controller 18 used in the present invention can be of any type familiar to those of ordinary skill in the art. One such remote controller 18 is shown in FIG. 2.”.)

117. The user input device 18 is configured to input driver instructions, such as instructions to “zoom in” or “zoom out” on the displayed map. (*Id.* at Abstract (“The apparatus accepts user input that can affect whether to display names, various icons, and/or roads of various priorities.”), 3:49-53 (“According to the present invention, the ninth object is achieved by providing default displays for each of the first eight objects; providing a physical user input device or remote controller; and using input from the remote controller to override the default displays.”), 6:9-14 (“An enlargement key 18 *b* is operated to increase the scale of a displayed map, i.e. to ‘zoom in’ on a displayed area to show more detailed information, albeit of a smaller area. A reduction key 18 *c* is operated to decrease the scale of a displayed map, i.e. to ‘zoom out’ on a displayed area to show a larger area, albeit with fewer details.”), 13:3-4 (“In step 216, input is accepted from the user input device...”)).

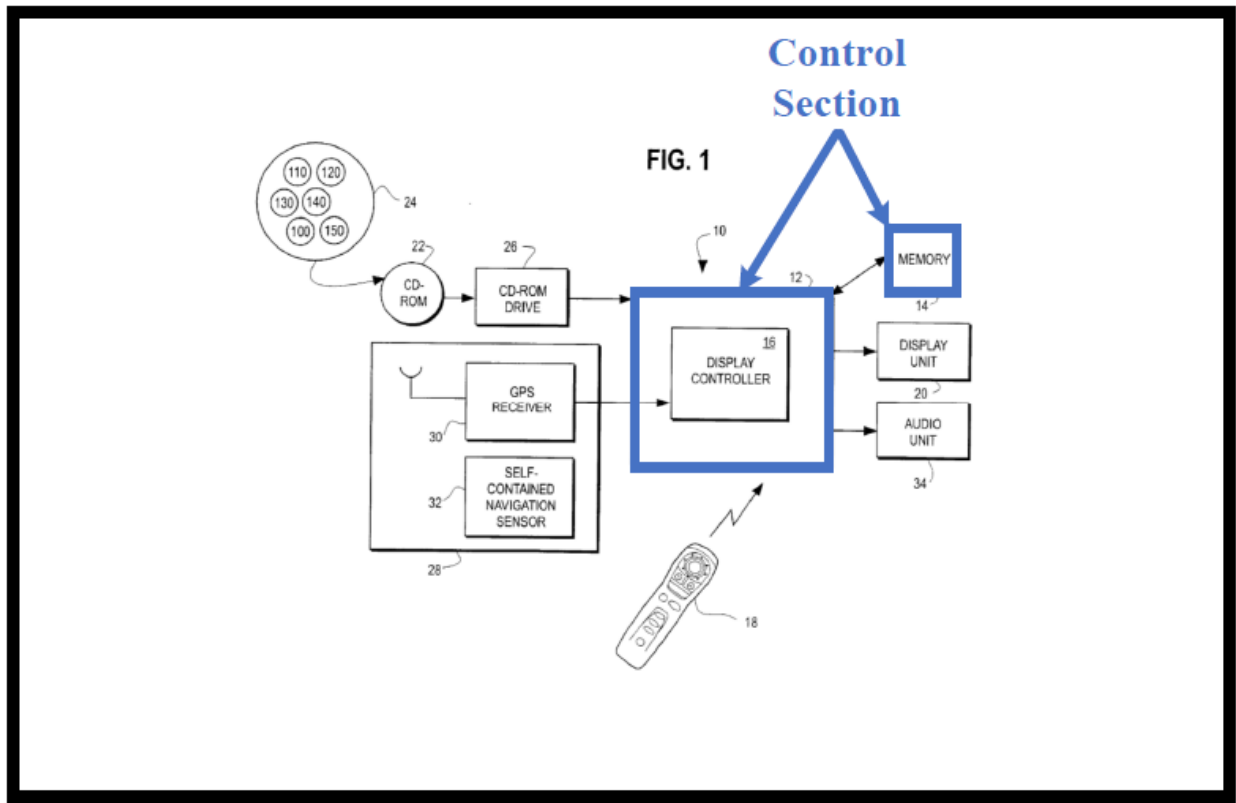


(*Id.* at FIG. 1 (annotated).)

e) Yokota Teaches “a control section for carrying out.”

118. Yokota teaches “a control section for carrying out” (“limitation [1d]”).

119. Yokota teaches that navigation system 10 comprises a microprocessor 12 with an associated memory 14 (collectively, a control section). (Yokota, EX1005 at 4:19-21, FIG. 1, claim 23.)



(*Id.* at FIG. 1 (annotated).)

120. As discussed in detail below, Yokota's control section carries out various procedures.

- f) **Yokota In Combination With The Knowledge Of A POSITA Teaches And Renders Obvious “a procedure of calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed via the input section.”**

121. Yokota in combination with the knowledge of a POSITA teaches and renders obvious “a procedure of calculating a route between an own-vehicle position

and a destination represented by one of the display elements, the destination being instructed via the input section” (“limitation [1e]”).

122. Yokota teaches a procedure of calculating a guidance route “to a desired destination.” (Yokota, EX1005 at 1:16-25 (“A vehicle navigation apparatus of a well-known type performs vehicle travel guidance, enabling a driver to easily drive the vehicle to a desired destination. The navigation apparatus detects the position of the vehicle, reads out map data pertaining to an area in which the vehicle is positioned from, e.g., a CD-ROM (compact disk read-only memory), and displays a map image on a display screen while superimposing a mark representing the position of the vehicle (user's vehicle position mark) on a predetermined portion of the map image.”), 11:18-22 (“Regarding guidance routes, these are directions to a driver to show the driver a pathway to a particular destination. One such guidance route system is described in detail in U.S. Pat. No. 5,852,791, the disclosure of which is hereby incorporated by reference.”); *see also id.* at 11:8-17.)

123. A POSITA would have found it obvious to begin Yokota’s calculated guidance route at the current position of the vehicle (*i.e.*, an own-vehicle position). Before the alleged invention of the ‘465 patent, it was typical for vehicle-based navigation systems such as Yokota’s navigation system 10 to calculate a route from

the vehicle's current position to a user-specified destination. (Lou, EX1012 at 1:11-23 ("If the navigation system is installed in a vehicle, the starting point is typically the current position of the vehicle"); *see also* Tanizaki, EX1009 at Abstract, [0009], [0028]; Moroto, EX1013 at 9:13-18; Harada, EX1014 at 7:1-5; Geelen, EX1017 at [0057].) A POSITA would have been motivated to begin Yokota's calculated guidance route at the vehicle's current position: (i) to increase user convenience by eliminating the need for the driver to manually enter a route starting point; (ii) to simplify the route guidance process for the driver by placing the driver's vehicle on the guidance route immediately once the destination is entered; and (iii) to prevent driver confusion when the driver's current position differs from the route starting point (*e.g.*, where the driver does not know how to get from his or her current position to the route starting point).

124. Yokota's teaching that microprocessor 12 determines the present position of the vehicle is consistent with beginning the calculated route at an own-vehicle position. (Yokota, EX1005 at 1:16-25, 10:50-56.)

125. U.S. Patent No. 5,852,791 ("Sato"), which is incorporated by reference in Yokota, further supports that a calculated guidance route begins at an own-vehicle position. (Yokota, EX1005 at 11:18-22; Sato, EX1006 at 10:14-17.)

126. A POSITA would have understood that Yokota's microprocessor 12 (*i.e.*, control section) performs the procedure of calculating a route between an own-vehicle position and a destination because: (i) Yokota teaches that microprocessor 12 receives vehicle position information from location system 28 and generates a map display (including a guidance route) using the position information; and (ii) navigation systems typically used a microprocessor such as Yokota's microprocessor 12 to perform route calculation functions. (Yokota, EX1005 at 10:50-56, 11:8-17; Sato, EX1006 at FIG. 4, 10:14-17, 10:34-38; Harada, EX1014 at 8:21-29.)

127. Sato, which is also incorporated by reference in Yokota, further supports that Yokota's microprocessor 12 performs the procedure of calculating a route between an own-vehicle position (*i.e.*, the current position of the vehicle) and a destination. (Sato, EX1006 at FIG. 4, 10:14-17, 10:34-38.)

128. A POSITA would have found it obvious to input the destination using Yokota's input device 18 (*i.e.*, input section). Prior to the alleged invention of the '465 patent, using an input device (*e.g.*, a keypad, microphone, touchscreen, etc.) to input a destination into a navigation system was routine and ubiquitous in the art as it allowed drivers to specify where they would like to go. (*See, e.g.*, Tanizaki,

EX1009 at [0042] (“the destination is input from the input unit”); TomTom ONE, EX1015 at 7-9; Khavakh, EX1016 at 4:7-19, 9:39-47; Geelen, EX1017 at [0057]; *Human factors engineering*, EX1029 at 3.) Yokota teaches guiding a driver to a “desired destination” (Yokota, EX1005 at 1:16-25), and a POSITA would have been motivated to input a destination using Yokota’s input device 18 to allow the driver to specify his or her desired destination and because Yokota’s navigation system 10 would have no way of knowing where the driver wants to go without the driver’s input. (*See also* Yokota, EX1005 at 4:22-24 (teaching that input device 18 is responsible for accepting user input).)

129. Sato, which is incorporated by reference in Yokota, further supports that the destination would be input using Yokota’s input device 18. (Sato, EX1006 at 7:61-64 (disclosing a remote controller 2 used to set a guide route to a destination); *see also id.* at 1:11-13, 10:14-15.)

130. A POSITA would also have found it obvious to represent the user-input destination with a display element. Prior to the alleged invention of the ‘465 patent, it was common for displayed guidance routes to end at a display element representing the driver’s destination (*e.g.*, a star, a checkered flag, etc.). (*See, e.g.*, Tanizaki, EX1009 at FIGS. 2A-C; TomTom ONE, EX1015 at 9-10, 25, 52; Geelen,

EX1017 at FIG. 11B; *Human factors engineering*, EX1029 at 6 (Figure 12).) A POSITA would have known that displaying a guidance route that ends abruptly could confuse the driver. A POSITA would have been motivated to represent the driver's set destination with a display element to beneficially provide a clear visual demarcation of the end of the guidance route and to help the driver find his or her destination (*e.g.*, by showing which side of the road the destination is on). A POSITA would have had a reasonable expectation of success because the proposed modification would have required a routine, straightforward adjustment to Yokota's map data 24 (*e.g.*, adding a checkered flag icon to represent a destination) and Yokota already discloses placing icons at representative positions on a map. (*See, e.g.*, Yokota, EX1005 at FIG. 7D.)

131. Yokota in combination with the knowledge of a POSITA teaches and renders obvious limitation [1e].

g) Yokota Teaches “in accordance with one of the plurality of map scales instructed via the input section, a procedure of displaying a map on the display section.”

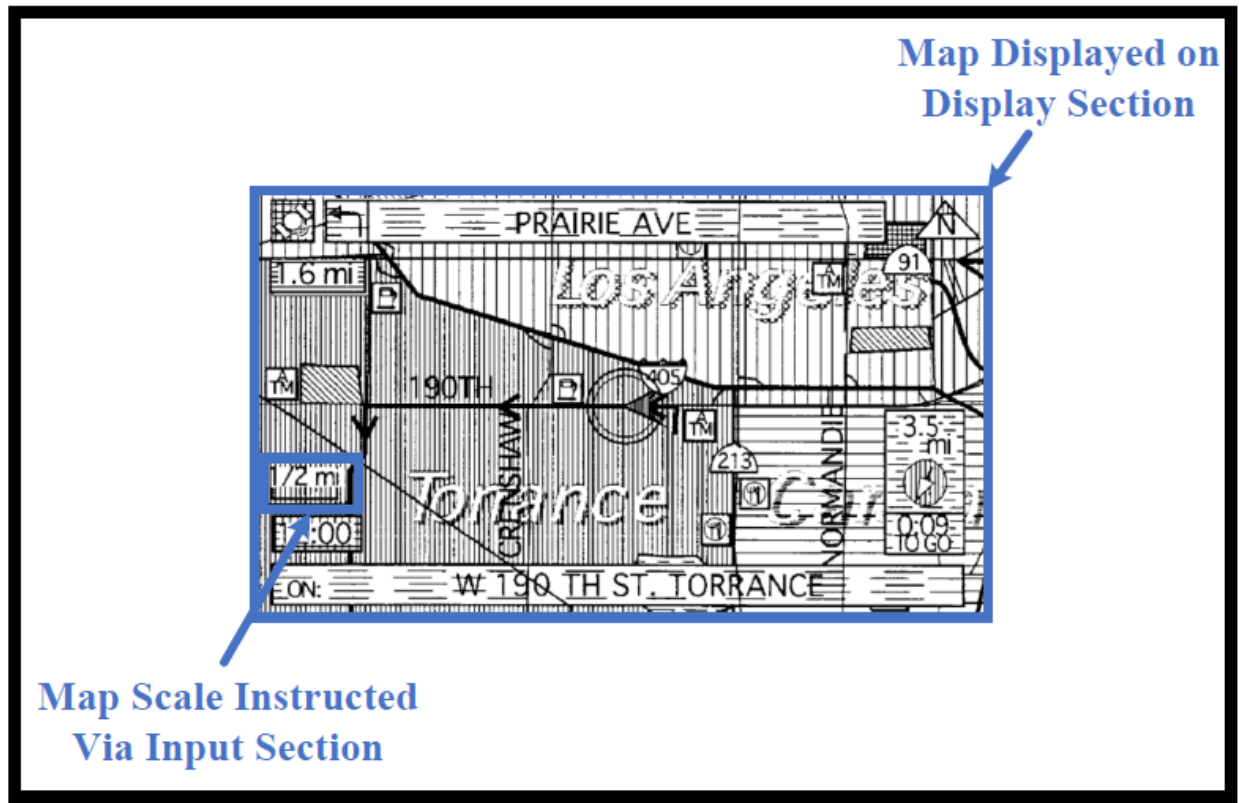
132. Yokota teaches “in accordance with one of the plurality of map scales instructed via the input section, a procedure of displaying a map on the display section” (“limitation [1f]”).

133. Yokota teaches that display controller 16, which is part of microprocessor 12 (*i.e.*, the control section), performs a procedure of displaying a map on display unit 20 (*i.e.*, the display section). (Yokota, EX1005 at 6:40-46 (“The display unit 20 is of any well-known type, and is controlled by the display controller 16. The display unit 20 is generally of a size and shape adapted to fit into a dashboard of an automobile or other vehicle for ready viewing by a driver of the vehicle. The display controller 16 comprises computer software on the microprocessor 12.”), 10:51-11:4 (“Once the display controller 16 has a position of the vehicle, the display controller 16 obtains the map data for that position and the surrounding area from the map database 24 on the CD-ROM 22 via the CD-ROM drive 26 in the well-known manner. The display controller 16 then creates a map display from the map data according to the values of the variables described above, whether default values or user-entered values. For instance, one map display might be a small-scale map with cities depicted as larger or smaller dots, with all geographic areas displayed monochromatically and names in uppercase Roman embossed text embedded in the network of highways, while another display might be a large-scale map with the network of all road types, with each geographic area having a color distinct from those of its neighbors and names in mixed case plain

Italic text floating above or below the roads. The display controller 16 creates the map display using a plurality of layers, then synthesizes all the layers into a single map display and sends the single map display to the display unit 20 to be displayed in the well-known manner.”), 13:9-12 (“In step 220, the display controller builds a map display. In step 222, the display controller displays the map display on the display unit.”); *see also id.* at Abstract, claim 23.)

134. Yokota teaches that the map is displayed on the display unit 20 in accordance with one of a plurality of map scales input via input device 18 (*i.e.*, the input section). (*Id.* at 1:35-43 (“Displays are available at a plurality of scale, or zoom, levels, e.g. large-scale displays for urban areas with comparatively many roads and small-scale displays for rural areas with comparatively few roads. A typical large-scale display might show approximately {fraction (1/10)} or 5/8 of one square mile, while a typical small-scale display might show 9,000 or 100,000 square miles. Between these two, a typical middle-scale map might show 10 or 160 square miles.”), 6:9-14 (“An enlargement key 18 *b* is operated to increase the scale of a displayed map, *i.e.* to ‘zoom in’ on a displayed area to show more detailed information, albeit of a smaller area. A reduction key 18 *c* is operated to decrease the scale of a displayed map, *i.e.* to ‘zoom out’ on a displayed area to show a larger

area, albeit with fewer details.”), 10:51-67 (“Once the display controller 16 has a position of the vehicle, the display controller 16 obtains the map data for that position and the surrounding area from the map database 24 on the CD-ROM 22 via the CD-ROM drive 26 in the well-known manner. The display controller 16 then creates a map display from the map data according to the values of the variables described above, whether default values or user-entered values. For instance, one map display might be a small-scale map with cities depicted as larger or smaller dots, with all geographic areas displayed monochromatically and names in uppercase Roman embossed text embedded in the network of highways, while another display might be a large-scale map with the network of all road types, with each geographic area having a color distinct from those of its neighbors and names in mixed case plain Italic text floating above or below the roads.”); *see also id.* at Abstract, claim 22.)



(*Id.* at FIG. 7D (annotated).)

- h) Yokota Alone Teaches, Or Yokota In Combination With The Knowledge Of A POSITA Renders Obvious, “selecting the roads indicated by the attributes as being displayable according to the instructed map scale, and by selecting the display elements based on ranks.”**

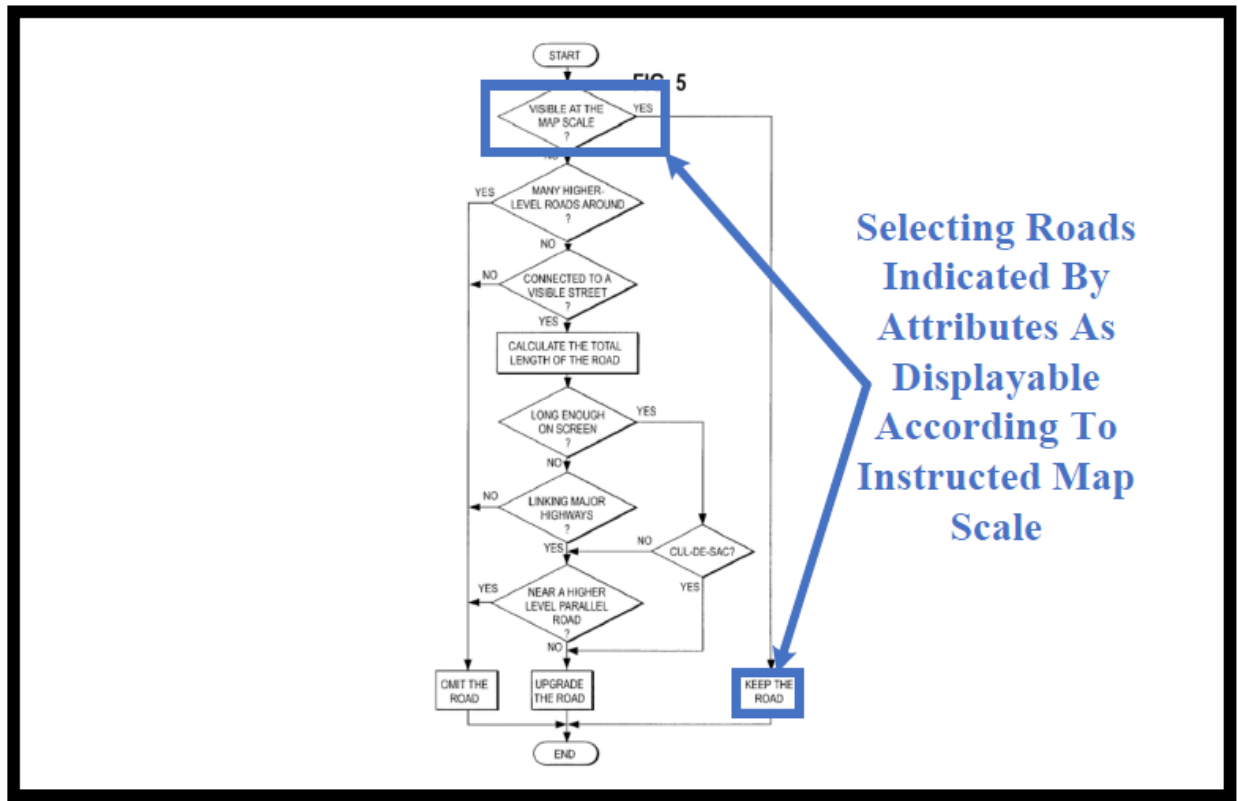
135. Yokota alone teaches, or Yokota in combination with the knowledge of a POSITA renders obvious, “selecting the roads indicated by the attributes as being displayable according to the instructed map scale, and by selecting the display elements based on ranks” (“limitation [1g]”).

136. As discussed above with respect to limitation [1a], Yokota teaches

storing attributes indicative of whether or not each of the roads in the map data 24 should be displayed for each of a plurality of map scales. (Yokota, EX1005 at 5:33-51, 9:8-30, 12:53-61, FIG. 10 (at reference numeral 206).)

137. Yokota further teaches that the display controller 16 selects the roads indicated by the attributes as being displayable according to the instructed map scale and draws them as a layer. (*Id.* at 9:8-16 (“The display controller 16 uses the road priority levels to determine the appropriate set of roads to display on a given map display. For instance, a default road priority level might be to display only interstate highways and roads at exits from interstate highways on very small-scale map displays. Preferably, there is at least one road priority level for each map scale level. A sample set of road priority levels, i.e. when to display certain roads, is given in Table 3”), 11:1-17 (“The display controller 16 creates the map display using a plurality of layers, then synthesizes all the layers into a single map display and sends the single map display to the display unit 20 to be displayed in the well-known manner. The various layers contain at least geographic features, such as lakes and parks; geographic areas, such as states and cities; roads, such as interstate highways and city streets; and names, such as California and Main Street. One such set of layers, and an order in which the display controller 16 may synthesize them to create

a display, is: base polygons, e.g. city boundaries; then geo-feature polygons, e.g. shopping malls and rivers; then city name labels; then local roads; then highways; then freeways; then street names; then points of interest, such as restaurants; then a guidance route, if present; then route numbers. These overlays are shown individually in FIG. 6 and overlaid on top of each other in FIGS. 7 and 8.”); *see also id.* at Abstract (“The apparatus selectively displays or does not display any given road based on both display scale and the importance, or priority, of the road.”), 9:17-30 (Table 3), FIG. 5, FIG. 6D, 10:51-67.) In the example shown in Table 3, all road types are selected when the user sets the map scale to the “largest” scale because the road priority levels (*i.e.*, attributes) indicate that all road types are displayable at that scale. (*Id.* at 9:8-30.)

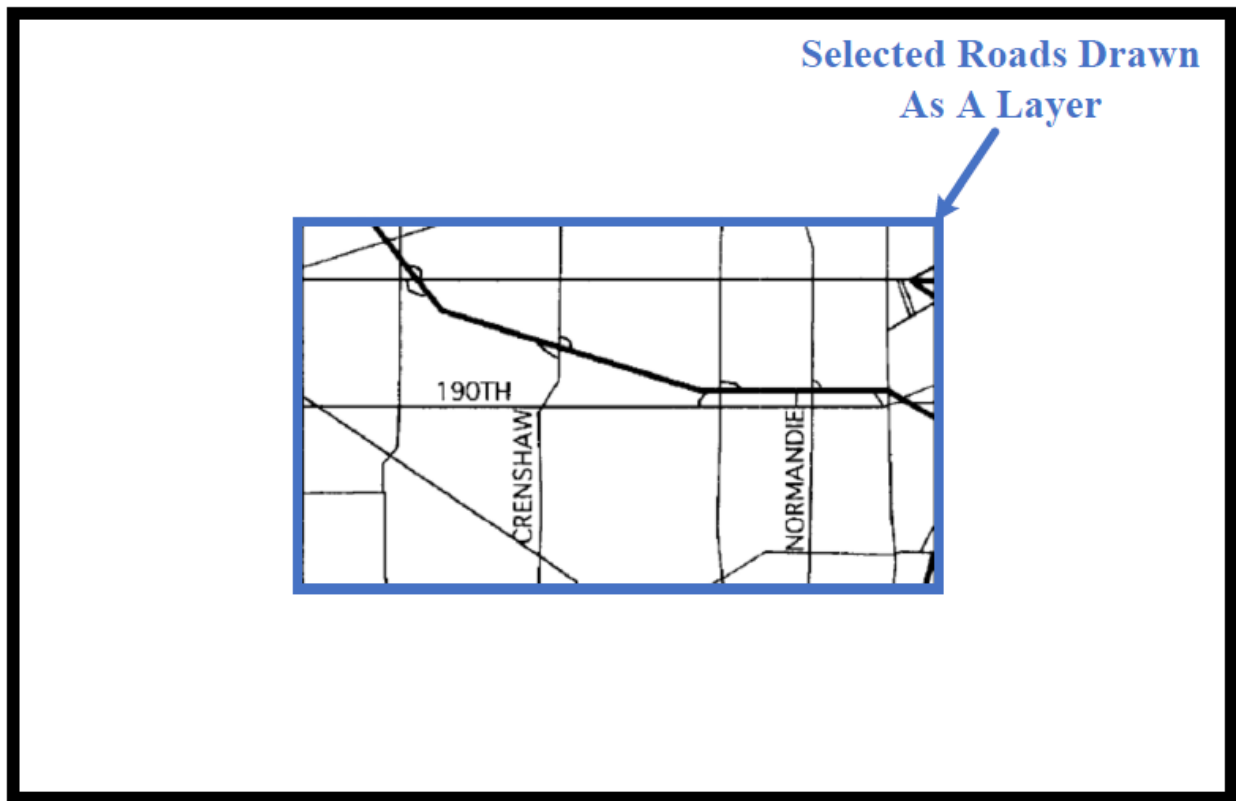


(*Id.* at FIG. 5 (annotated).)

TABLE 3

	Scale				
	Smallest	Small	Medium	Large	Largest
Inter-state	Shown	Shown	Shown	Shown	Shown
Major Hwys	Upgradable	Shown	Shown	Shown	Shown
Minor Hwys	Omitted	Upgradable	Shown	Shown	Shown
Major Roads	Omitted	Omitted	Upgradable	Shown	Shown
Minor Roads	Omitted	Omitted	Omitted	Upgradable	Shown

(*Id.* at 9:17-30 (Table 3).)

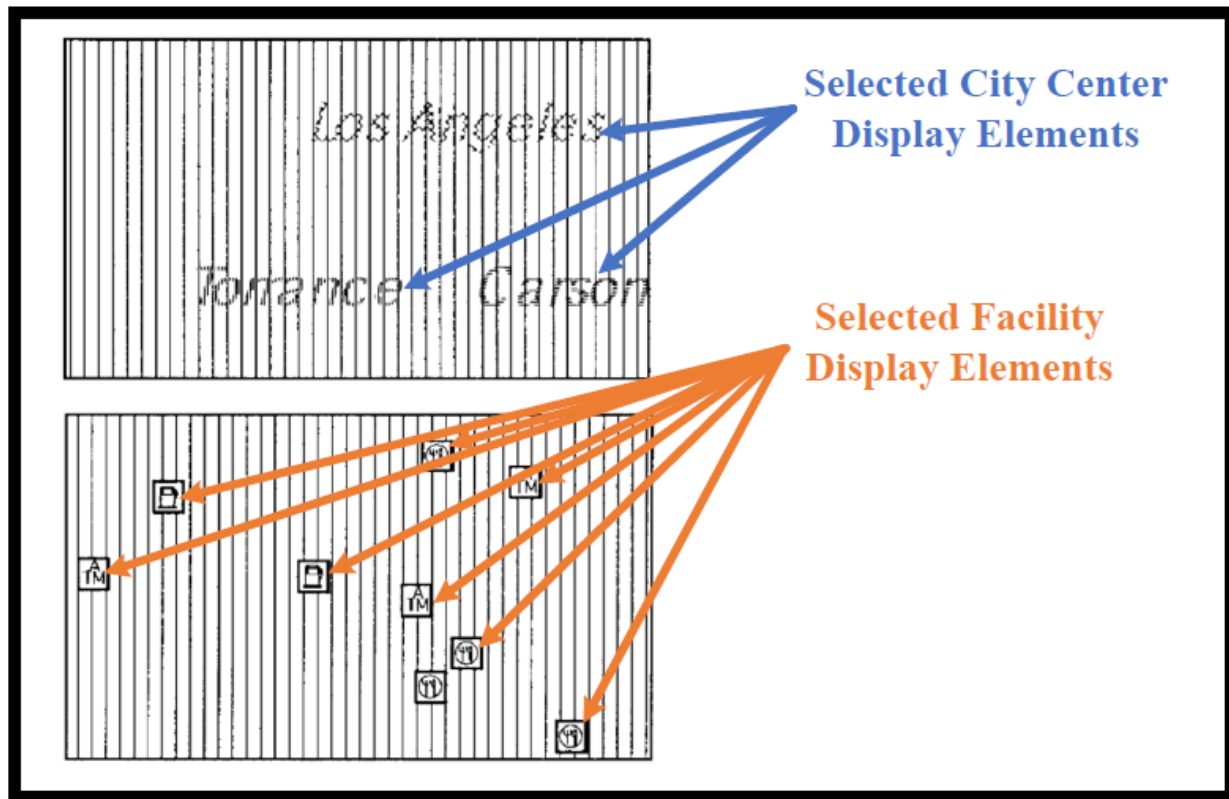


(*Id.* at FIG. 6D (annotated).)

138. Yokota further teaches that display controller 16 selects city center and facility display elements based on their priorities (*i.e.*, ranks) and draws them as layers. (Yokota, EX1005 at 4:56-5:11 (“The state and urban area polygon table 110 comprises information fields used in displaying large geographic areas, such as countries, states, counties, urban areas, and the like, in the vehicle navigation system hereof, such as: display type, e.g. meshed polygon, solid polygon, icon, dot, etc.; color, e.g. a unique color for each municipality such that no adjacent

municipalities have the same color, else a single color for all municipalities; color fill position, i.e. a point within the polygon at which to start filling in with color; shape, e.g. a pointer to a geometry table of either absolute coordinates or coordinates relative to a representative position; pattern, e.g. solid fill, preset hatch patterns, or an icon design ID; geographic size of the urban area; population of the urban area; display size, e.g. a size factor for the icon or other display that is generally proportional to the geographic size or population of the urban area; road network pattern, e.g. a pointer to an appropriate entry in the major road geometry table; entity type, e.g. country, state, county, city, community, zip code area, etc.; availability of predetermined services in the entity, and icons for same; and priority, e.g. applicable map scales on which to display the particular entity, detail level for user preference setting, overlap priority, etc.”), 5:22-26 (“A city polygon table 130 contains a subset of the information fields in the state and urban area polygon table 110, and is preferably used for large-scale maps. Information fields in the city polygon table 130 include position, shape, color, entity type, priority, and name, all as described above.”); *see also id.* at Abstract, 2:59-64, 3:30-36, 3:37-44, 7:12-25 (Table 1), 8:23-35 (Table 2), 10:6-21, 11:1-17, 12:61-13:1, FIGS. 6C and 6E.) For example, Yokota teaches that the “name of the most prominent city in the

metropolitan area should be displayed,” while other cities may be omitted depending on their population. (*Id.* at 8:39-53.)



(*Id.* at FIGS. 6C and 6E (annotated).)

139. A POSITA would also have found it obvious to select Yokota’s city center and facility display elements based on ranks. Prior to the alleged invention of the ‘465 patent, it was well-known in the art for navigation systems to use ranks to determine which display elements to display on a map. (*See, e.g., McDonough, EX1007 at 16:57-64; Geelen, EX1017 [0020], [0050]-[0052]; JP ‘285, EX1023 at*

3-5, FIG. 4C, FIG. 7 (disclosing assigning to “character data” used to display the names of places and facilities a “hierarchical level” that “indicates the display priority” of the character data, and controlling which character data is shown in the map according to the assigned hierarchical levels).) Ranks were commonly used to minimize the amount of information displayed on the map (thus reducing clutter and making the map easier to read) while ensuring that the most relevant display elements are shown for the selected map scale. (Geelen, EX1017 at [0020] (“FIGS. 5A-5E are screen shots from an implementation showing how Point of Interest icons can be prioritized to reduce screen clutter”); *see also id.* at [0051]; McDonough, EX1007 at 18:14-16; *Human factors engineering*, EX1029 at 1-2.)

140. A POSITA would have been motivated to modify Yokota to select city center and facility display elements based on ranks to: (i) reduce map clutter and make the map easier to read, (ii) prevent display elements from overlapping with each other and with the displayed roads, and (iii) ensure that the most relevant display elements are shown for the selected map scale. The proposed combination would have been consistent with Yokota’s goals of avoiding overlapping information and clutter and presenting the most important information to the driver. (Yokota, EX1005 at Abstract, 3:30-44, 10:22-26.)

141. Yokota alone teaches, or Yokota in combination with the knowledge of a POSITA renders obvious, limitation [1g].

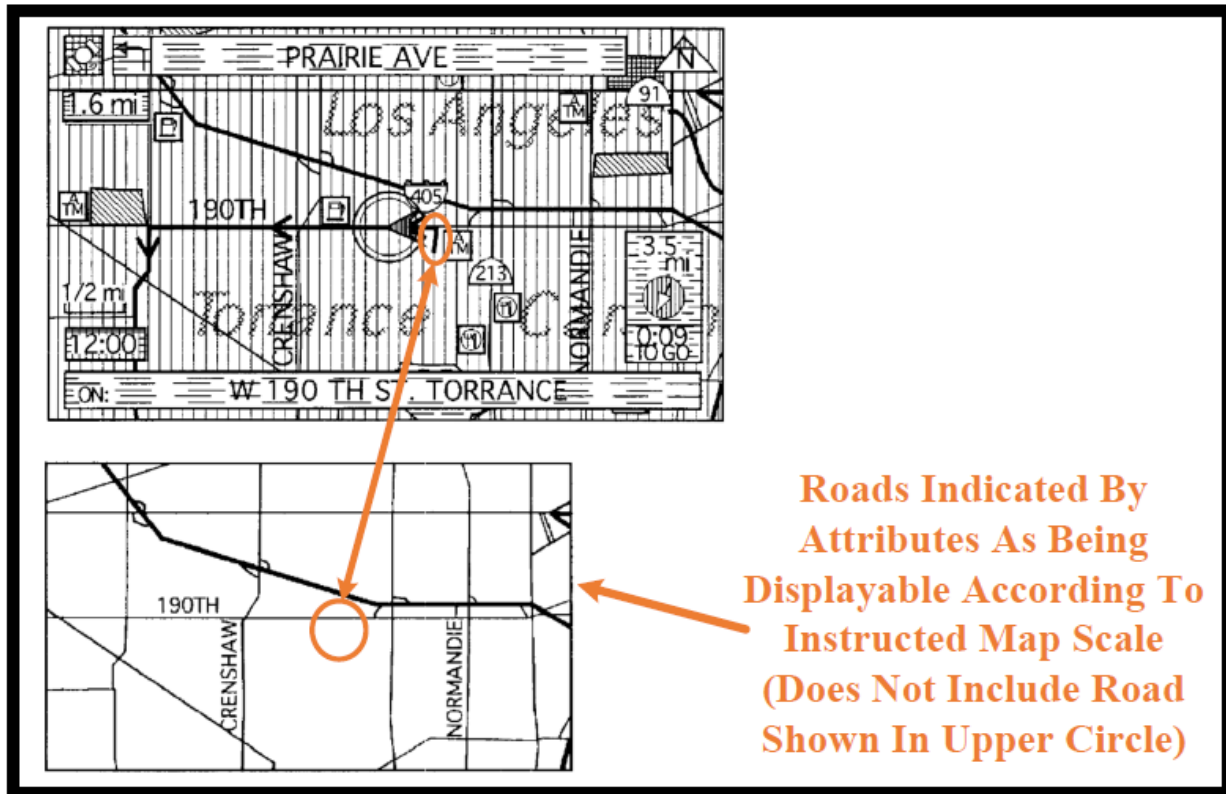
i) Yokota Teaches And Suggests “further selecting each of the roads that is part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale.”

142. Yokota teaches and suggests “further selecting each of the roads that is part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale” (“limitation [1h]”).

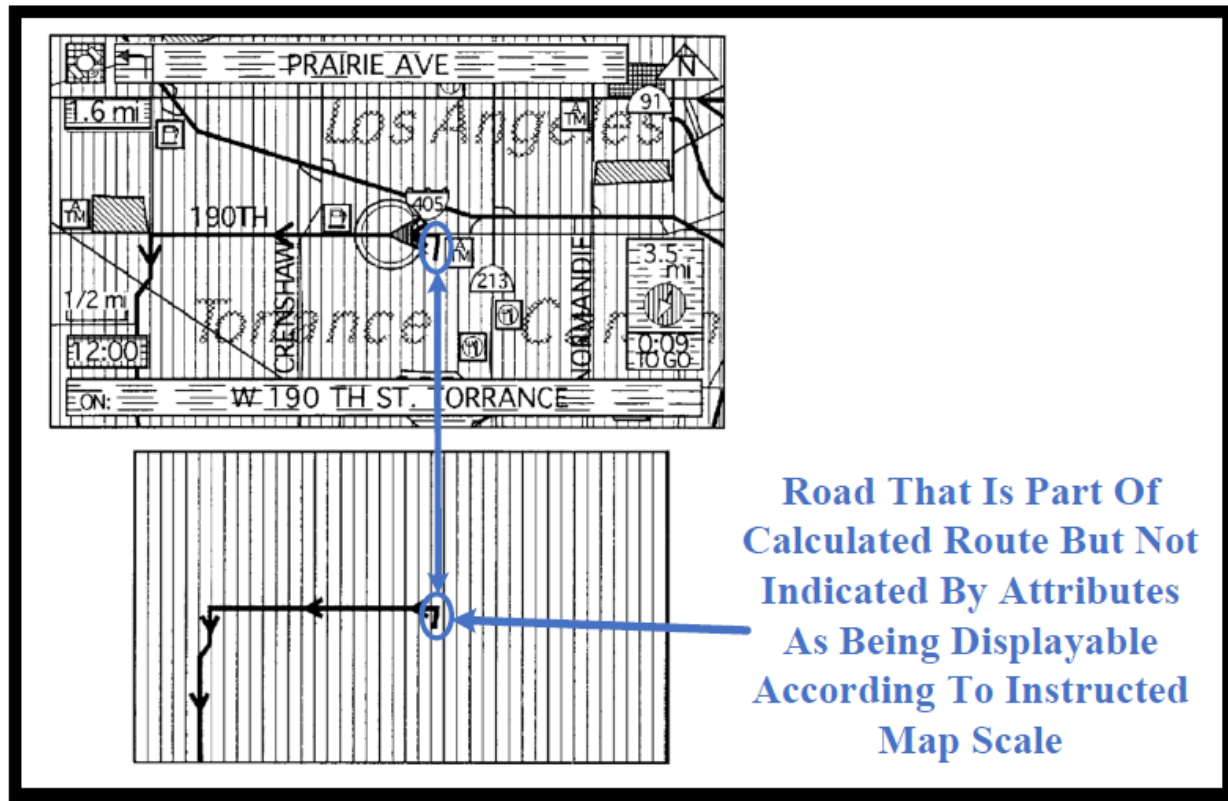
143. Yokota teaches that after the layers containing the displayable roads and the selected display elements have been drawn, the display controller 16 draws a layer containing the calculated “guidance route.” (Yokota, EX1005 at 11:8-17 (“One such set of layers, and an order in which the display controller 16 may synthesize them to create a display, is: base polygons, e.g. city boundaries; then geo-feature polygons, e.g. shopping malls and rivers; then city name labels; then local roads; then highways; then freeways; then street names; then points of interest, such as restaurants; then a guidance route, if present; then route numbers. These overlays are shown individually in FIG. 6 and overlaid on top of each other in FIGS. 7 and 8.”); *see also id.* at 11:1-4, FIGS. 6A-F.)

144. Yokota teaches that the layer containing the calculated guidance route

includes the roads that are part of the calculated route but are not indicated by the attributes as being displayable according to the instructed map scale:



(*Id.* at FIGS. 6D, 7C (annotated).)



(*Id.* at FIGS. 6F, 7C (annotated).)

145. Yokota’s teaching that “a guidance route” is displayed (as opposed to “a portion of a guidance route,” “the displayable portions of a guidance route,” etc.), along with Yokota’s figures reproduced above, also at least suggests that the layer containing the calculated guidance route includes all roads that are part of the calculated guidance route—including any roads that are part of the calculated guidance route but not indicated by the attributes as being displayable according to the instructed map scale. (Yokota, EX1005 at 11:8-17, FIGS. 6F and 7A-D.)

146. A POSITA would have understood that, to draw a layer containing the roads that are part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale, the display controller 16 must first select the roads to be drawn. (Yokota, EX1005 at Abstract, FIG. 5, 9:8-30, 11:1-17 (disclosing that the display controller 16 selects the roads that are displayed).)

147. Yokota teaches and suggests limitation [1h].

j) Yokota Teaches “displaying the selected roads and the selected display elements on the display selection as part of the map.”

148. Yokota teaches “displaying the selected roads and the selected display elements on the display selection as part of the map” (“limitation [1i]”).

149. Yokota teaches that the display controller 16 synthesizes the layers containing the selected roads and display elements “into a single map display” that is sent to the display unit 20 (*i.e.*, the display section). (Yokota, EX1005 at 11:1-4 (“The display controller 16 creates the map display using a plurality of layers, then synthesizes all the layers into a single map display and sends the single map display to the display unit 20 to be displayed in the well-known manner.”), 11:15-17 (“These overlays are shown individually in FIG. 6 and overlaid on top of each other in FIGS. 7 and 8.”).) The selected roads and display elements are then displayed on the display unit 20 as part of the displayed map. (*Id.*; *see also id.* at Abstract, FIGS. 7A-

D, 11:23-27, 13:9-12.)

2. Yokota Teaches And Suggests The Additional Limitations Of Challenged Claim 2.

150. Yokota teaches and suggests the additional limitations of Challenged Claim 2: “The navigation system according to claim 1, wherein the control section displays each selected road not indicated by the attributes as being displayable according to the instructed map scale on the display section in a fashion different from the other selected roads.”

151. Yokota’s display controller 16 (which is part of the control section) displays each selected road not indicated by the attributes as being displayable according to the instructed map scale on the display unit 20 (*i.e.*, the display section) in a fashion different from the other selected roads. (Yokota, EX1005 at 11:1-17, FIGS. 6D, 6F, and 7D.) The selected roads not indicated by the attributes as being displayable according to the instructed map scale are displayed using a thick line, while the other selected roads are displayed using either a thin line or a thick line superimposed over a thin line. (*Id.*)

152. Yokota also teaches that upgradable roads “may be displayed with a slightly adjusted color (e.g. lighter) and/or a line style (e.g. dotted) to indicate [their] lower priority.” (Yokota, EX1005 at 9:41-44.) An “upgradable” road is a road that

should not be displayed at a certain map scale unless certain criteria are met. (*Id.* at FIG. 5, 9:33-10:5.) In view of the above, Yokota also suggests displaying the selected roads not indicated by the attributes as being displayable according to the instructed map scale in a different fashion from the other selected roads.

153. Yokota teaches and suggests the additional limitations of Challenged Claim 2.

3. Yokota In Combination With The Knowledge Of A POSITA Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 3.

154. Yokota in combination with the knowledge of a POSITA teaches and renders obvious the additional limitations of Challenged Claim 3: “The navigation system according to claim 1, wherein the route calculation is performed between the own-vehicle position and one of the selected display elements, and the route calculation is performed under a condition recommended by navigation or under a condition which is designated by the user and is input from the input section.”

155. As discussed above with respect to limitation [1e], Yokota in combination with the knowledge of a POSITA teaches and renders obvious performing a route calculation between an own-vehicle position and a selected display element (*e.g.*, a star or checkered flag representing a destination).

156. Prior to the alleged invention of the ‘465 patent, it was well-known in

the art to calculate a guidance route according to a condition recommended by the navigation system (*e.g.*, a route that minimizes time and/or distance) or according to a driver-input condition (*e.g.*, avoid tollways). (Lou, EX1012 at 1:25-40; Harada, EX1014 at 8:21-24; TomTom ONE, EX1015 at 11, 18, 29-30, 55; Khavakh, EX1016 at 1:21-34, 6:27-35, 19:41-65, 30:66-31:2; Geelen, EX1017 at [0028], pps. 4-5; Millington, EX1018 at 1:22-37.)

157. A POSITA would have been motivated to have Yokota's navigation system calculate a route according to a condition recommended by the navigation system (*e.g.*, minimizing time and/or distance) to ensure that the driver is recommended the fastest and/or shortest (or otherwise most preferable) route that is available. (*Id.*)

158. A POSITA also would have been motivated to have Yokota's navigation system calculate a route according to a user-input condition to beneficially allow the driver to incorporate his or her preferences into the calculation of the most preferred route (*e.g.*, a preference for avoiding tollways) or, if the driver does not like the suggested route, to help the system calculate an acceptable route. (*Id.*)

159. A POSITA would have had a reasonable expectation of success as

algorithms for calculating a fastest and/or shortest guide route (optionally in accordance with driver preferences) were well-known and well understood prior to the alleged invention of the '465 patent, and these functions came standard in prior art navigation systems. (*Id.*)

160. Yokota in combination with the knowledge of a POSITA teaches and renders obvious the additional limitations of Challenged Claim 3.

4. Challenged Claim 5.

- a) **Yokota Teaches “A display method of a road network in a navigation system having a map data storage section for storing map data, which is composed of roads necessary for a route search and display elements including city centers and facilities, together with attributes and classes of the map data, the attributes being indicative of whether or not each of the roads should be displayed for each of a plurality of map scales, the navigation system also having a position information acquiring section for obtaining position information on a vehicle, a control section including a drawing memory, an input section for inputting an instruction from a user, and a display section for displaying the map data, the display method of the road network in the navigation system comprising.”**

161. Yokota teaches a “display method of a road network in a navigation system having a map data storage section for storing map data, which is composed of roads necessary for a route search and display elements including city centers and

facilities, together with attributes and classes of the map data, the attributes being indicative of whether or not each of the roads should be displayed for each of a plurality of map scales, the navigation system also having a position information acquiring section for obtaining position information on a vehicle, a control section including a drawing memory, an input section for inputting an instruction from a user, and a display section for displaying the map data, the display method of the road network in the navigation system comprising” (“limitation [5-PRE]”).

162. Limitation [5-PRE] combines limitations [1-PRE] through [1d]. The only material differences between limitation [5-PRE] and limitations [1-PRE] through [1d] are that limitation [5-PRE] requires (i) “a display method of a road network”; (ii) “a position information acquiring section for obtaining position information on a vehicle”; and (iii) “a drawing memory.” (Claims Comparison Chart, EX1011.)

163. As shown above, Yokota teaches limitations [1-PRE] through [1d]. Further, as shown below, Yokota teaches each of the material differences between limitation [5-PRE] and limitations [1-PRE] through [1d]. Thus, Yokota teaches limitation [5-PRE].

164. First, Yokota teaches “a display method of a road network.” (Yokota,

EX1005 at Abstract, 10:51-59, 11:1-17, 11:23-27, 13:9-12, FIGS. 7A-D.)

165. Second, Yokota teaches “a position information acquiring section for obtaining position information on a vehicle.” Yokota teaches that navigation system 10 has a location system 28 (*i.e.*, a position information acquiring section) for obtaining a vehicle’s position. (*Id.* at 10:50-51 (“The position of the vehicle at any given time is input to the display controller 16 from the location system 28.”); *see also id.* at FIG. 1, 4:28-30, 6:24-37, 11:23-27, 13:7-9.)

166. Third, Yokota teaches a control section including “a drawing memory.” Yokota teaches that microprocessor 12 includes a display controller 16 and an associated memory 14. (*Id.* at FIG. 1, 4:19-22, 6:45-46.) As demonstrated below, a POSITA would have understood that Yokota’s microprocessor 12 uses memory to store all the drawn map data elements (*i.e.*, a drawing memory) that are displayed on the display section via the display controller 16.

167. Yokota teaches that the microprocessor 12, using display controller 16, draws map data using a plurality of layers that are synthesized together into a display. (*Id.* at 11:1-17 (“The display controller 16 creates the map display using a plurality of layers, then synthesizes all the layers into a single map display and sends the single map display to the display unit 20 to be displayed in the well-known manner.

The various layers contain at least geographic features, such as lakes and parks; geographic areas, such as states and cities; roads, such as interstate highways and city streets; and names, such as California and Main Street. One such set of layers, and an order in which the display controller 16 may synthesize them to create a display, is: base polygons, e.g. city boundaries; then geo-feature polygons, e.g. shopping malls and rivers; then city name labels; then local roads; then highways; then freeways; then street names; then points of interest, such as restaurants; then a guidance route, if present; then route numbers. These overlays are shown individually in FIG. 6 and overlaid on top of each other in FIGS. 7 and 8.”); *see also id.* at 10:51-59, 11:23-27, 13:9-12, FIGS. 6A-H.) A POSITA would have understood that, to synthesize layers of drawn map data in a state ready to be sent to the display unit 20, the drawn map data must be stored. (*Id.*) In view of the above, a POSITA would have understood that Yokota’s microprocessor 12 has memory that is used to store all the drawn map data elements (*i.e.*, a drawing memory) that are displayed on the display section.

168. Other than the above, there are no material differences between limitation [5-PRE] and limitations [1-PRE] through [1d]. (Claims Comparison Chart, EX1011.) Yokota teaches limitations [1-PRE] through [1d], as well as the

differences of [5-PRE]. Thus, Yokota teaches limitation [5-PRE].

b) Yokota In Combination With The Knowledge Of A POSITA Teaches And Renders Obvious “calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed by the user via the input section.”

169. Yokota in combination with the knowledge of a POSITA teaches and renders obvious “calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed by the user via the input section” (“limitation [5a]”).

170. There are no material differences between limitation [5a] and limitation [1e]. (Claims Comparison Chart, EX1011.) For the same reasons discussed above with respect to limitation [1e], Yokota in combination with the knowledge of a POSITA teaches and renders obvious limitation [5a].

c) Yokota Teaches “drawing, according to one of a plurality of map scales designated by the user via the input section, a map on the drawing memory by.”

171. Yokota teaches “drawing, according to one of a plurality of map scales designated by the user via the input section, a map on the drawing memory by” (“limitation [5b]”).

172. As discussed above with respect to limitation [1f], Yokota teaches

drawing a map according to a map scale designated by the driver via the input device 18 (*i.e.*, the input section). (Yokota, EX1005 at 10:51-67 (“Once the display controller 16 has a position of the vehicle, the display controller 16 obtains the map data for that position and the surrounding area from the map database 24 on the CD-ROM 22 via the CD-ROM drive 26 in the well-known manner. The display controller 16 then creates a map display from the map data according to the values of the variables described above, whether default values or user-entered values. For instance, one map display might be a small-scale map with cities depicted as larger or smaller dots, with all geographic areas displayed monochromatically and names in uppercase Roman embossed text embedded in the network of highways, while another display might be a large-scale map with the network of all road types, with each geographic area having a color distinct from those of its neighbors and names in mixed case plain Italic text floating above or below the roads.”), 11:1-4 (“The display controller 16 creates the map display using a plurality of layers, then synthesizes all the layers into a single map display and sends the single map display to the display unit 20 to be displayed in the well-known manner.”), 13:9-12 (“In step 220, the display controller builds a map display. In step 222, the display controller displays the map display on the display unit.”); *see also id.* at Abstract,

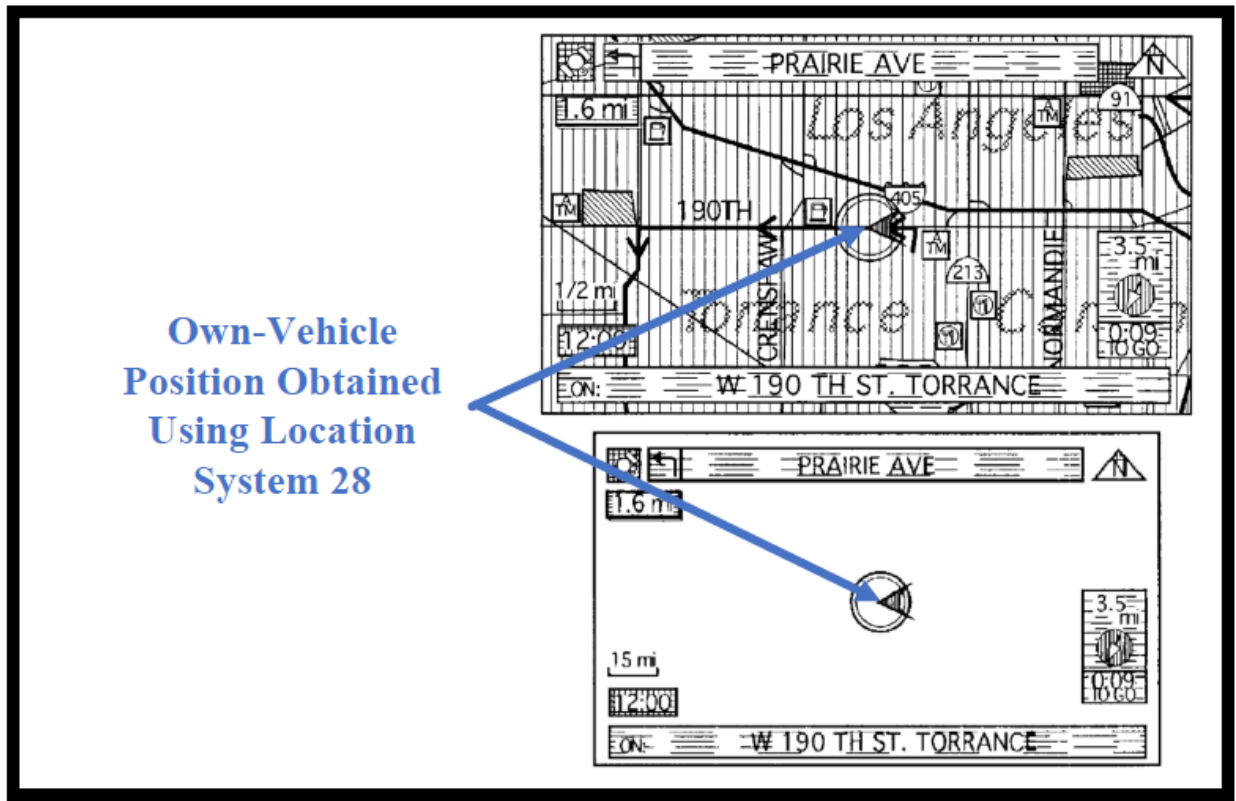
1:35-43, 6:9-14, claim 22.)

173. Further, as discussed above with respect to limitation [5-PRE], a POSITA would have understood that Yokota's map is drawn on a drawing memory.
(*Id.*)

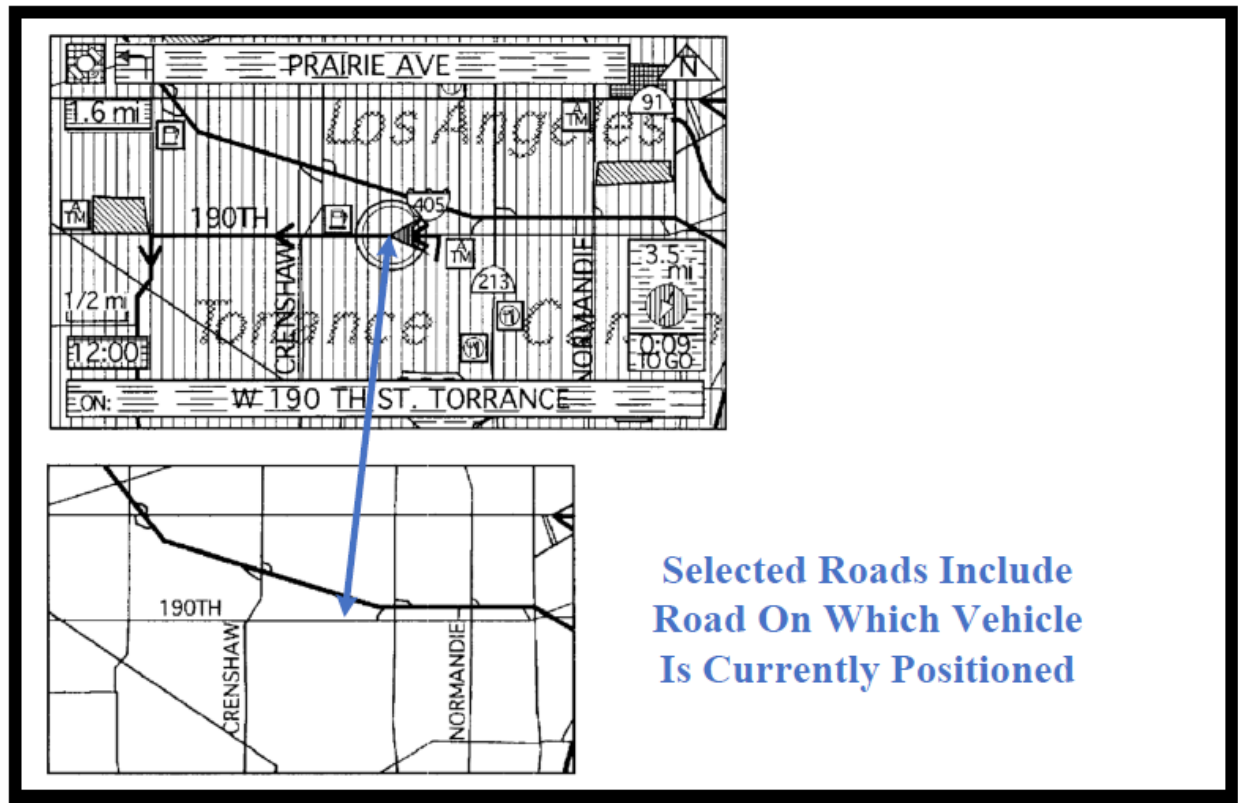
d) Yokota Teaches “selecting the roads indicated by the attributes as being displayable according to a designed map scale, the selected roads including an own-vehicle position obtained by the position information acquiring section.”

174. Yokota teaches “selecting the roads indicated by the attributes as being displayable according to a designed map scale, the selected roads including an own-vehicle position obtained by the position information acquiring section” (“limitation [5c]”).

175. As discussed above with respect to limitation [1g], Yokota teaches selecting the roads indicated by the attributes as being displayable according to a driver-designated map scale. Yokota also teaches obtaining an own-vehicle position using location system 28 (*i.e.*, the position information acquiring section) and that the selected roads include the road on which the vehicle is currently positioned:



(Yokota, EX1005 at FIGS. 6H and 7D (annotated); *see also id.* at 6:24-37, 10:50-51, 11:23-27, 13:7-9, FIG. 6H (showing current vehicle position as an arrow with a circle around it).)



(*Id.* at FIGS. 6D and 7D (annotated).)

- e) **Yokota Teaches “drawing the selected roads and one or more of the display elements on the drawing memory.”**

176. Yokota teaches “drawing the selected roads and one or more of the display elements on the drawing memory” (“limitation [5d]”).

177. Yokota teaches drawing the selected roads and one or more display elements as layers, and a POSITA would have understood that these layers are drawn on Yokota’s drawing memory so that they can then be synthesized “into a single map display” to be sent to the display unit 20. (Yokota, EX1005 at 11:1-17, FIG.

6C (showing selected city center display elements drawn as a layer), FIG. 6D (showing selected roads drawn as a layer), FIG. 6E (showing selected facility display elements drawn as a layer); *see also id.* at 9:8-14, 10:51-67.)

- f) Yokota Teaches And Suggests “further selecting each of the roads that is part of the calculated route produced as a result of the route calculation, but not indicated by the attributes as being displayable according to the designated map scale, on the drawing memory.”**

178. Yokota teaches and suggests “further selecting each of the roads that is part of the calculated route produced as a result of the route calculation, but not indicated by the attributes as being displayable according to the designated map scale, on the drawing memory” (“limitation [5e]”).

179. As demonstrated above with respect to limitation [1h], Yokota teaches and suggests further selecting each of the roads that is part of the calculated route (*i.e.*, the route produced in the route calculation step) but not indicated by the attributes as being displayable according to the driver-designated map scale.

180. A POSITA would have understood that these roads are selected on Yokota’s drawing memory, as map data that is ultimately displayed is drawn to memory to create the “single map display” that is sent to the display unit 20. (Yokota, EX1005 at 11:1-17.)

181. Yokota teaches and suggests limitation [5e].

g) Yokota Teaches “displaying the road network drawn on the drawing memory on the display section.”

182. Yokota teaches “displaying the road network drawn on the drawing memory on the display section” (“limitation [5f]”).

183. Yokota teaches displaying the road network drawn on the drawing memory (*e.g.*, the road network shown in Yokota’s FIGS. 7A-D) on display unit 20 (*i.e.*, the display section). (Yokota, EX1005 at 10:51-59, 11:1-17; *see also id.* at Abstract, FIGS. 7A-D, 11:23-27, 13:9-12.)

B. Ground 2: McDonough In Combination With Huber And Tanizaki Renders Obvious Challenged Claims 1-3 And 5.

1. Motivation To Combine McDonough With Huber.

184. McDonough is directed to a navigation system that displays maps on a display. (McDonough, EX1007 at 1:8-28, 3:20-28, 6:59-66.) While McDonough discloses that its navigation system has a “zoom” function (*id.* at 5:54-60, 6:31-33, 8:5-9), McDonough’s disclosure is focused on the system’s “scrolling” function. (*Id.* at Abstract (“A system and method for implementing a smooth scrolling function in a map display...”); *see also id.* at 1:6-7.) To obtain greater context and detail regarding McDonough’s zoom functionality, a POSITA would have been motivated to turn to Huber, which incorporates McDonough by reference and relies

on McDonough's disclosure to teach "display[ing] maps using data from a geographic database." (*Id.* at 3:40-45.)

185. I understand that both McDonough and Huber were owned by the same entity (*i.e.*, Navteq North America, LLC). Like McDonough, Huber is directed to an "in-vehicle navigation system" that displays maps on a display. (Huber, EX1008 at 3:14-15, 3:37-45.) Huber's navigation system, like McDonough's navigation system, supports zoom functionality. (*Id.* at 1:11-15, 2:20-22, 4:24-27.) Huber is directed to "a method for representing geographic features when a map display is zoomed in or out." (*Id.* at 2:20-22; *see also id.* at 1:11-15.)

186. Huber's zooming-related teachings (*e.g.*, organizing map data into layers and controlling the level of detail displayed at each map scale by assigning ranks to different road types) are virtually identical to, and complement, McDonough's zooming teachings. (*Compare id.* at 3:46-62, 3:63-4:5, 5:36-50 with McDonough, EX1007 at 5:53-60, 5:63-6:8, 6:9-33.)

187. McDonough and Huber are so inter-related that a POSITA would have understood that the references should be read together. A POSITA also would have understood that Huber supplements McDonough's teachings and provides additional design details and examples of zooming that are not included in McDonough. For

example, Huber clarifies that the driver sets different map scales using an input device and provides a specific example of the driver zooming out from a layer “0” map scale to a layer “3” map scale. (Huber, EX1008 at 1:24-45, 1:57-60, 4:24-33, 4:55-57, 5:36-64, 6:32-35, 7:29-35.) The additional details and examples disclosed in Huber provide relevant context that would have been helpful to a POSITA in understanding McDonough’s disclosures.

188. A POSITA would have had a reasonable expectation of success in combining McDonough with Huber. The references were owned by the same company, describe virtually identical navigation systems, provide complementary teachings regarding zooming, and would have been read together as a single work. A POSITA would have found it trivial to use Huber’s additional details regarding the zoom functionality to interpret McDonough. A POSITA would have found it obvious to turn to Huber to provide more detail and context regarding McDonough’s zoom functionality.

2. Motivation To Combine McDonough And Huber With Tanizaki.

189. McDonough’s navigation system 10 comprises a display 27 for displaying maps generated from map data in a map database 30. (McDonough, EX1007 at 4:1-4, 6:59-7:5, 7:54-59; *see also id.* at 1:24-28, 2:3-9, 2:17-19, claim 1.)

The features to be included in the map (*e.g.*, roads, point of interest icons, etc.) are selected from the map database using a map display tool 40. (*Id.* at 5:53-62, 6:9-33, 6:59-66, 7:1-9, 7:46-59, 8:17-27, 10:7-18, 13:33-38, 15:25-32.) Roads are selected based on whether stored “ranks” for the roads indicate that the roads are displayable according to a set map scale. (*Id.* at 5:63-6:33, 8:17-27, 8:40-43, 8:66-9:3, 10:7-18, 13:53-65.) Points of interest (*e.g.*, city centers and facilities) are selected based on their “priorities.” (*Id.* at 9:5-9, 16:57-17:11, 18:14-24.) The selected roads and points of interest are drawn to a graphics buffer, and the map, once rendered in the graphics buffer, is sent to display 27. (*Id.* at 6:59-66, 7:6-9, 7:51-59, 12:33-41, 14:30-36, 14:53-56, 15:25-38, 19:31-32.)

190. McDonough’s navigation system 10 also comprises a navigation software program 18 that provides “navigation features and functions” such as “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.” (*Id.* at 6:44-55, 7:9-20; *see also id.* at 1:9-28.) Using the navigation software program 18, the navigation system 10 can display maps “that outline routes to destinations, the types of maneuvers to be taken at various locations along the routes, locations of certain

types of features, and so on.” (*Id.*) McDonough does not specify how its navigation system 10 displays a calculated route to a destination. (*Id.*)

191. In the same field of endeavor, Tanizaki discloses “a car navigation apparatus” comprising, *inter alia*, a position detector 2, a map database 6, and a display unit 7 with a display screen 10. (Tanizaki, EX1009 at [0014], [0027], FIG. 1.) The map database 6 includes road data and display element data that is read from the database to create a road map displayed on display unit 7. (*Id.* at [0016], [0019].) The displayed road map includes a vehicle guide route 12, a destination 13, and roads other than the guide route 14. (*Id.* at [0022], [0027].) The road map can be displayed at a plurality of different map scales, wherein the amount of detail displayed is decreased as the map is zoomed out. (*Id.* at [0023]-[0026], [0036], [0053].)

192. To display the guide route 12, Tanizaki’s navigation apparatus first receives a current vehicle position 11 from position detector 2 and a user-specified destination 13 from input unit 9, and then calculates a route from the vehicle position 11 to the destination 13 using “predetermined conditions.” (*Id.* at [0042], [0044]; *see also id.* at FIG. 4 (reference numerals 100-102), FIG. 9 (same).) Priorities are then set for the roads in map database 6. (*Id.* at [0054]-[0056], [0058]-[0059], FIGS. 7-8, claim 3.) The roads in the guide route 12 are set to the highest priority, while

roads that are not in the guide route are set to lower priorities based on road type (e.g., main roads are set to a second-highest priority, branch roads are set to a next highest priority, etc.). (*Id.*)

193. Roads in map database 6 are then selected for display in “descending order of priority.” (*Id.* at [0054], [0072], claim 3.) Because all roads in guide route 12 are set to the highest priority irrespective of road type, the map “is displayed on the display screen 10 in such a manner as to include the guide route from the present vehicle position to the destination” regardless of the map scale. (*Id.* at [0028]; *see also id.* at [0029]-[0031], [0077], FIGS. 2A-C (displaying roads included in guide route 12 regardless of map scale), FIGS. 3A-C (same), claims 1 and 9.)

194. Turning back to McDonough, a POSITA would have recognized that McDonough’s map display technique would not select (and thus would not display) roads in the calculated guide route that have a “rank” that is less than the set map scale. (McDonough, EX1007 at 5:63-6:33, 10:7-18.) For example, a road in the calculated guide route of rank “2” would not be selected when the map scale is set to layer “3.” (*Id.*) Consequently, a POSITA would have been motivated to modify McDonough’s navigation system 10 to further select (and draw on the graphics buffer) each of the roads that is part of the calculated route but not indicated by the

ranks as being displayable according to the selected map scale so that all roads in the designated map area that are part of the calculated route are displayed regardless of the map scale, as taught in Tanizaki.

195. In vehicular navigation systems, a guide route is a continuous series of roads that the driver is supposed to follow to reach a destination. (*See, e.g., TomTom ONE, EX1015 at 9-10; Human factors engineering, EX1029 at 6 (Figure 12).*) Thus, navigation system users expect a guide route to be displayed as a continuous line leading from a starting location to a destination. A POSITA would have known that McDonough's map display technique would lead to discontinuities in the displayed guide route at certain map scales, which would undesirably confuse the driver who is expecting to see a continuous route. On the other hand, a POSITA would have recognized that Tanizaki's teachings desirably prevent discontinuities in the displayed guide route regardless of the map scale, which would advantageously lessen driver confusion. A POSITA also would have recognized that Tanizaki's teachings beneficially increase driver safety in the use of the navigation system by avoiding distraction where the driver, due to route discontinuities, is uncertain regarding his or her current whereabouts, where he or she is relative to the guide route, and/or where he or she is relative to the destination.

196. Prior to the alleged invention of the '465 patent, it was common for navigation system users to “zoom out” before starting a journey to see the entire guide route. (*See, e.g.,* Tanizaki, EX1009 at FIG. 2A, [0044]; TomTom ONE, EX1015 at 9, 25; Millington, EX1018 at 1:59-62; *Human factors engineering*, EX1029 at 6 (“Drivers may wish to see the total route displayed when they have input destinations”); *Some human factors design issues*, EX1030 at 7 (“However, there are advantages to providing a display of an entire route. One advantage is route preview.”).) This allowed the driver to visualize the entire route and plan potential stops along the way. (TomTom ONE, EX1015 at 44-48; *Human factors engineering*, EX1029 at 6 (Figure 12).) Further, if the driver did not like the proposed route, the driver could ask the navigation system to calculate a new route to the destination. (TomTom ONE, EX1015 at 18-19.) A POSITA would have recognized that, by preventing discontinuities in the displayed guide route even when the driver zooms out to see the entire guide route, the proposed modification would have made it easier for drivers to plan their trip and decide whether to request a new route.

197. A POSITA would have had a reasonable expectation of success in implementing the proposed modification. A POSITA would have recognized that

McDonough already discloses the hardware and software needed for implementing the proposed modification, including a processor 12, a positioning system 24, a display 27, and a navigation program 18 with a navigation application 47 and a map display tool 40. (McDonough, EX1007 at 3:31-37, 3:45-48, 4:1-4, 7:9-20, FIG. 1, FIG. 6.) McDonough also teaches that map display tool 40 (which is used to select roads from the database 30) interfaces with, and receives input from, navigation application 47 (which is used to calculate guide routes). (McDonough, EX1007 at 7:9-24, 7:51-52; *see also id.* at FIG. 6, 6:44-55.) A POSITA would have known that implementing the proposed modification would have required routine, straightforward adjustments to the programming logic in McDonough's map display tool 40 (*i.e.*, logic to additionally select roads from map database 30 that are part of the guide route received from navigation application 47).

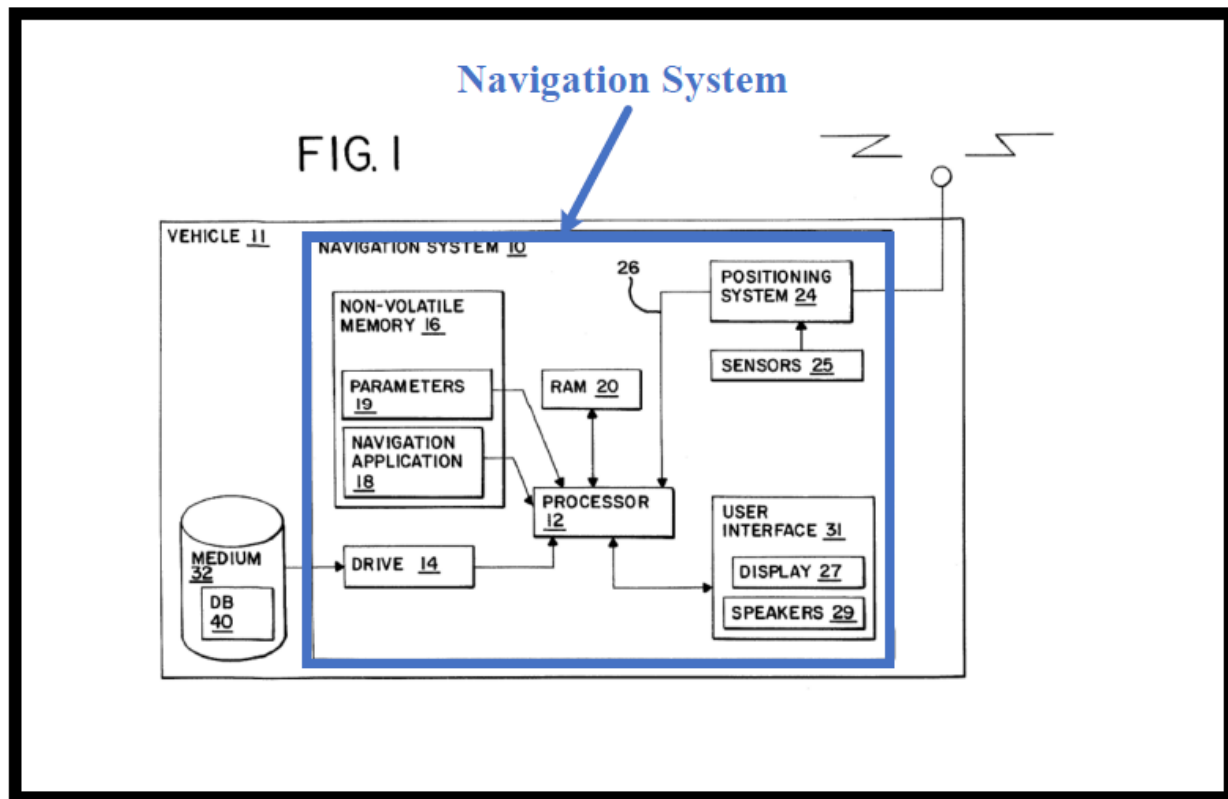
198. A POSITA would have found it obvious to modify McDonough in view of Tanizaki to further select (and draw on McDonough's graphics buffer) each of the roads that is part of the calculated route but not indicated by the ranks as being displayable according to the selected map scale.

3. Challenged Claim 1.

a) McDonough Teaches Limitation [1-PRE]: “A navigation system comprising.”

199. Regardless of whether the preamble is limiting, McDonough teaches limitation [1-PRE].

200. McDonough teaches a “navigation system 10.” (McDonough, EX1007 at 2:33-34 (“FIG. 1 is a block diagram of an exemplary navigation system.”), 3:20-28 (“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, although in alternative embodiments, the navigation system 10 may be located outside of a vehicle or may be implemented in various other platforms. For example, the navigation system may be implemented as a hand-held portable system, or may be implemented on a personal computer (such as a desktop or portable notebook) or a personal digital assistant.”), 3:31-33 (“In the embodiment illustrated in FIG. 1, the navigation system 10 is a combination of hardware and software components.”); *see also id.* at Abstract, 1:8-28, 2:17-19.)



(McDonough, EX1007 at FIG. 1 (annotated).)

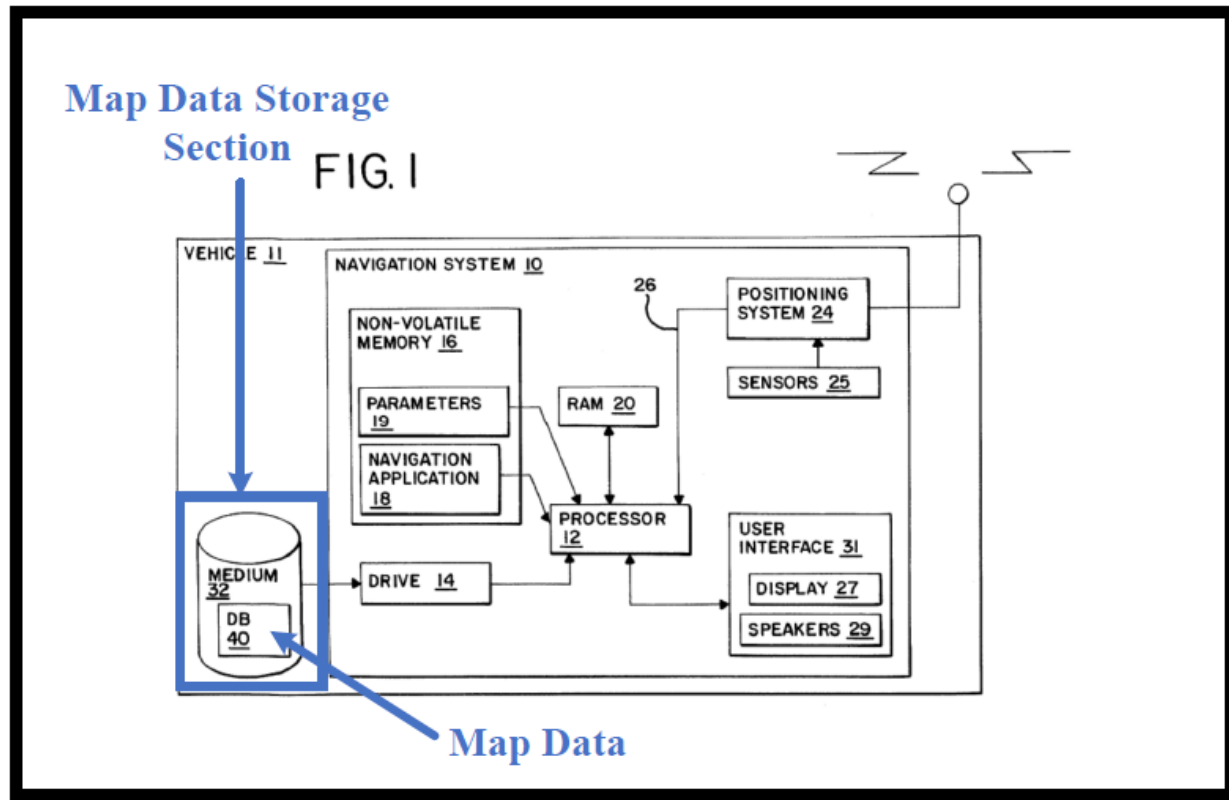
- b) **McDonough Teaches Limitation [1a]:** “a map data storage section for storing map data together with attributes and classes of the map data, the map data being composed of roads necessary for a route search and display elements including city centers and facilities, and the city centers being a display element each representing a city and indicating a representative position of the city, wherein the attributes are indicative of whether or not each of the roads should be displayed for each of a plurality of map scales.”

201. McDonough teaches limitation [1a].

202. McDonough teaches a map database 30 with “map data” that is stored

on a storage medium 32 (*i.e.*, a map data storage section). (McDonough, EX1007 at 2:9-13 (“The map processing layer communicates with a navigation application program for instructions and a map database for information necessary to carry out the map rendering instructions.”), 4:5-6 (“The navigation system 10 uses a map database 30 stored on a storage medium 32.”), 6:63-64 (“The map display tool 40 generates maps from the map data in the map database 30”); *see also id.* at 9:13-16, claim 1.)

203. The storage medium 32 is installed in a drive 14 of the navigation system 10 “so that the map database can be read and used by the navigation system.” (*Id.* at 4:6-8.) The storage medium 32 may be, for example, a CD-ROM disc, a DVD, a PCMCIA card, or a hard disk. (*Id.* at 4:14-21.)



(*Id.* at FIG. 1 (annotated); *see also id.* at FIG. 6.)

204. McDonough teaches that map data “includes data which represent the road network in a region, including the roads and intersections in the region” (*i.e.*, the roads necessary for a route search). (McDonough, EX1007 at 1:33-39; *see also id.* at FIG. 2, 4:24-26, 8:31-40.) “Features such as roads ... are represented by polyline information in the map database.” (*Id.* at 4:28-30; *see also id.* at FIG. 3, 4:40-47.)

205. McDonough’s map data also includes point data items 428 that are

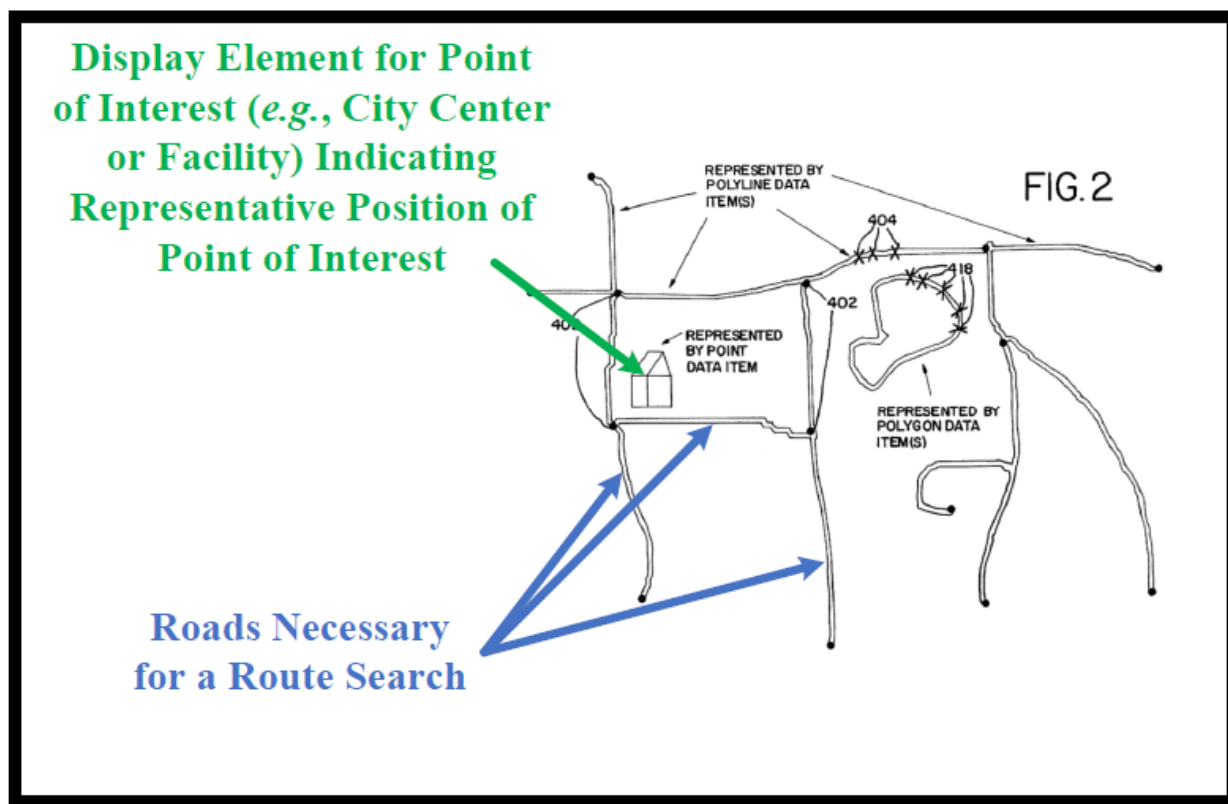
displayed as icons (*i.e.*, display elements) on a display. (*Id.* at 5:45-52 (“FIG. 5 shows the point data item 428 structure. Point data items 428 are typically displayed as an icon on a display. The point data item contains point position data 430 describing the latitude and longitude of the point of interest. Although the point data item 428 does not require delta shape point information, it also contains the feature name 432, a data item identifier 434, database layer information 436, and a feature identifier 438.”); *see also id.* at 4:24-26, 4:34-38, 12:47-50.)

206. McDonough’s point data items 428 represent points of interest including cities (*i.e.*, city centers), as well as museums, restaurants, and the like (*i.e.*, facilities). (*Id.* at 1:39-41 (“Further, the data may include information about points-of-interest such as museums, national parks, restaurants and the like.”), 4:30-33 (“Lakes, parks, airports, and other features displayed as areas are represented by polygon information in the map database. Points of interest such as museums or restaurants are represented as point information in the map database.”), 8:31-40 (“The information sent from the navigation application also preferably includes graphics preferences and settings information such as the database layer desired, the features desired from that layer, and the feature attributes associated with the feature. The features in a database layer may include items such as airports, aircraft roads,

cities, counties, countries, golf courses, lakes, rivers, national parks, road networks, railroads and the like. The feature attributes refer to colors, fill styles, polygon border styles and other aspects of how a feature is to appear on the display.”), 9:15-23 (“A point of interest list 66 maintains a list of all point of interest names that are retrieved by the map display tool during a map rendering process. Points of interest may include cities, museums, government offices, national monuments, restaurants and other unique locations within the map area rendered. As shown in FIG. 10, the point of interest list 66 is preferably a singly linked list containing name 80, icon 82, and location 84 information on each retrieved point of interest.”); *see also id.* at 15:25-38.)

207. McDonough’s point data items 428 “contain point position data 430 describing the latitude and longitude of the point of interest” so that an icon for the point of interest (*e.g.*, a city center) can be correctly placed to indicate the representative position of the point of interest. (*Id.* at 5:45-52 (“FIG. 5 shows the point data item 428 structure. Point data items 428 are typically displayed as an icon on a display. The point data item contains point position data 430 describing the latitude and longitude of the point of interest. Although the point data item 428 does not require delta shape point information, it also contains the feature name 432,

a data item identifier 434, database layer information 436, and a feature identifier 438.”), 9:20-23 (“As shown in FIG. 10, the point of interest list 66 is preferably a singly linked list containing name 80, icon 82, and location 84 information on each retrieved point of interest.”); *see also id.* at FIG. 5 (reference numeral 430), FIG. 10 (reference numeral 84).)



(*Id.* at FIG. 2 (annotated).)

208. McDonough’s map data storage section also stores, for each road segment data record in the map database 30, a “rank” of the represented road that

corresponds to the road's class (*e.g.*, freeway, alleyway, etc.). (McDonough, EX1007 at 5:63-6:8 (“As an example, each road segment data record in the map database 30 also identifies the rank of the corresponding portion of the roadway that it represents. A rank of a road segment may correspond to its functional class. Road segments having a rank of ‘4’ may include high volume, controlled access roads, such as expressways and freeways. Road segments having a rank of ‘3’ may be high volume roads with few speed changes, but are not necessarily controlled access roads. The lower ranked roads handle corresponding lower volumes and generally have more speed changes or slower speeds. Road segments having a rank of ‘0’ can handle the lowest volumes. For example, these may include side streets, alleyways, etc.”); *see also id.* at 5:27-30.) In one example, the ranks range from “0” to “4.” (*Id.*) High volume roads such as expressways and freeways may have a rank of “4,” while lowest volume roads such as alleyways may have a rank of “0.” (*Id.*)

209. McDonough also teaches a plurality of data layers that range from “0” to “4.” (*Id.* at 6:10-14 (“The rank of a road segment data entity also specifies the highest data layer in which a road segment is included. For example, the cartographic data may include five separate layers of the data, C0, C1, C2, C3, and C4, each comprising a separate collection of the cartographic data with a different level of

detail, which can be used by the map display tool.”).) Each data layer corresponds with a different map scale. (*Id.* at 5:53-62 (“As indicated above, the geographic data of the map database 30 is preferably organized in layers. The map display tool may use data at different levels of detail; for example, the navigation application instructs the map display tool to provide information for zooming. Zooming can be done more efficiently if the data are organized into layers, with greater detail at the lower layers and less detail at the higher layers. Therefore, within some of the subsets of data types, the geographic data are provided in separate collections or groups corresponding to separate layers.”), 6:31-33 (“Each higher layer includes fewer records, however these records represent roads upon which travel is generally faster. Using these different layers of cartographic data, the map display tool can provide rapid panning and zooming.”); *see also id.* at 10:7-18 (providing an example where layer 4 corresponds with a 40-mile map scale and layer 3 corresponds with a 30-mile map scale).) Layer “0” is the most “zoomed in” map scale and provides the greatest level of detail, while layer “4” is the most “zoomed out” map scale and provides the lowest level of detail. (*Id.*; *see also id.* at 6:10-14.)

210. Huber’s teachings further confirm that each data layer in McDonough corresponds with a different map scale. (Huber, EX1008 at 1:57-60, 4:55-57, 5:36-

50, 6:32-35; *see also id.* at Abstract, FIG. 3, FIG. 8, 2:20-26, 3:46-62, 4:6-12, 7:15-17, claim 1.)

211. McDonough teaches that the rank of a road segment indicates “the highest data layer in which [the] road segment is included.” (McDonough, EX1007 at 6:9-10.) When the map scale is set to layer 0 (*i.e.*, the most “zoomed in” scale), “all the portions of all the roads in the geographic region” will be displayed. (*Id.* at 6:15-29.) When the map scale is set to layer 4 (*i.e.*, the most “zoomed out” scale), only roads having a rank of 4 will be displayed. (*Id.*; *see also* Huber, EX1008 at FIG. 2.) A POSITA would have understood that McDonough’s ranks are “attributes” indicative of whether or not each of the roads in the map database 30 should be displayed for each of a plurality of map scales (*i.e.*, a rank of “0” indicates that the road should be displayed only on the layer 0 map scale, a rank of “1” indicates that the road should be displayed only on the layer 0 and layer 1 map scales, etc.).

212. McDonough further teaches that its map data storage section stores the “type” (*i.e.*, class) of each item of map data in the map database 30. (McDonough, EX1007 at 5:21-27 (“The polyline data item 400 contains feature information 412 identifying the map feature that the data item is carrying. For example, the feature

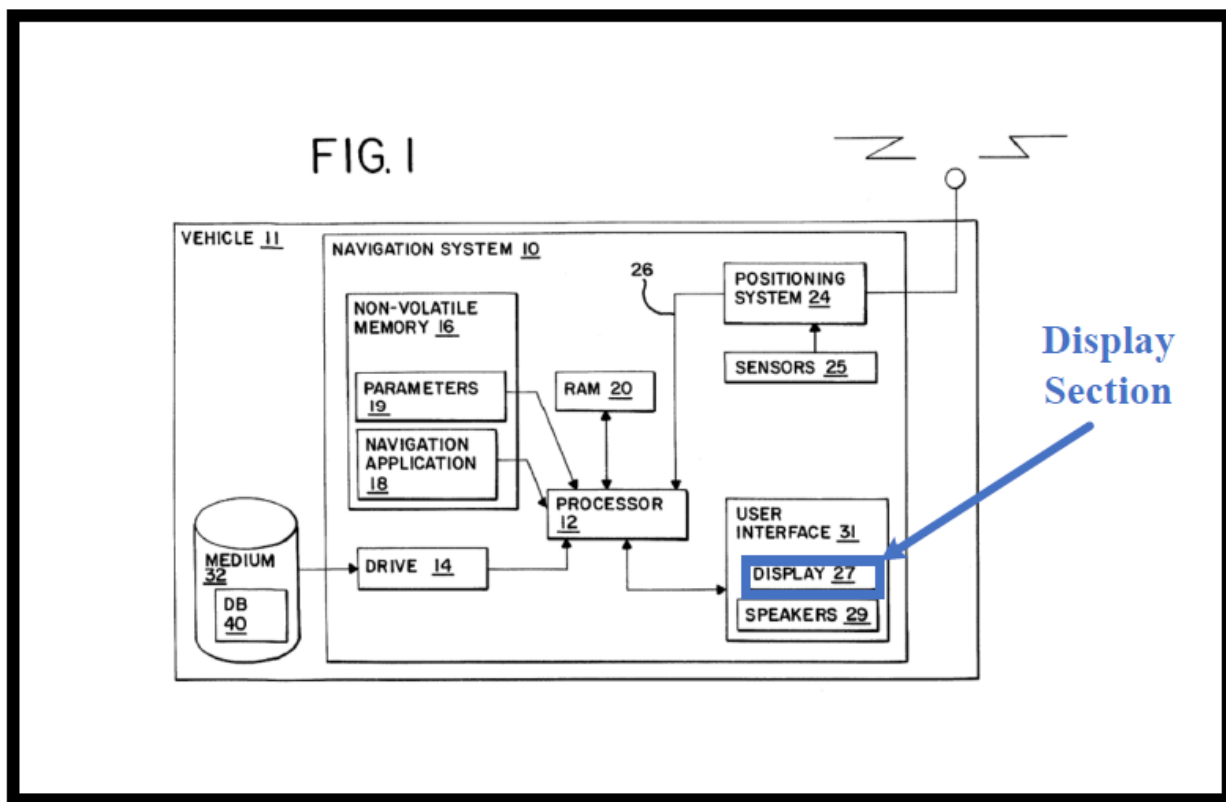
information 412 may include data indicating that the polyline data item represents a limited access expressway, a tollway, a bridge, a ferry, an alley, a side street, a railroad track, a river, and so on.”), 5:45-52 (“FIG. 5 shows the point data item 428 structure. Point data items 428 are typically displayed as an icon on a display. The point data item contains point position data 430 describing the latitude and longitude of the point of interest. Although the point data item 428 does not require delta shape point information, it also contains the feature name 432, a data item identifier 434, database layer information 436, and a feature identifier 438.”); *see also id.* at FIGS. 3-5 (reference numerals 412, 426, 438).) The map data storage section of McDonough stores whether each road is an expressway, tollway, alley, side street, etc. (*Id.* at 5:21-27, 5:63-6:8.)

c) McDonough Teaches Limitation [1b]: “a display section for displaying the map data.”

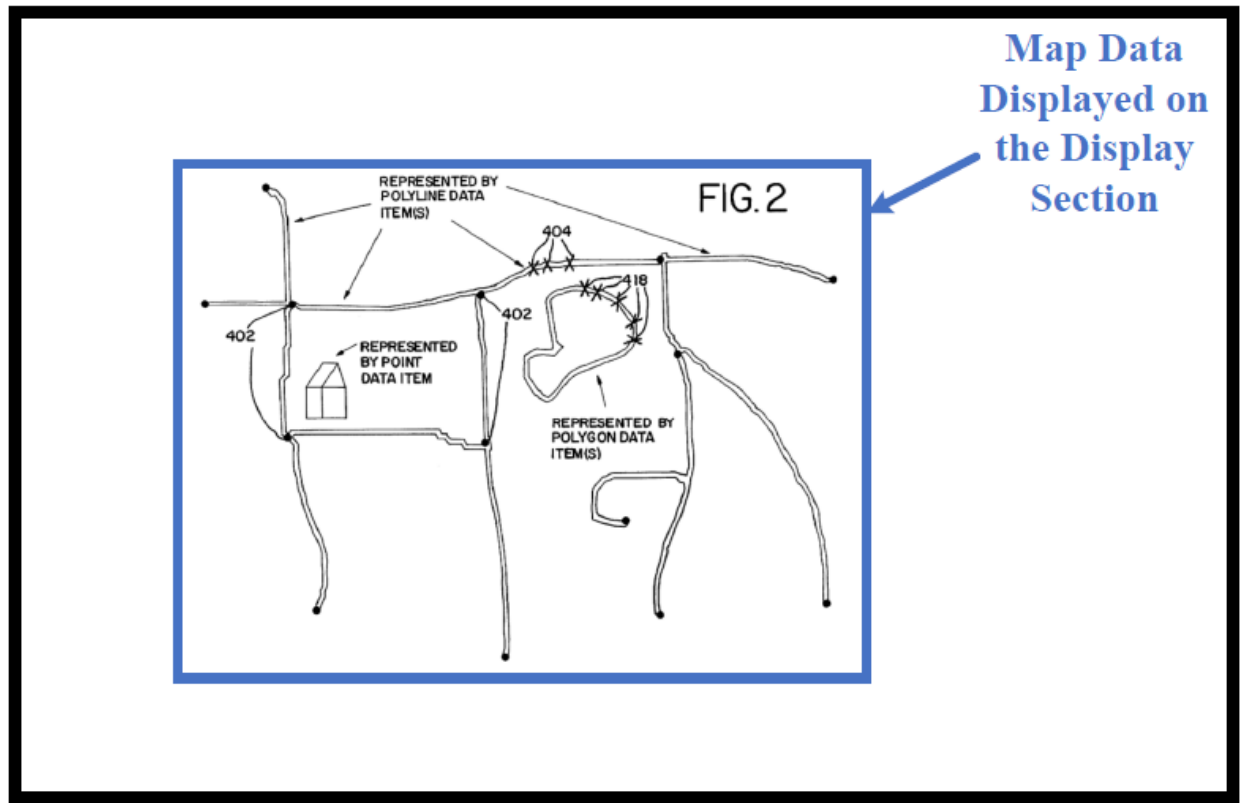
213. McDonough teaches limitation [1b].

214. McDonough teaches that navigation system 10 comprises a display 27 (*i.e.*, a display section) for displaying maps generated from the map data in the map database 30. (McDonough, EX1007 at 4:1-4 (“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.”), 7:54-59 (“The map display

tool executes graphics processing functions of the particular graphics platform 48 utilized by the navigation application so that the map requested by the navigation application and created from the data retrieved from the map database may be shown on the display 27, sent to a buffer, or sent to a data file.”); *see also id.* at 1:24-28, 2:3-9, 2:17-19, 6:59-7:5, claim 1.)



(McDonough, EX1007 at FIG. 1 (annotated).)



(*Id.* at FIG. 2 (annotated).)

d) McDonough Teaches Limitation [1c]: “an input section for inputting an instruction from a user.”

215. McDonough teaches limitation [1c].

216. McDonough teaches that navigation system 10 comprises “appropriate equipment that allows the end-user to input information into the navigation system,” such as a keypad, keyboard, or microphone (*i.e.*, an input section). (McDonough, EX1007 at 3:58-4:1 (“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. This input information may include a request to display a location on a map in a desired manner. The input information may also include other kinds of information, such as configuration information or vehicle information. 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.”).)

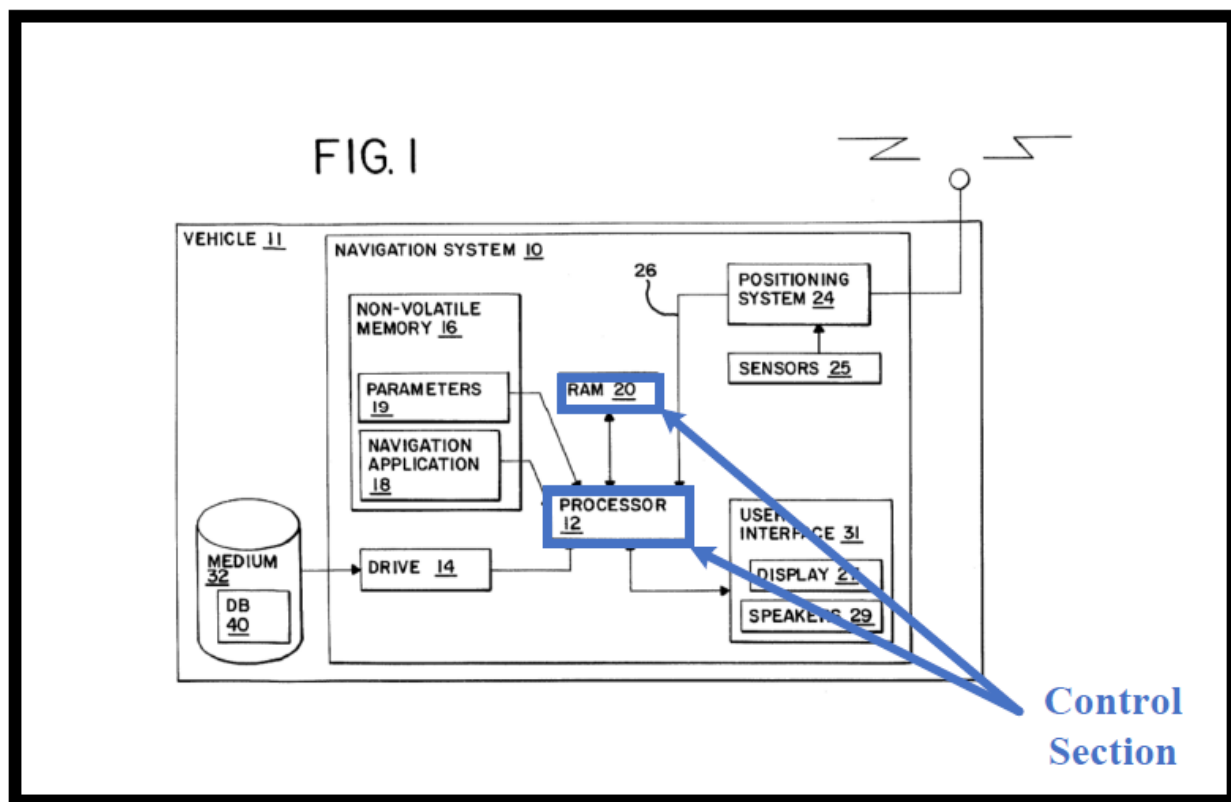
217. The input section is used for inputting user or driver instructions, such as “a request to display a location on a map in a desired manner.” (*Id.*; *see also id.* at 1:10-17.)

e) McDonough Teaches Limitation [1d]: “a control section for carrying out.”

218. McDonough teaches limitation [1d].

219. McDonough teaches that navigation system 10 comprises a processor 12 and associated RAM 20 (collectively, a control section) for operating the navigation system. (McDonough, EX1007 at 3:33-44 (“In one embodiment, the navigation system 10 includes a processor 12, a drive 14 connected to the processor 12, and a non-volatile memory storage device 16 for storing a navigation software program 18, as well as other information, such as configuration parameters 19. The processor 12 may be of any type used in

navigation systems, such as 32-bit processors using a flat address space, such as a Hitachi SH1, an Intel 80386, an Intel 960, a Motorola 68020 (or other processors having similar or greater addressing space). Processor types other than these, as well as processors that may be developed in the future, are also suitable.”), 6:40-44 (“Referring again to FIG. 1, the navigation application software program 18 is loaded from the non-volatile memory 16 into a RAM 20 associated with the processor 12 in order to operate the navigation system.”.)



(*Id.* at FIG. 1 (annotated).)

220. As demonstrated below, McDonough's control section is configured to carry out various procedures.

f) McDonough In Combination With Tanizaki Teaches And Renders Obvious Limitation [1e]: “a procedure of calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed via the input section.”

221. McDonough in combination with Tanizaki teaches and renders obvious limitation [1e].

222. McDonough teaches a procedure of performing “route calculation” to “a desired destination” using a navigation software program 18 running on processor 12. (McDonough, EX1007 at 3:55-57 (“The signal 26 may be used by the navigation software program 18 that is run on the processor 12 to determine the location, direction, speed, etc., of the navigation system 10.”), 6:40-55 (“Referring again to FIG. 1, the navigation application software program 18 is loaded from the non-volatile memory 16 into a RAM 20 associated with the processor 12 in order to operate the navigation system. The navigation system 10 uses the map database 30 stored on the storage medium 32, possibly in conjunction with the output 26 from the positioning system 24, to provide various navigation features and functions. The navigation software program 18 may include separate 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.”), 7:14-24 (“Specifically, in the navigation software program 18, the map display tool 40 interfaces with a navigation application 47. 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 route calculation tool, and so on, to implement one or more of the other various navigation functions.”); *see also id.* at FIG. 6, 1:12-28.)

223. McDonough’s teaching that the navigation system uses “input from ... equipment that can determine the end-user’s physical location (such as a GPS system) ... [to] examine various routes between two locations to determine an optimum route to travel” is consistent with, and suggests, beginning the calculated route at the present position of the vehicle (*i.e.*, an own-vehicle position). (*Id.* at

1:12-17.)

224. A POSITA would also have found it obvious to begin the calculated route at the present position of the vehicle (*i.e.*, an own-vehicle position), as taught in Tanizaki. (Tanizaki, EX1009 at Abstract, [0007], [0028], [0036], [0042], [0044], claim 1.) Prior to the alleged invention of the ‘465 patent, it was common for vehicle-based navigation systems such as McDonough’s navigation system 10 and Tanizaki’s navigation apparatus to calculate a route from the vehicle’s current position to a driver-specified destination. (Lou, EX1012 at 1:11-23 (“If the navigation system is installed in a vehicle, the starting point is typically the current position of the vehicle”); *see also* Tanizaki, EX1009 at Abstract, [0009], [0028]; Moroto, EX1013 at 9:13-18; Harada, EX1014 at 7:1-5; Geelen, EX1017 at [0057].) A POSITA would have been motivated to begin McDonough’s calculated route at the vehicle’s current position: (i) to increase driver convenience by eliminating the need for the driver to manually enter a route starting point; (ii) to simplify the route guidance process for the driver by placing the driver’s vehicle on the guidance route immediately once the destination is entered; and (iii) to prevent driver confusion when the driver’s current position differs from the route starting point (*e.g.*, where the driver does not know how to get from his or her current position to the route

starting point).

225. A POSITA would also have understood that the destination is input using McDonough's input section. McDonough states that the navigation system calculates a route to the destination "[u]sing input from the end-user," which itself suggests inputting a destination using McDonough's input section as McDonough's input section is responsible for "input[ting] information" (*e.g.*, a destination) into the navigation system 10. (McDonough, EX1007 at 1:12-17, 3:58-41.) McDonough also teaches guiding the driver to a "desired destination" (*id.* at 6:52-55), and a POSITA would have known that McDonough's navigation system 10 would have no way of knowing where the driver wants to go without the driver's input.

226. It would also have been obvious to represent the driver-input destination with a display element, as taught in Tanizaki. Tanizaki teaches using a display element (*i.e.*, a star icon) to represent the driver's destination, which was common well before the alleged invention of the '465 patent. (Tanizaki, EX1009 at FIGS. 2A-C, 3A-C, 6; *see also* TomTom ONE, EX1015 at 9-10, 25, 52; Geelen, EX1017 at FIG. 11B; *Human factors engineering*, EX1029 at 6 (Figure 12).) A POSITA would have known that displaying a guidance route that ends abruptly could confuse the driver and could cause safety issues. A POSITA would have been

motivated to modify McDonough in view of Tanizaki to represent the driver's set destination with a display element to beneficially provide a clear visual demarcation of the end of the guidance route and to help the driver find his or her destination (*e.g.*, by showing which side of the road the destination is on). A POSITA would have had a reasonable expectation of success because the proposed modification would have required a routine, straightforward adjustment to McDonough's map data (*e.g.*, adding a star icon to represent a destination) and McDonough already discloses placing icons at representative positions on a map. (*See, e.g.*, McDonough, EX1007 at FIG. 2.)

227. McDonough in combination with Tanizaki teaches and renders obvious limitation [1e].

g) McDonough Alone, Or In Combination With Huber, Renders Obvious Limitation [1f]: “in accordance with one of the plurality of map scales instructed via the input section, a procedure of displaying a map on the display section by.”

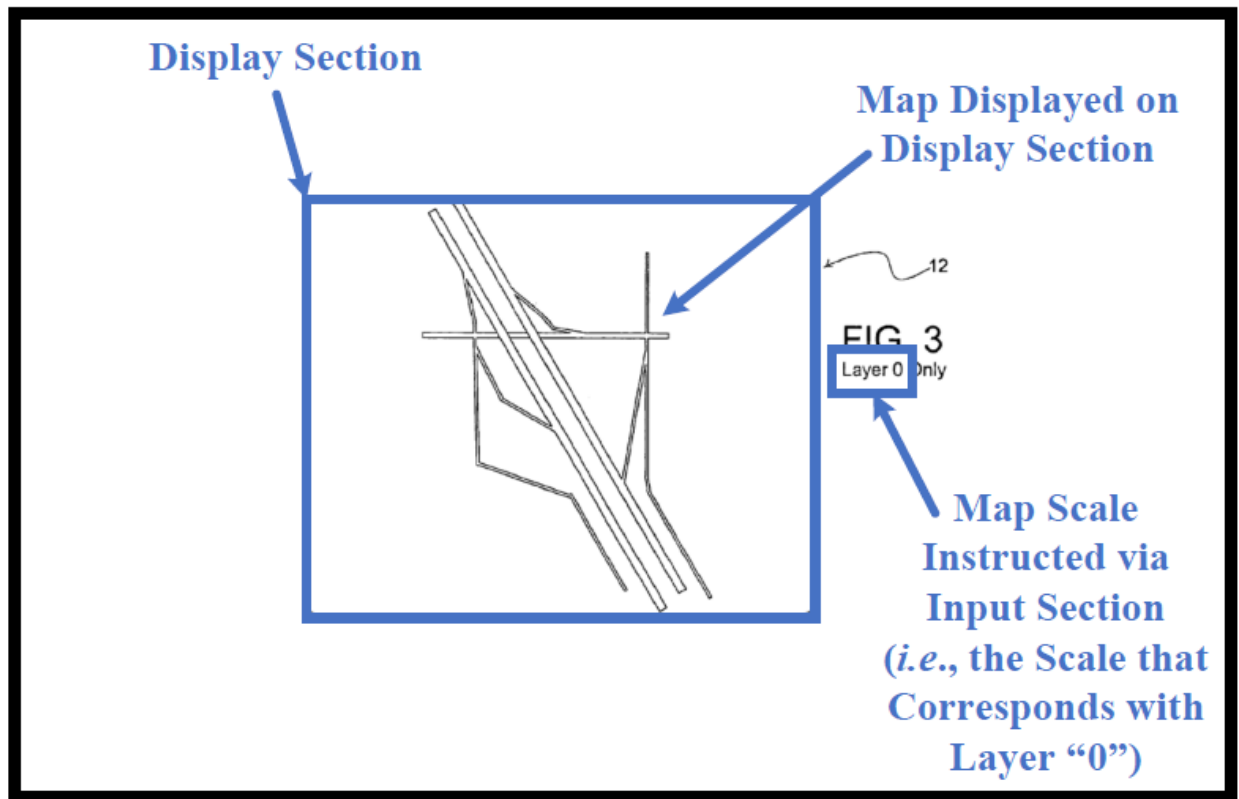
228. McDonough alone, or in combination with Huber, renders obvious limitation [1f].

229. McDonough teaches a procedure of displaying a map on the display 27 (*i.e.*, the display section) in accordance with one of the plurality of map scales (*i.e.*, the map scales that correspond with layers “0” to “4”) using a map display tool 40

running on processor 12. (McDonough, EX1007 at 5:53-62 (“As indicated above, the geographic data of the map database 30 is preferably organized in layers. The map display tool may use data at different levels of detail; for example, the navigation application instructs the map display tool to provide information for zooming. Zooming can be done more efficiently if the data are organized into layers, with greater detail at the lower layers and less detail at the higher layers. Therefore, within some of the subsets of data types, the geographic data are provided in separate collections or groups corresponding to separate layers.”), 6:59-66 (“Referring to FIG. 6, in the navigation software program 18 the map generation and display capabilities are provided by a map display tool 40. The map display tool 40 is a computer program that may be used as part of the navigation software program 18. The map display tool 40 generates maps from the map data in the map database 30 for specified locations that may either be rendered directly to a display or to a graphics buffer.”), 15:25-32 (“After completing the sequence of steps described above for the current data item, the next data item is processed accordingly (see steps 118-140) until all items from the database within the designated area are exhausted. The designated area consists of all of the geographical data that will fit within the graphics buffer at a predetermined scale that is centered at the center point provided

by the navigation application.”); *see also id.* at 2:3-9, 6:9-33, 7:1-9, 7:46-59, 8:2-9, 8:17-27, 10:7-18, 13:33-38.)

230. Figure 3 of Huber, which is reproduced below, further illustrates this procedure:



(Huber, EX1008 at FIG. 3 (annotated).)

231. It would have been obvious in view of McDonough alone to set the scale of the displayed map using McDonough’s input section. McDonough teaches that its navigation system supports “zooming,” which was a task typically performed

using a user input device. (McDonough, EX1007 at 5:54-60, 6:31-33, 8:5-9; *see also* Yokota, EX1005 at 6:1-14; TomTom ONE, EX1015 at 10.) A POSITA would have known that using a user input device, such as McDonough's input section, to perform a zoom operation would have advantageously given the driver control over the zoom operation and allowed the driver to set the map scale to his or her desired scale (*e.g.*, zooming in to better see certain map data elements or zooming out to be able to see the driver's entire guide route). (*Id.*) McDonough also teaches that its input section is configured "to input information into the navigation system," and allowing the driver to input his or her desired map scale using the input section is consistent with this teaching. (McDonough, EX1007 at 3:59-4:1.)

232. As demonstrated above in Section X(B)(1), it would also have been obvious to set the scale of the displayed map using McDonough's input section in view of Huber's teachings clarifying that the driver sets the map scale using an input device. (*See also* Huber, EX1008 at 1:24-45, 1:57-60, 4:24-33, 4:55-57, 5:51-64, 6:32-35, 7:29-35 (teaching that the user sets the map scale using an input device).)

233. McDonough alone, or in combination with Huber, renders obvious limitation [1f].

h) McDonough Teaches Limitation [1g]: “selecting the roads indicated by the attributes as being displayable according to the instructed map scale, and by selecting the display elements based on ranks.”

234. McDonough teaches limitation [1g].

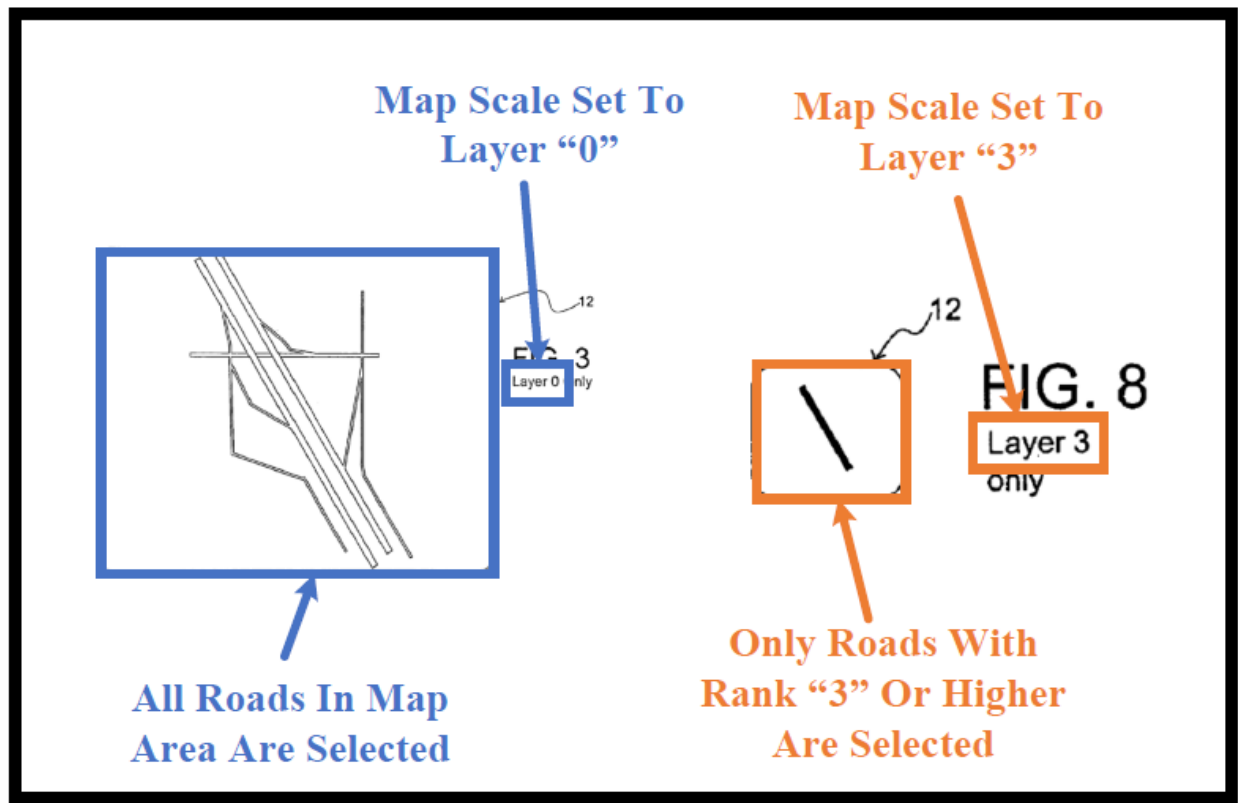
235. As demonstrated above with respect to limitation [1a], McDonough teaches storing attributes indicative of whether or not each of the roads in the map data should be displayed for each of a plurality of map scales. (McDonough, EX1007 at 5:63-6:33.)

236. McDonough further teaches that a map processing layer 42 of map display tool 40, which runs on processor 12, retrieves (*i.e.*, selects) roads from map database 30. (*Id.* at 8:40-43 (“The map processing layer retrieves map information in the form of data items (400,414,428) and processes one data item before retrieving the next.”), 13:53-65 (“The map database returns map information in the form of data items 400, 414, 428 (see FIGS. 3-5). According to one embodiment, each data item is retrieved one at a time such that each retrieved data item is fully processed before the next data item is obtained from the database. The map processing layer 42 uses the instructions received from the navigation application 47 to determine the amount of map data to retrieve. The map processing layer 42 retrieves map data that corresponds to the area within the map rectangle as well as map data for the area

around the map rectangle that will fill the space available in the graphics buffer.”); *see also id.* at 8:17-27, 8:66-9:3.)

237. Roads are selected from map database 30 based on whether the stored road ranks (*i.e.*, attributes) indicate that the roads are displayable according to the instructed map layer (*i.e.*, map scale). (*Id.*; *see also id.* at 6:9-33, 10:7-18.) For example, if the map scale is set to layer “3,” only roads with a rank of “3” or higher will be selected. (*Id.*)

238. Figures 3 and 8 of Huber, which are reproduced below, further illustrate this selection process:



(Huber, EX1008 at FIGS. 3, 8 (annotated).)

239. McDonough also teaches that points of interest in a map area to be rendered are placed into a point of interest list 66. (McDonough, EX1007 at 9:15-23 (“A point of interest list 66 maintains a list of all point of interest names that are retrieved by the map display tool during a map rendering process. Points of interest may include cities, museums, government offices, national monuments, restaurants and other unique locations within the map area rendered. As shown in FIG. 10, the point of interest list 66 is preferably a singly linked list containing name 80, icon 82,

and location 84 information on each retrieved point of interest.”), 16:49-50 (“A singly linked list 66 is used to store the information for point of interest icons.”).)

240. The point of interest list 66 may be presorted “according to point of interest priority information contained in the point of interest data retrieved from the map database.” (*Id.* at 16:60-64.) Alternatively, points of interest may be prioritized in a priority list 76. (*Id.* at 9:5-9, 16:57-60, 17:1-5.)

241. The map processing layer 42 then selects for display names and icons (*i.e.*, display elements) in the point of interest list 66 according to their presorted priority order (or according to their priority order in the priority list 76). (*Id.* at 9:5-9 (“A priority list 76 in the map object contains a list of feature types and is used for determining the priority of placement of names for roadways, points of interest and roadway shields (e.g., the red, white, and blue shield icon of a U.S. interstate freeway) on a rendered map.”), 16:57-60 (“Once all the names and icons have been retrieved, the entire name table and point of interest list are processed together based on name placement priorities in the priority list 76 of the map object 52.”), 16:65-17:11 (“When performing the priority and conflicts checks on both the name table and point of interest list, the navigation application may supply a priority list or use the default priority list of the map display tool. In one embodiment, the priority

list 76 contains a list of feature types (names of roadways of a certain rank, airports, rivers, parks, and etc.) The map processing layer processes the name and icon information in the order designated by the priority list. Thus, the map processing layer scans through all the buffered name placement information, in the order in which it exists in the name table and point of interest list, for the first type of name (e.g., road names of rank 4 roads) in the priority list, scans all the buffered information for the second type of name in the priority list (e.g., river names), and so on.”), 18:14-24 (“the name priority list will dictate the order in which the name information is processed and enforce name placement priorities.”); *see also id.* at 15:25-38.)

242. Each name/icon is processed in priority order and is selected for display as long as it will not overlap with a selected higher-priority name or icon. (*Id.* at 17:12-33 (“As prioritization takes place, the map processing layer performs a conflicts check to determine whether names and icons will overlap or interfere with one another on the rendered map. One or more new lists are created in the map object to hold data pertaining to names and icons that have passed the priority and conflicts checks. The conflicts check preferably consists of taking each name item in an order of priority and determining if the name will overlap the area of a name already

selected based on priority. One of the new lists created in the name placement routine is a list that stores the spatial extents of each item that has passed the conflict check regardless of whether it is a roadway name, roadway shield or point of interest icon.”), 18:4-13 (“With respect to point of interest items that have passed the conflicts checks, these are left in the prioritized singly linked list and flagged as having passed conflicts. As set forth above, the conflicts check is preferably performed by comparing the spatial extents of the icon or information against all the items already placed in the temporary spatial extents list described above. If the extents of the new item do not overlap any of the existing items in the list, it is then placed on the map and the extents are added to the spatial extents list. Additionally, the item is added to the appropriate list of successful items or flagged if it is a point of interest item.”); *see also id.* at 9:23-28, 15:62-65.)

243. In view of the above, McDonough teaches that map processing layer 42 selects points of interest (*i.e.*, city centers and facilities) for display based on their priorities (*i.e.*, ranks).

- i) **McDonough In Combination With Tanizaki Teaches And Renders Obvious Limitation [1h]: “further selecting each of the roads that is part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale.”**

244. As demonstrated above in Section X(B)(2), a POSITA would have been

motivated to modify McDonough in view of Tanizaki to further select each of the roads that is part of the calculated route but not indicated by the attributes as being displayable according to the instructed map scale.

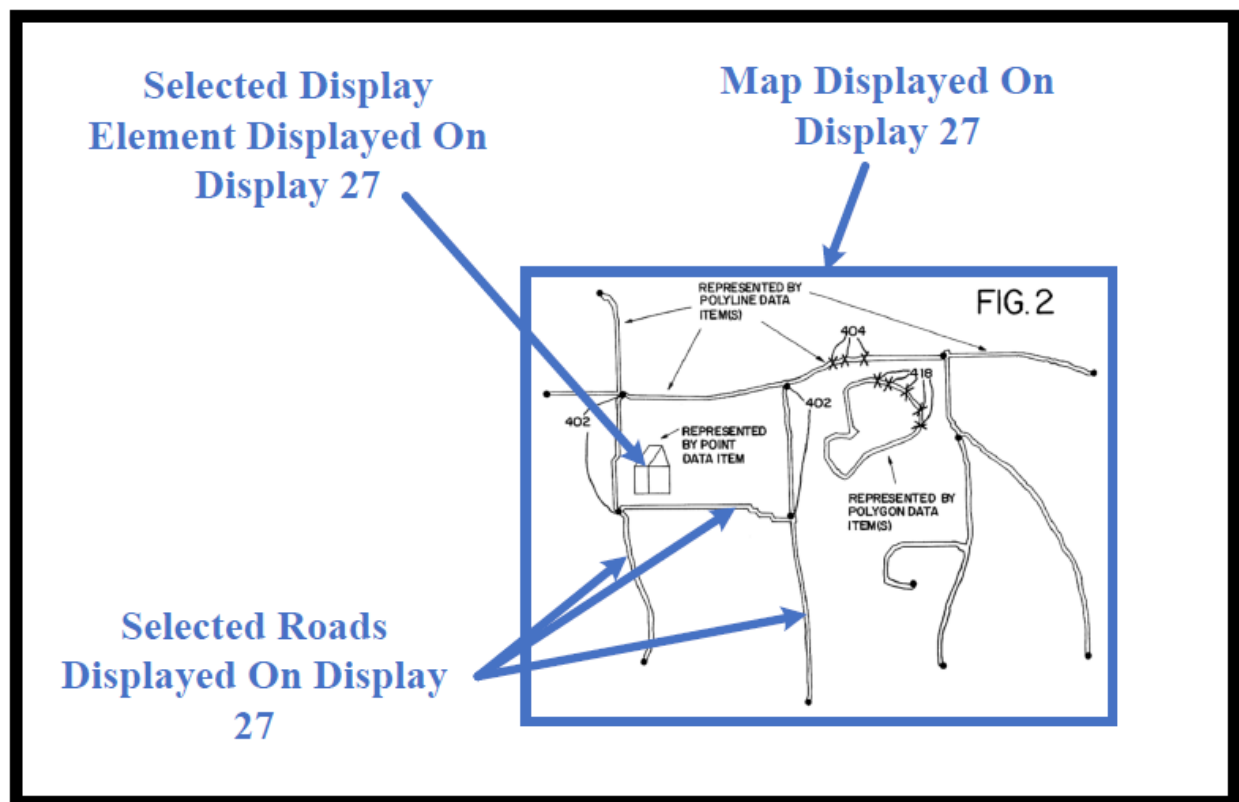
245. McDonough in combination with Tanizaki teaches and renders obvious limitation [1h].

j) McDonough Teaches Limitation [1i]: “displaying the selected roads and the selected display elements on the display selection as part of the map.”

246. McDonough teaches limitation [1i].

247. McDonough teaches that map display tool 40 running on processor 12 displays the selected roads and display elements on display 27 (*i.e.*, the display selection) as part of a map. (McDonough, EX1007 at 6:59-66 (“Referring to FIG. 6, in the navigation software program 18 the map generation and display capabilities are provided by a map display tool 40. The map display tool 40 is a computer program that may be used as part of the navigation software program 18. The map display tool 40 generates maps from the map data in the map database 30 for specified locations that may either be rendered directly to a display or to a graphics buffer.”), 7:6-9 (“If used with a navigation software program 18 in a navigation system installed in a vehicle, the map display tool 40 may be used to render and update a map illustrating the vehicle's location and immediate surroundings.”), 7:51-

59 (“The map display tool 40 receives input from the navigation application 47. The map display tool also receives map information from a database via a map database interface 49. The map display tool executes graphics processing functions of the particular graphics platform 48 utilized by the navigation application so that the map requested by the navigation application and created from the data retrieved from the map database may be shown on the display 27, sent to a buffer, or sent to a data file.”); *see also id.* at 14:30-36, 14:53-56, 15:25-38, 19:31-32.)



(*Id.* at FIG. 2 (annotated).)

4. McDonough Alone Renders Obvious The Additional Limitations Of Challenged Claim 2.

248. McDonough alone renders obvious the additional limitations of Challenged Claim 2: “The navigation system according to claim 1, wherein the control section displays each selected road not indicated by the attributes as being displayable according to the instructed map scale on the display section in a fashion different from the other selected roads.”

249. Prior to the alleged invention of the ‘465 patent, it was common in the art to highlight, or display in a different color, the roads in a calculated guide route. (*See, e.g.,* Lou, EX1012 at 1:41-43; Moroto, EX1013 at 6:24-25; TomTom ONE, EX1015 at 9-10, 21, 25; Geelen, EX1017 at FIGS. 2A-D, 8A-D, 9A-B, 10A, 11A-B; Millington, EX1018 at 1:38-40; *Human factors engineering*, EX1029 at 6 (Figure 12).) A POSITA would have been motivated to display the roads in McDonough’s calculated route using highlighting (or a different color) to allow the driver to visually distinguish the roads in the calculated route from other roads in the displayed map area that are not part of the calculated route, which in turn would make it easier for the driver to follow the calculated route.

250. In the proposed modification, the selected roads that are part of the calculated route but not indicated by the attributes as being displayable according to

the instructed map scale would be displayed in a fashion different from the other selected roads (*i.e.*, highlighted or colored lines vs. plain lines, respectively). (McDonough, EX1007 at FIG. 2 (showing selected roads displayed as plain lines).)

251. McDonough alone renders obvious the additional limitations of Challenged Claim 2.

5. McDonough In Combination With Tanizaki Teaches And Renders Obvious The Additional Limitations Of Challenged Claim 3.

252. McDonough in combination with Tanizaki teaches and renders obvious the additional limitations of Challenged Claim 3: “The navigation system according to claim 1, wherein the route calculation is performed between the own-vehicle position and one of the selected display elements, and the route calculation is performed under a condition recommended by navigation or under a condition which is designated by the user and is input from the input section.”

253. As demonstrated above with respect to limitation [1e], McDonough in combination with Tanizaki teaches and renders obvious performing a route calculation between an own-vehicle position and a selected display element (*i.e.*, a star representing a destination).

254. McDonough also teaches that the “navigation system can examine

various routes between two locations to determine an optimum route to travel from a starting location to a destination location in the geographic region.” (McDonough, EX1007 at 1:14-17; *see also id.* at 1:9-12, 1:17-22.) McDonough teaches that route calculation is performed under a condition recommended by the navigation system (*i.e.*, a condition that determines the “optimum route” out of the various possible routes to the destination). (*Id.*)

255. It also would have been obvious to modify McDonough’s navigation system to calculate a route according to a driver-input condition to beneficially allow the driver to incorporate his or her preferences into the calculation of the “optimum route” (*e.g.*, a preference for avoiding tollways), as was well-known in the art before the alleged invention of the ‘465 patent. (*See, e.g.*, TomTom ONE, EX1015 at 11, 18, 29-30, 55; Khavakh, EX1016 at 6:27-35; Geelen, EX1017 at [0028], pps. 4-5.) A POSITA would have had a reasonable expectation of success because algorithms for calculating an “optimum route” (optionally in accordance with user preferences) were well-known and well understood prior to the alleged invention of the ‘465 patent, and these functions came standard in prior art navigation systems. (*Id.*) McDonough’s teaching that the navigation system can use “input from the end-user” to determine an “optimum route” is consistent with, and suggests, calculating a route

according to a user-input condition. (McDonough, EX1007 at 1:12-17.)

256. McDonough in combination with Tanizaki teaches and renders obvious the additional limitations of Challenged Claim 3.

6. Challenged Claim 5.

- a) **McDonough Teaches Limitation [5-PRE]: “A display method of a road network in a navigation system having a map data storage section for storing map data, which is composed of roads necessary for a route search and display elements including city centers and facilities, together with attributes and classes of the map data, the attributes being indicative of whether or not each of the roads should be displayed for each of a plurality of map scales, the navigation system also having a position information acquiring section for obtaining position information on a vehicle, a control section including a drawing memory, an input section for inputting an instruction from a user, and a display section for displaying the map data, the display method of the road network in the navigation system comprising.”**

257. Regardless of whether the preamble is limiting, McDonough teaches limitation [5-PRE].

258. Limitation [5-PRE] combines limitations [1-PRE] through [1d]. The only material differences between limitation [5-PRE] and limitations [1-PRE] through [1d] are that limitation [5-PRE] requires (i) “a display method of a road network”; (ii) “a position information acquiring section for obtaining position

information on a vehicle”; and (iii) “a drawing memory.” (Claims Comparison Chart, EX1011.)

259. As shown above, McDonough teaches limitations [1-PRE] through [1d]. As shown below, McDonough also teaches each of the material differences between limitations [1-PRE] through [1d] and limitation [5-PRE]. Thus, McDonough teaches limitation [5-PRE].

260. First, McDonough teaches “a display method of a road network.” (McDonough, EX1007 at 6:59-66 (“Referring to FIG. 6, in the navigation software program 18 the map generation and display capabilities are provided by a map display tool 40. The map display tool 40 is a computer program that may be used as part of the navigation software program 18. The map display tool 40 generates maps from the map data in the map database 30 for specified locations that may either be rendered directly to a display or to a graphics buffer.”); *see also id.* at 7:6-9, 7:51-59, 14:53-56, 15:25-38, 19:31-32, FIG. 2.)

261. Second, McDonough teaches “a position information acquiring section for obtaining position information on a vehicle.” McDonough teaches that navigation system 10 has a positioning system 24 (*i.e.*, a position information acquiring section) for obtaining a vehicle’s position. (*Id.* at 3:45-57

(“The navigation system 10 may also include a positioning system 24. The positioning system 24 may utilize GPS-type technology, a dead reckoning-type system, or combinations of these, or other systems, all of which are known in the art. The positioning system 24 may include suitable sensing devices 25 that measure the speed, direction, and so on, of the vehicle. The positioning system 24 may also include appropriate wireless communication technology to obtain a GPS signal, in a manner which is known in the art. The positioning system 24 outputs a signal 26 to the processor 12. The signal 26 may be used by the navigation software program 18 that is run on the processor 12 to determine the location, direction, speed, etc., of the navigation system 10.”), 6:44-55 (“The navigation system 10 uses the map database 30 stored on the storage medium 32, possibly in conjunction with the output 26 from the positioning system 24, to provide various navigation features and functions.”); *see also id.* at 1:8-28.)

262. Third, McDonough teaches a control section including “a drawing memory.” McDonough teaches that a map object 52 of processor 12 includes a graphics buffer. (*Id.* at FIG. 9 (reference numerals 67, 68), 9:10-16.) A POSITA would have understood that McDonough’s graphics buffer is a drawing memory. Specifically, map data is drawn and stored on the graphics buffer. (*Id.* at FIG. 20

(reference numeral 228), 6:63-66, 7:54-59, 12:36-39, 13:7-10, 14:53-56, 15:16-17, 15:32-33, 18:40-43, 19:31-33, claim 21; *see also id.* at 2:20-22, 9:13-16, claim 5, claim 7, claim 15.) The map data that is drawn and stored on the graphics buffer is used to create a map that is then sent to display 27. (*Id.* at 6:59-66, 7:6-9, 7:51-59, 12:33-41, 14:30-36, 14:53-56, 15:25-38, 19:31-32.)

263. Other than the above, there are no material differences between limitation [5-PRE] and limitations [1-PRE] through [1d]. (Claims Comparison Chart, EX1011.) McDonough teaches limitations [1-PRE] through [1d] as well as those differences of [5-PRE], and thus McDonough teaches limitation [5-PRE].

b) McDonough In Combination With Tanizaki Teaches And Renders Obvious Limitation [5a]: “calculating a route between an own-vehicle position and a destination represented by one of the display elements, the destination being instructed by the user via the input section.”

264. There are no material differences between limitation [5a] and limitation [1e]. (Claims Comparison Chart, EX1011.) For the same reasons discussed above, McDonough in combination with Tanizaki teaches and renders obvious limitation [5a].

- c) **McDonough Alone, Or In Combination With Huber, Renders Obvious Limitation [5b]: “drawing, according to one of a plurality of map scales designated by the user via the input section, a map on the drawing memory by.”**

265. McDonough alone, or in combination with Huber, renders obvious limitation [5b].

266. As demonstrated above with respect to limitation [1f], McDonough alone, or in combination with Huber, renders obvious displaying, according to one of a plurality of map scales designated by the user via the input section, a map on display 27 (*i.e.*, the display section).

267. McDonough further teaches that, prior to displaying the map on display 27, the map is first drawn on the graphics buffer (*i.e.*, the drawing memory). (McDonough, EX1007 at FIG. 20 (reference numeral 228), 6:63-66, 7:51-59, 12:36-39, 13:7-10, 14:53-56, 15:16-17, 15:32-33, 19:31-33, claim 21.)

268. McDonough alone, or in combination with Huber, renders obvious limitation [5b].

- d) **McDonough Teaches Limitation [5c]: “selecting the roads indicated by the attributes as being displayable according to a designed map scale, the selected roads including an own-vehicle position obtained by the position information acquiring section.”**

269. McDonough teaches limitation [5c].

270. As demonstrated above with respect to limitation [1g], McDonough teaches selecting the roads indicated by the attributes as being displayable according to a driver-designated map scale.

271. McDonough further teaches obtaining an own-vehicle position using positioning system 24 (*i.e.*, the position information acquiring section). (McDonough, EX1007 at 1:8-28, 3:45-57, 6:44-55.) A POSITA would have understood that when the own-vehicle position obtained by positioning system 24 (*i.e.*, the position information acquiring section) is on a road with a rank that is greater than or equal to the selected map layer (*i.e.*, map scale), the selected roads will include the obtained own-vehicle position (*i.e.*, the road on which the vehicle is currently positioned). (*Id.* at 6:9-33, 8:19-27, 10:7-18, 15:25-38.)

e) McDonough Teaches Limitation [5d]: “drawing the selected roads and one or more of the display elements on the drawing memory.”

272. McDonough teaches limitation [5d].

273. McDonough teaches drawing the selected roads and one or more display elements on the graphics buffer (*i.e.*, the drawing memory). (McDonough, EX1007 at FIG. 20 (reference numeral 228), 6:59-66, 7:51-59, 12:36-39, 13:7-10, 14:30-36, 14:53-56, 15:16-17, 15:25-38, 19:31-33, claim 21; *see also id.* at FIG. 2 (showing map with selected roads and display element).)

- f) McDonough In Combination With Tanizaki Teaches And Renders Obvious Limitation [5e]: “further selecting each of the roads that is part of the calculated route produced as a result of the route calculation, but not indicated by the attributes as being displayable according to the designated map scale, on the drawing memory.”**

274. McDonough in combination with Tanizaki teaches and renders obvious limitation [5e].

275. As demonstrated above in Section X(B)(2), a POSITA would have been motivated to modify McDonough in view of Tanizaki to further select each of the roads that is part of the calculated route (*i.e.*, the route produced as a result of the route calculation) but not indicated by the attributes as being displayable according to the designated map scale, and to draw those roads on McDonough’s graphics buffer (*i.e.*, the drawing memory).

276. McDonough in combination with Tanizaki teaches and renders obvious limitation [5e].

- g) McDonough Teaches Limitation [5f]: “displaying the road network drawn on the drawing memory on the display section.”**

277. McDonough teaches limitation [5f].

278. McDonough teaches displaying the road network drawn on the graphics buffer (*i.e.*, the drawing memory) on display 27 (*i.e.*, the display section).

(McDonough, EX1007 at 2:19-30 (“The method includes the steps of providing first and second graphics buffers. The first graphics buffer contains map information regarding a first location, and the second graphics buffer holds map information regarding a predicted future location. While a map area is shown and scrolled from map information in the first graphics buffer, a look-ahead process creates an auxiliary map in the second buffer. When the map area that is shown on the display reaches or approaches the edge of the map information stored in the first buffer, the map information from the second buffer is copied into the first buffer and the process repeats.”), 12:33-41 (“The bitblock hook causes the graphics interface layer to determine whether the navigation application desires a special routine for transferring bits of information from a graphics buffer to a display. For example, if the map display tool is configured to first draw a map to a graphics buffer rather than directly to a display, a block of individual bits representing the map image is stored in the graphics buffer. A bitblock transfer routine is necessary to move the map image in the graphics buffer to the display.”), 18:40-47 (“Referring to FIG. 19, the implementation of the smooth scrolling function can be visualized as overlapping map areas 200, 202 where the first map area 200 represents map data rendered in the first graphics buffer 67, and the second map area 202 represents map

data rendered, or being rendered, in the second graphics buffer 68. The first map area 200 consists of a present geographic location shown in the screen rectangle 204 and the surrounding area.”), 20:44-45 (“Thus, the map area shown on the display is always retrieved from the first buffer...”); *see also id.* at 6:59-66, 7:51-59, 13:7-10, claim 21.)

XI. CONCLUSION

- Challenged Claims 1-3 and 5 are unpatentable and invalid as obvious over Yokota (EX1005) in combination with the knowledge of a POSITA; and
- Challenged Claims 1-3 and 5 are unpatentable and invalid as obvious over McDonough (EX1007) in combination with Huber (EX1008) and Tanizaki (EX1009).

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 15, 2023

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

David H. Williams