

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HONDA MOTOR CO., LTD.; AND
AMERICAN HONDA MOTOR CO., INC.,
Petitioner

v.
INFOGATION CORPORATION,
Patent Owner

Case No. IPR2024-01160
U.S. Patent No. 6,292,743

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 6,292,743**

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Ex. No.	Description
Ex-1001	U.S. Patent No. 6,292,743 (“the ’743 Patent”)
Ex-1002	Declaration of Mr. Scott Andrews
Ex-1003	Curriculum Vitae of Mr. Scott Andrews
Ex-1004	Prosecution History of U.S. Patent No. 6,292,743
Ex-1005	U.S. Patent No. 6,680,694 (“Knockeart”)
Ex-1006	U.S. Patent No. 5,893,113 (“McGrath”)
Ex-1007	U.S. Patent No. 6,334,087 (“Nakano”)
Ex-1008	U.S. Patent No. 5,059,965 (“Geiser”)
Ex-1009	European Patent App. Pub. No. EP 0827124A2 (“Watanabe”)
Ex-1010	Japanese Patent App. Pub. No. JP H10-221091A (“Nunokawa”)
Ex-1011	Certified Translation of Nunokawa
Ex-1012	Japanese Patent App. Pub. No. JP H8-110230 (“Endo”)
Ex-1013	Certified Translation of Endo
Ex-1014	INTENTIONALLY LEFT BLANK
Ex-1015	INTENTIONALLY LEFT BLANK
Ex-1016	INTENTIONALLY LEFT BLANK
Ex-1017	INTENTIONALLY LEFT BLANK

¹ Four-digit pin citations that begin with 0 are to the page stamps added by Honda in the bottom right corner of the exhibits. All other pin citations are to original page, column, paragraph, and/or line numbers.

Ex-1018	INTENTIONALLY LEFT BLANK
Ex-1019	INTENTIONALLY LEFT BLANK
Ex-1020	Claim Mapping Table
Ex-1021	<i>InfoGation Corp. v. ZTE Corp.</i> , No. 16-cv-01901-H-JLB, D.I. 74 (S.D. Cal. May 5, 2017) (Claim Construction Order)
Ex-1022	<i>InfoGation Corp. v. Google LLC</i> , No. 21-cv-00843-H-LL, D.I. 85 (S.D. Cal. June 8, 2021) (Claim Construction Order)
Ex-1023	Infogation’s Infringement Contentions
Ex-1024	“Behind the Success of the CVCC Engine,” Honda Worldwide, https://web.archive.org/web/20070219081359/http://world.honda.com/history/challenge/1981navigationsystem/text/01.html (last visited July 15, 2024)
Ex-1025	“The Final Test: From Suzuka to Tokyo,” Honda Worldwide, https://web.archive.org/web/20070221131328/http://world.honda.com/history/challenge/1981navigationsystem/text/06.html (last visited July 15, 2024)
Ex-1026	“Creating a Progressive Strategy,” Honda Worldwide, https://web.archive.org/web/20070221131445/http://world.honda.com/history/challenge/1981navigationsystem/text/02.html (last visited July 15, 2024)
Ex-1027	Kunihiro Ishikawa, Michima Ogawa, Shigetoshi Azuma, and Tooru Ito, <i>Map Navigation Software of the Electro-Multivision of the ’91 Toyota Soarer</i> , in Proceedings of the Vehicle Navigation and Info. Sys. Conference (Oct. 1, 1991) (“Ishikawa”)
Ex-1028	U.S. Patent No. 4,502,123 to Minami et.al. (“Minami”)
Ex-1029	Robert L. French, <i>Automobile Navigation: Where is it Going?</i> , 2 IEEE Aerospace & Elec. Sys. Mag. 5, 6-12 (1987)
Ex-1030	U.S. Dep’t. of Transp., Fed. Highway Admin., TravTek Global Evaluation and Executive Summary, Pub. No. FHWA-RD-96-031

	(Mar. 1996)
Ex-1031	C. Blumentritt, K. Balke, E. Seymour, R. Sanchez, TravTek System Architecture Evaluation, Pub. No. FHWA-RD-94-141 (July 1995)
Ex-1032	Robert L. French, <i>Historical Navigation of Automobile Navigation Technology</i> , Institute of Electrical Engineers (May 1986)
Ex-1033	U.S. Patent No. 6,163,749 (“McDonough”)
Ex-1034	U.S. Patent No. 5,808,566 (“Behr”)
Ex-1035	ISO/TR 14825 Technical Report, <i>Geographic Data Files (GDF)</i> (1st ed., 1996-11-15)
Ex-1036	U.S. Provisional Pat. Appl. No. 60/056,150, filed on Aug. 19, 1997 (“Knockeart Provisional”)
Ex-1037	Chart Mapping Knockeart Provisional’s Disclosures (Ex-1036) to Knockeart (Ex-1005)
Ex-1038	Yilin Zhao, <i>Vehicle Location and Navigation Systems</i> , Artech House (1997)

I. INTRODUCTION

Honda Motor Co., Ltd. and American Honda Motor Co., Inc. (collectively, “Petitioner”) request *Inter Partes* Review (“IPR”) of Claims 1-19, and 21-22 of U.S. Patent No. 6,292,743 (“the ’743 Patent”) (Ex-1001), assigned to Infogation Corporation (“PO”).

The ’743 Patent discloses a client-server navigation system in which a requested route is calculated by the server and sent to the client in a “natural language” format. Ex-1001, 3:21-26. This format allegedly improved upon then-existing systems in which “all geographic data transmitted by the server is in a propriety [*sic*] format.” *Id.*, 1:62-67.

But as demonstrated in the Grounds below, use of a non-proprietary, natural language format for routes was well-known before the ’743 Patent’s filing date. Specifically, the Geographic Data File (GDF) format (described by McGrath, Ex-1006), developed in the 1980s and 1990s as a public open standard for industry-wide adoption, uses natural language descriptions of elements forming a route and was developed specifically to enable the exchange of mapping data between databases of different manufactures. Combined with well-known features of navigation systems, use of the GDF format shows that Claims 1-19, and 21-22 are obvious over the prior art.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8

Real Parties-in-Interest: Petitioner identifies the following real parties-in-interest: Honda Motor Co., Ltd. and American Honda Motor Co., Inc.

Related Matters: The '743 Patent is currently the subject of the following litigations: *Infogation Corp. v. MiTAC Computing Tech. Corp.*, No. 2:24-cv-00536 (E.D. Tex. July 12, 2024); *Infogation Corp. v. Alps Alpine Co.*, No. 2:24-cv-00537 (E.D. Tex. July 12, 2024); *Infogation Corp. v. Subaru Corp.*, No. 2:24-cv-00362 (E.D. Tex. May 14, 2024); *Infogation Corp. v. Daimler AG*, No. 2:24-cv-00363 (E.D. Tex. May 14, 2024); *Infogation Corp. v. Porsche AG*, No. 2:24-cv-00350 (E.D. Tex. May 9, 2024); *Infogation Corp. v. American Honda Motor Co., Inc.*, No. 2:24-cv-00346 (E.D. Tex. May 8, 2024); *Infogation Corp. v. Aisin Corp.*, No. 2:24-cv-00301 (E.D. Tex. May 1, 2024); *Infogation Corp. v. DENSO TEN Ltd.*, No. 2:24-cv-00302 (E.D. Tex. May 1, 2024); *Infogation Corp. v. Panasonic Automotive Sys. Co., Ltd.*, No. 2:24-cv-00303 (E.D. Tex. May 1, 2024); *Infogation Corp. v. BMW of N. Am, LLC*, No. 2:24-cv-00304 (E.D. Tex. May 1, 2024); *Infogation Corp. v. Ford Motor Co.*, No. 2:23-cv-00573 (E.D. Tex. Dec. 6, 2023); *Infogation Corp. v. Honda Motor Co. Ltd.*, No. 2:23-cv-00513 (E.D. Tex. Nov. 7, 2023); *Infogation Corp. v. Bayerische Motoren Werke AG*, No. 2:23-cv-00358 (E.D. Tex. Aug 2, 2023); *Infogation Corp. v. Toyota Motor Co.*, No. 2:23-cv-00359 (E.D. Tex. Aug. 2, 2023).

The '743 Patent was previously asserted in the following litigations, all of which have been dismissed and none of which named any Real Party-in-Interest to this petition: *InfoGation Corp. v. Google LLC*, No. 3:21-cv-00843 (S.D. Cal. Apr. 29, 2021); *InfoGation Corp. v. Google LLC*, No. 6:20-cv-00366 (W.D. Tex. May 5, 2020); *Google Inc. v. InfoGation Corp.*, No. 3:16-cv-05821 (N.D. Cal. Oct. 7, 2016); *InfoGation Corp. v. ZTE Corp.*, No. 3:16-cv-01901 (S.D. Cal. July 27, 2016); *InfoGation Corp. v. HTC Corp.*, No. 3:16-cv-01902 (S.D. Cal. July 27, 2016); and *InfoGation Corp. v. Huawei Techs. Co., Ltd.*, No. 3:16-cv-01903 (S.D. Cal. July 27, 2016).

Finally, the '743 Patent is the subject of IPR2024-00756 (*Toyota Motor Corp. v. Infogation Corp.*) and was previously the subject of IPR2017-00819 (*Google Inc. v. InfoGation Corp.*). None of the Real Parties-in-Interest to this Petition were Real Parties-in-Interest to these IPRs.

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III. FEE AUTHORIZATION

Pursuant to 37 C.F.R. §42.15(a) and §42.103(a), the PTO is authorized to charge any and all fees to Deposit Account No. LA500639.

IV. GROUNDS FOR STANDING

Petitioner certifies that the '743 Patent is available for review, and Petitioner is not barred or estopped from requesting review.

V. PRECISE RELIEF REQUESTED

Petitioner requests cancellation of Claims 1-19, and 21-22 of the '743 Patent under 35 U.S.C. §103 on the following grounds, supported by a declaration from Mr. Scott Andrews. Ex-1002; Ex-1003.

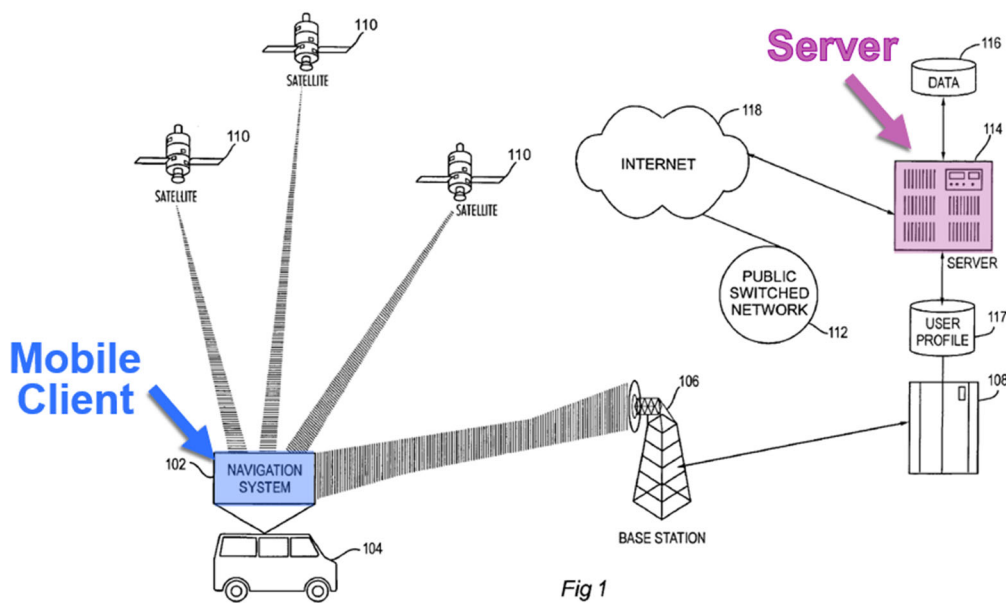
Ground	Summary
1	Claims 1-7, 12-16, and 21-22 are obvious over US 6,680,694 (“Knockeart,” Ex-1005) in view of US 5,893,113 (“McGrath,” Ex-1006)
2	Claims 8-9 are obvious over Knockeart-McGrath, in further view of US 5,059,965 (“Geiser,” Ex-1008)
3	Claims 10-11 are obvious over Knockeart-McGrath-Geiser, in further view of EP 0827124A (“Watanabe,” Ex-1009)
4	Claims 17-18 are obvious over Knockeart-McGrath, in further view of JPH10-221091A (“Nunokawa,” Ex-1011)
5	Claim 19 is obvious over Knockeart-McGrath, in further view of JPH8-110230 (“Endo,” Ex-1013)
6	Claims 1-2, 4-7, 13-16, and 21-22 are obvious over US 6,334,087 (“Nakano,” Ex-1007) in view of McGrath
7	Claims 7-9 are obvious over Nakano-McGrath, in further view of Geiser
8	Claims 10-11 are obvious over Nakano-McGrath-Geiser, in further view of Watanabe
9	Claim 12 is obvious over Nakano-McGrath, in further view of Knockeart
10	Claims 17-18 are obvious over Nakano-McGrath, in further view of Nunokawa

11	Claim 19 is obvious over Nakano-McGrath, in further view of Endo
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VI. THE CHALLENGED PATENT

The '743 Patent relates to a navigation system that includes a mobile client device and a remote navigation server, as illustrated in annotated Figure 1, below.

Ex-1001, Abstract.



In response to the client “request[ing] a specific route by uploading start and stop specifications to the server,” the server uses real-time data to calculate “an optimal route for the user.” *Id.*, 3:29-33. The server sends this route to the client in a “natural language” format, as illustrated in Figure 5 below. *Id.*, 3:34-35.

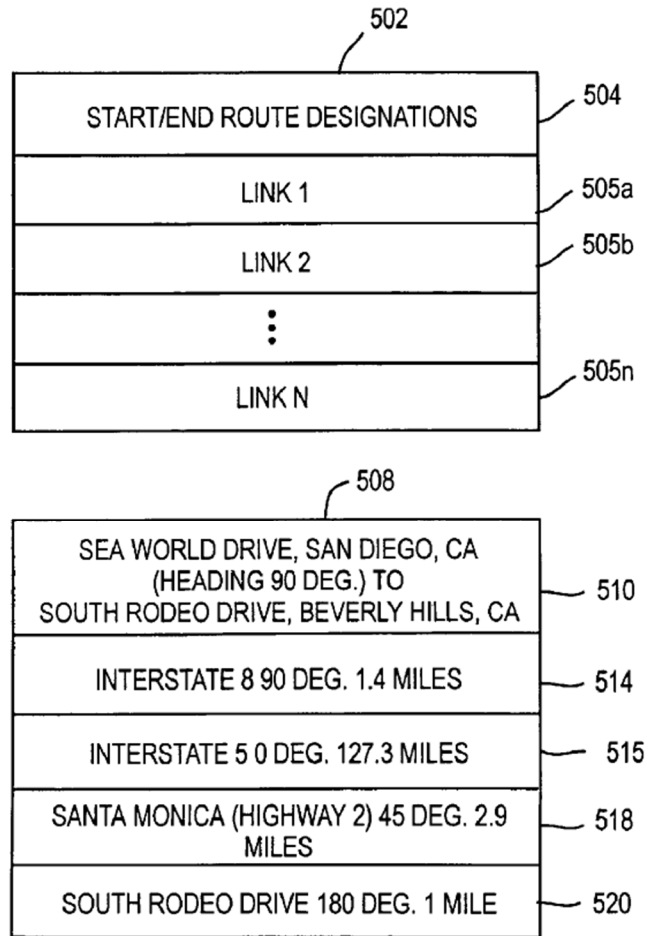


Fig. 5

The “natural language” format includes “generic terms such as road names and turning directions.” *Id.*, 3:37-40. Figure 5, for example, shows each route link described using English language, such as “Interstate 8 90 deg[rees] 1.4 miles.” The patent claims by using this format, the alleged “invention can be used with any mapping database installed on the client navigation system” and “navigation systems from any vendor can be easily adapted to work with the server of the present invention.” *Id.*, 2:48-50, 3:8-10.

In response to receiving the route, the client uses a mapping database local to the client to reconstruct the route, “using a mapping reconstruction algorithm stored on the client,” for display “on the display screen on the client navigation system.” *Id.*, 3:40-48.

VII. PATENT PROSECUTION HISTORY

The '743 Patent was filed on January 6, 1999. Ex-1001, Cover. On October 3, 2000, all original claims were rejected in a first office action. Ex-1004, 0087-0091. The applicant then amended the independent claims to require that the originally-claimed “natural language description” of the route also be “non-proprietary,” arguing that the prior art failed to disclose “formatting the optimal route into a non-proprietary, natural language description and downloading the non-proprietary, natural language description to the client.” *Id.*, 0110, 0118. The examiner then allowed the claims. *Id.*, 0145.

VIII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art at the relevant time (“POSITA”) would have had at least a four-year degree in electrical engineering, computer science, or related field of study, and at least two years’ experience in academia or industry working with navigation systems. This description is approximate, and a higher level of education or skill might make up for less experience, and vice versa. Ex-1002 ¶¶31-32.

IX. PRIORITY DATE

The '743 Patent is entitled to a priority date no earlier than its filing date of January 6, 1999. PO has not asserted an earlier priority date in the parties' district court litigation or in the prior IPRs. Ex-1023; *Google Inc. v. Infogation Corp.*, IPR2017-00819, Paper 14 (PTAB June 12, 2017). Accordingly, pre-AIA 35 U.S.C. §102 applies.

X. CLAIM CONSTRUCTION

Petitioner interprets the claims according to *Phillips*. 37 C.F.R. §42.100(b). A district court previously construed terms of the '743 Patent in PO's prior litigations against ZTE, HTC, and Huawei (Ex-1021) and Google (Ex-1022). Additionally, the Board issued preliminary constructions in IPR2017-00819. For purposes of this Petition only, Petitioner adopts the most recently issued claim constructions from PO's litigation against Google, listed below. Ex-1022. Petitioner does not believe that any other term requires express construction. CTPG, 44; Ex-1002 ¶35.

“optimal route” – “recommended route based on one or more criteria.” Ex-1022, 0009.

“non-proprietary” – a “format that can be used with mapping databases provided by other manufacturers.” *Id.*, 0014. The Board similarly construed “non-proprietary” as “formatting that is not specific to the particular mapping database

used on the client.” IPR2017-00819, Paper 16 at 14. Both constructions are consistent with one another, requiring a route format that can be used by mapping databases from different manufacturers. Indeed, in issuing its construction, the Board noted that the “district court’s construction is similar substantively to the meaning of the term suggested by the intrinsic evidence.” *Id.* at 13. The intrinsic evidence emphasizes that the alleged invention enables interoperability between different manufacturers, through the use of an open or industry-wide format. Ex-1001, 2:35-42 (explaining that a problem with existing systems is that “the proprietary server cannot be used with navigation systems and mapping database provided by other manufacturers”), 3:6-10 (“A feature of the present invention is that the server is hardware and software independent form the client,” such that “navigation systems from any vendor can be easily adapted to work with the server.”).

“natural language” – “includes language spoken or written by humans.” Ex-1022, 0019.

“downloading from the server said non-proprietary, natural language description to the client” – “the server sending the non-proprietary, natural language description and the client receiving the non-proprietary, natural language description.” *Id.*, 0025-0026.

XI. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION UNDER §325(D)

The Board should not exercise its discretion under §325(d) because the first prong of *Advanced Bionics* is not met here for two reasons. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential).

First, Nakano and McGrath were not before the Patent Office during prosecution or the prior Google IPR. The '743 Patent's claims were allowed during prosecution (Ex-1004, 0145), and Google's IPR was denied (IPR2017-00819, Paper 16) on the basis of the “non-proprietary” limitation. This petition presents a new reference, McGrath, as disclosing a non-proprietary format.

Second, while Knockeart was previously considered by the Board as part of Google's IPR, this Petition relies on the combination of Knockeart with McGrath, which the Office has not considered. *See Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 19 (PTAB Oct. 16, 2019) (precedential) (no discretionary denial where Petition relies on previously considered references in combination with one new, non-cumulative reference).

Moreover, under the second prong, which need not be reached, it was material error for the examiner not to meaningfully address the “non-proprietary” aspect of the claims, including by failing to consider the GDF standard—discussed in both

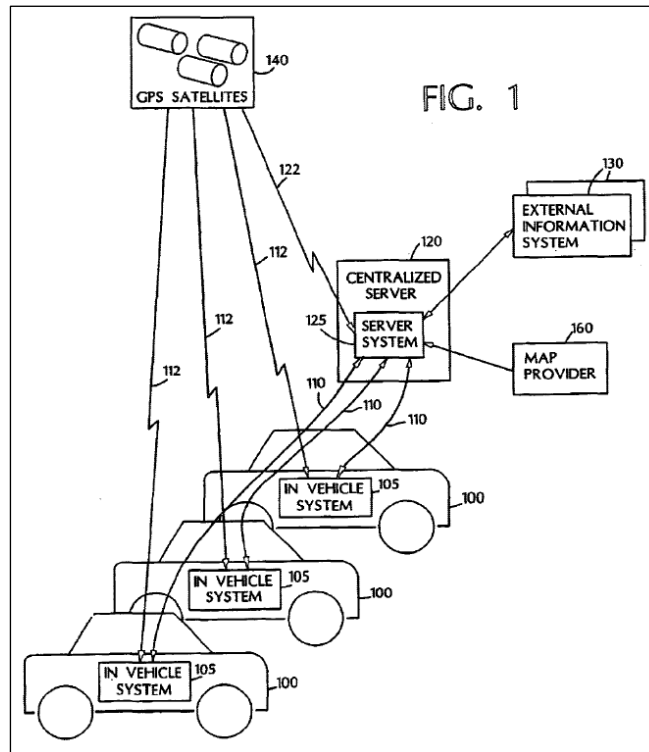
Knockeart and McGrath—which teaches a “non-proprietary” format, as explained in the grounds below.

XII. BRIEF DESCRIPTION OF THE APPLIED PRIOR ART REFERENCES

A. Knockeart (Ex-1005)

Knockeart was filed on August 19, 1998, and issued on January 20, 2004. Knockeart claims priority to U.S. Provisional Pat. Appl. No. 60/056,150, filed on August 19, 1997 (“Knockeart Provisional”). Knockeart is prior art under at least §102(e) because its filing date antedates the ’743 Patent’s priority date. Should PO attempt to claim a priority date earlier than Knockeart’s filing date, Petitioner reserves the right to prove that Knockeart is prior art as of Knockeart Provisional’s filing date. Ex-1036. Exhibit 1037 provides a mapping between Knockeart’s disclosures and corresponding disclosures in the Knockeart Provisional.

As illustrated in Figure 1 below, Knockeart teaches a vehicle navigation system that connects wirelessly to a centralized server system. Ex-1005, Abstract, 1:61-65, 7:41-56.



Knockeart's in-vehicle unit sends origin and destination information to the server. *Id.*, Abstract, 1:23-33, 5:15-26, Fig. 15A. The server uses this information to calculate an optimal route. *Id.*, Abstract, 1:66-2:22, 10:43-11:4, 22:33-41, 28:42-29:15, Fig. 15B. The server formats the route according to the "Geographic Data File" (GDF) format and sends it to the in-vehicle unit. *Id.*, 8:44-52, 15:42-58, 15:66-16:13, 29:15-60, 29:61-30:17, Figs. 8-9.

B. McGrath (Ex-1006)

McGrath was filed on April 25, 1996, and issued on April 6, 1999. McGrath is prior art under at least §102(e).

McGrath discloses incrementally updating a geographic database. Ex-1006, Abstract. Rather than tailoring the update format to the proprietary format used by

a specific customer's geographic database, McGrath's updates may be provided "in a non-proprietary format," and then "translated into [the] customer's proprietary format." *Id.*, 13:14-21. McGrath discloses use of the GDF format (i.e., the same GDF format referenced in Knockeart) for this purpose, explaining that GDF "is especially suitable for transferring geographical data sets from another format or to another format." *Id.*, 3:30-42, 3:66-67. McGrath notes that the "GDF 3.0 format is described in a document issued by the CEN (European Committee for Standardisation)," and incorporates that entire GDF specification by reference. *Id.*, 3:33-37.

McGrath explains that GDF uses "[e]lements," which "are classified into objects and their respective characteristics." *Id.*, 4:54-60. Examples of objects include "a 'Road Element' object," "Node" object, and "'Prohibited Turn' relationship" object. *Id.*, Table 1, 6:59-63. McGrath explains that each object is associated with one or more "characteristics," such as "text of a name" and/or "descriptive information." *Id.*, 5:17-50.

C. Nakano (Ex-1007)

Nakano was filed on April 30, 1998, and issued on December 25, 2001. Nakano is prior art under at least 35 U.S.C. §102(e).

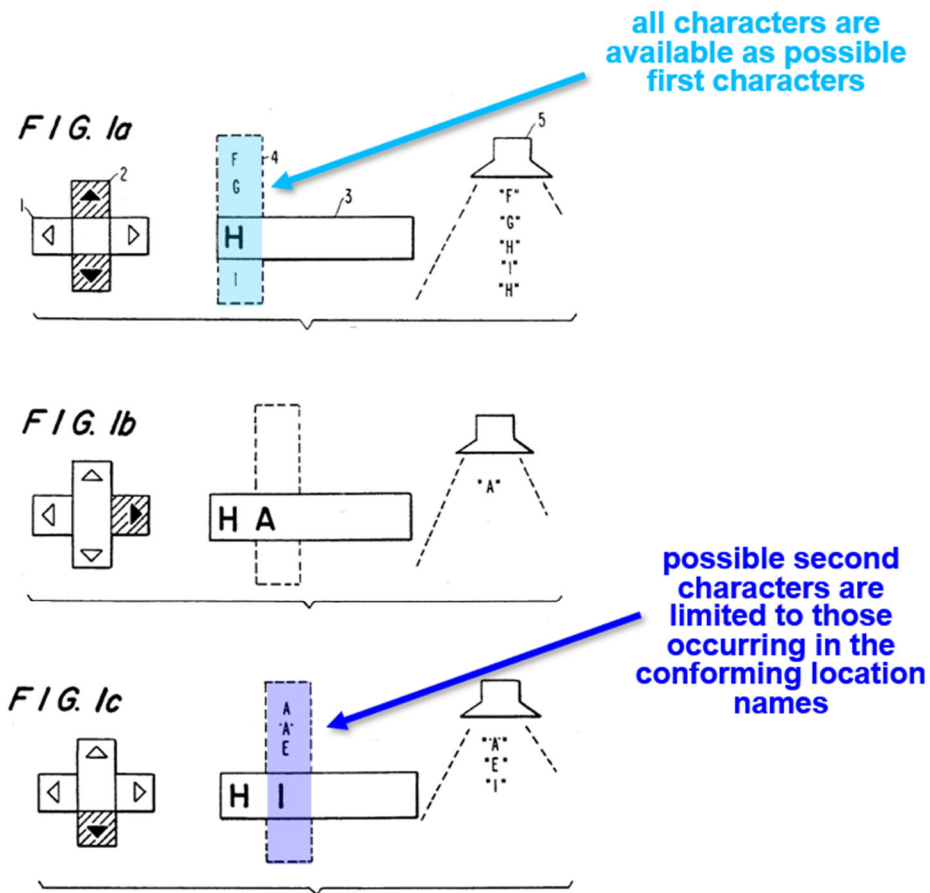
Nakano discloses a "server/client-type" navigation system in which a mobile terminal requests an "optimum route" between user-specified starting and

destination points. Ex-1007, Abstract, 11:63-12:6, 15:48-50. In response, a server calculates the optimum route that, e.g., “avoid[s] congestion,” and represents this route as a set of elements with associated element IDs. *Id.*, 14:34-41, 15:64-16:5. The mobile terminal downloads the route, formatted according to the element IDs, and uses those IDs to access locally-stored templates for “restoring” the route. *Id.*, 15:48-53, 17:26-18:6, Fig. 15.

D. Geiser (Ex-1008)

Geiser issued on October 22, 1991. Geiser is prior art under at least §102(b).

Geiser discloses a method for efficient location entry in a navigation system. Ex-1008, Abstract, 1:68-2:3. In Geiser, a keypad is used to enter location names, character-by-character, as illustrated in annotated Figures 1a-c, below. Each time a new character is entered, the system compares the entered characters to a list of possible location names and identifies a subset of conforming names. *Id.*, 3:10-16. The system then limits the set of characters from which the user may select for the next character position to those that occur in that position in the conforming locations. *Id.*, 3:16-25.



E. Watanabe (Ex-1009)

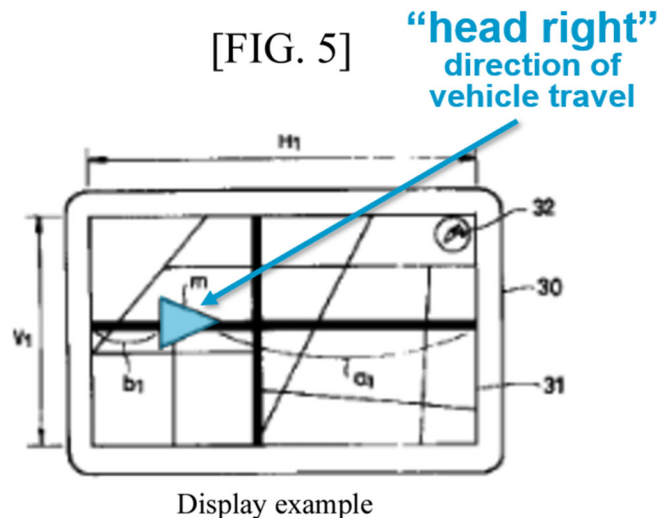
Watanabe published on March 4, 1998. Watanabe is prior art under at least §102(a).

Watanabe discloses a vehicle navigation system “with city name selection accelerator.” Ex-1009, Title. To improve the efficiency of the location entry process, Watanabe applies criteria to the set of possible locations from which a user may select. *Id.*, Abstract. Specifically, the user is presented with previously entered locations, ordered according to the recency and/or frequency of their prior input. *Id.*, 8:23-35.

F. Nunokawa (Ex-1010)

Nunokawa published on August 21, 1998, and is prior art under at least §102(a). A certified translation is concurrently submitted as Ex-1011.

Nunokawa discloses “an efficient display” for a navigation system in which, for display screens in “landscape orientation,” the vehicle is displayed as travelling along the horizontal “head right” (or “head left”) direction, as illustrated in annotated Figure 5, below. Ex-1011, Abstract, ¶¶25-26.



G. Endo (Ex-1012)

Endo published on April 30, 1996, and is prior art under at least §102(b). A certified translation is concurrently submitted as Ex-1013.

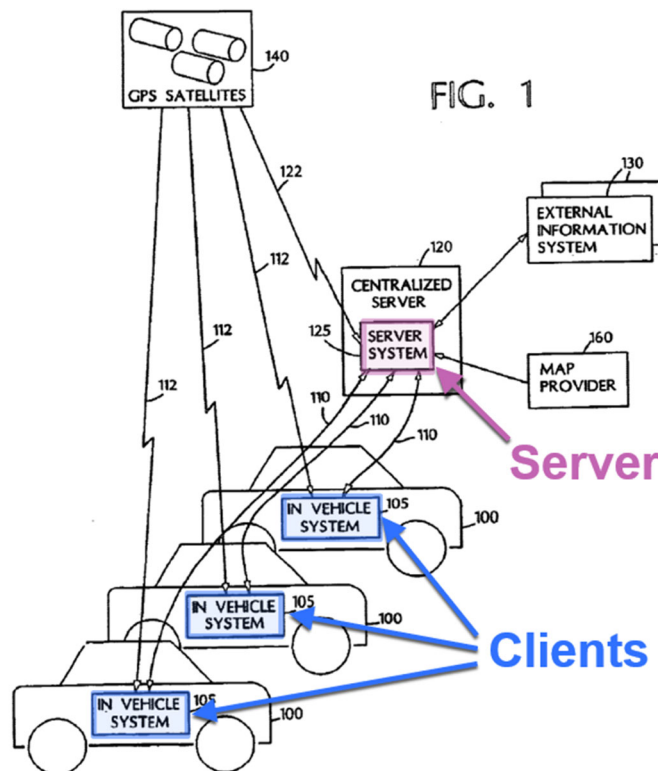
Endo discloses correcting the time displayed by a navigation device in a vehicle, based on the current time zone of the vehicle’s current position. Ex-1013, ¶¶5-6, 11.

XIII. DETAILED EXPLANATION OF THE UNPATENTABILITY GROUNDS

A. Ground 1: Claims 1-7, 12-16, and 21-22 Are Obvious Over Knockeart (Ex-1005) In View Of McGrath (Ex-1006)

1. A POSITA would have been motivated to combine Knockeart with McGrath with a reasonable expectation of success

Knockeart teaches a client-server vehicle navigation system, annotated in Figure 1, below. Ex-1005, Abstract, 6:4-5, 8:7-13.



Knockeart's in-vehicle clients send route requests to server 120. *Id.*, Abstract. Knockeart teaches that, in response, the server calculates routes using map information formatted according to "*the Geographic Data File (GDF) format, an international standard format,*" and sends those routes to the clients. *Id.*, 8:44-52,

15:42-58, 15:67-16:13, 29:15-60, 29:61-30:17, Figs. 8-9.² But other than mentioning the use of GDF, Knockeart does not describe specific implementation details or examples of the GDF format.

A POSITA seeking to implement Knockeart's system would have been motivated to turn to another reference for additional implementation details related to the GDF format. Ex-1002 ¶¶123-129. McGrath is one such reference. As explained in §XIII.A.2.f (Element 1[e]) below, McGrath expressly describes GDF as a "non-proprietary" format for creating and updating geographic route information. Ex-1006, 3:30-50, 13:9-29. McGrath provides examples of route information that may be formatted according to GDF, including information that Knockeart teaches is provided as part of its route. *Compare* Ex-1005, 29:27-29 (node latitude/longitude), 29:35-36 ("size ... of the road segment") *with* Ex-1006, Table 1 (node latitude and "road width"). Knockeart explains that GDF text fields may include "special information to be presented to the operator," but does not define the format of that information. Ex-1005, 29:49-55; Ex-1002 ¶126. McGrath gives examples of such information, including a "Prohibited Turn" relationship and a "Validity Period." Ex-1006, 6:55-67. By incorporating McGrath's GDF implementation details, Knockeart's GDF-based system would enhance

² Throughout, emphasis and annotations are added unless otherwise specified.

interoperability between different manufacturer's client and server mapping databases and achieve the other benefits of GDF-based formatting. Ex-1002 ¶¶127-129.

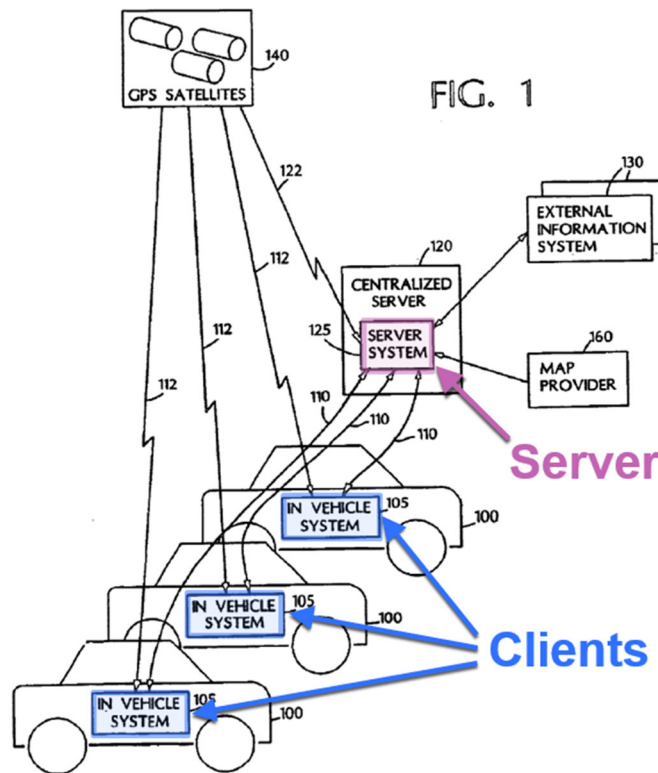
2. Independent Claim 1

- a. **Element 1[pre]: A method for providing an optimal route using real-time information for a navigation system comprising a client and a server, said server coupled to a computer network, said method comprising the steps of:**

Knockeart-McGrath teaches³ the preamble. Ex-1002 ¶¶130-133.

Knockeart teaches “a *vehicle navigation system*” that “includes an in-vehicle system 105 and a centralized server system 120,” in a “‘*client-server*’ arrangement” (annotated in Figure 1, below). Ex-1005, Abstract, 6:4-5, 8:7-13.

³ Petitioner uses the term “teaches” as including both express teachings and those fairly suggested to a POSITA. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (“The test for obviousness is...what the combined teachings of the references would have suggested to those of ordinary skill in the art.” (citations omitted)).



Knockeart's server calculates an optimal route for the in-vehicle system using real-time information such as "*traffic-related information* ... to determine a fastest route." *Id.*, 8:53-60; Ex-1002 ¶132. The calculated route is "optimal" under the district court's construction of "recommended route obtained using a set of criteria." *Id.* In particular, it is recommended to the in-vehicle operator based on various criteria, such as "fastest route," "smallest total distance," "shortest expected travel time," and/or avoiding "congested" routes or "toll fees." Ex-1005, 8:53-60, 10:43-47, 28:64-29:15, 43:33-38; Ex-1002 ¶132.

Knockeart's client and server are coupled to a "wireless communication" network, such as a "cellular" network, over which they communicate. Ex-1005,

Abstract. This wireless network corresponds to a “computer network,” because it connects computing devices. *Id.*, 12:55-65 (in-vehicle system includes “onboard computer”), 14:53-55 (server is a “computer”); Ex-1002 ¶133.

b. Element 1[a]: establishing a wireless connection between the client and the server;

Knockeart-McGrath teaches Element 1[a]. Ex-1002 ¶¶134-135.

Knockeart’s in-vehicle system (“client”) “establish[es] a wireless communication channel with the server” (“wireless connection between the client and the server”) over which it “transmit[s] a specification of [a] destination location” and “receiv[es] the planned route.” Ex-1005, 4:35-39, 10:48.

c. Elements 1[b]: transmitting start and end route designations from the client to the server;

Knockeart-McGrath teaches Element 1[b]. Ex-1002 ¶¶136-137.

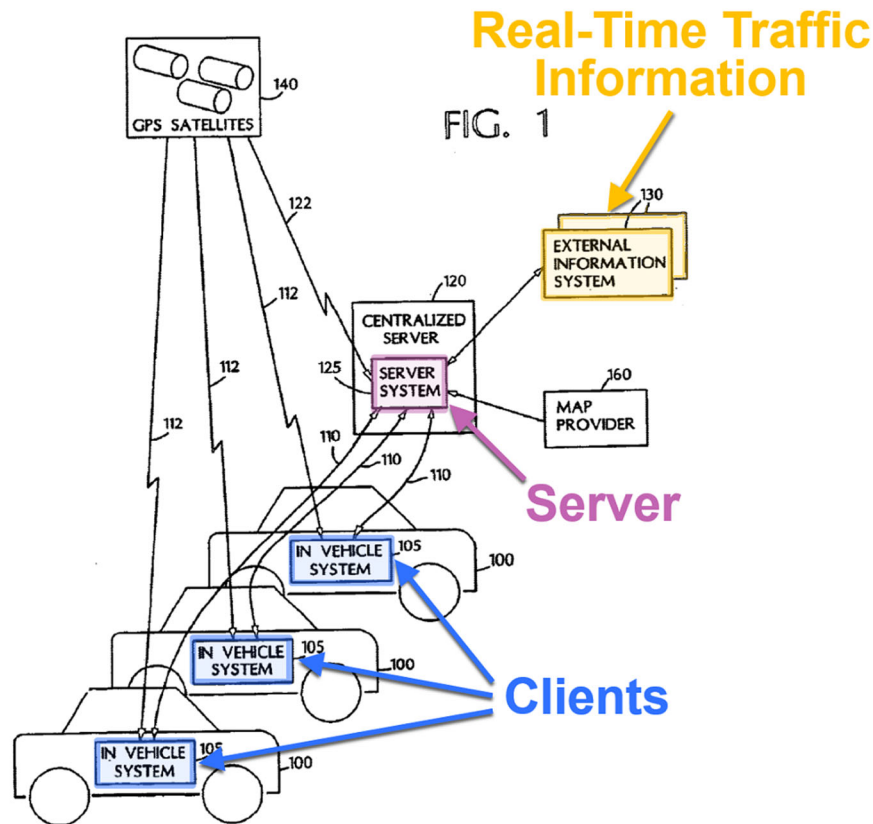
Knockeart’s in-vehicle system transmits “*a starting location* (or other location-related data), speed and heading, and *a desired destination* ... to the server system.” Ex-1005, 8:22-25; *see also id.*, Abstract, 1:23-33, 5:15-26, 9:64-10:13, Fig. 15A.

d. Element 1[c]: accessing real-time information by the server;

Knockeart-McGrath teaches Element 1[c]. Ex-1002 ¶¶138-139.

As discussed for Element 1[pre], Knockeart’s server accesses “external information” 130 (annotated in Figure 1, below), including real-time information

such as “*traffic-related information*” that is used by server system 125 to determine a fastest route.” Ex-1005, 8:53-60, 41:5-8.



- e. **Element 1[d]: calculating the optimal route by the server, based on the real-time information and said start and end route designations;**

Knockeart-McGrath teaches Element 1[d]. Ex-1002 ¶¶140-142.

As annotated in the route planning flowchart of Figure 15B, below, Knockeart’s server receives the destination and current vehicle location (step 1553) and determines a planned route to the specified destination (step 1561). Ex-1005, 21:53-56.

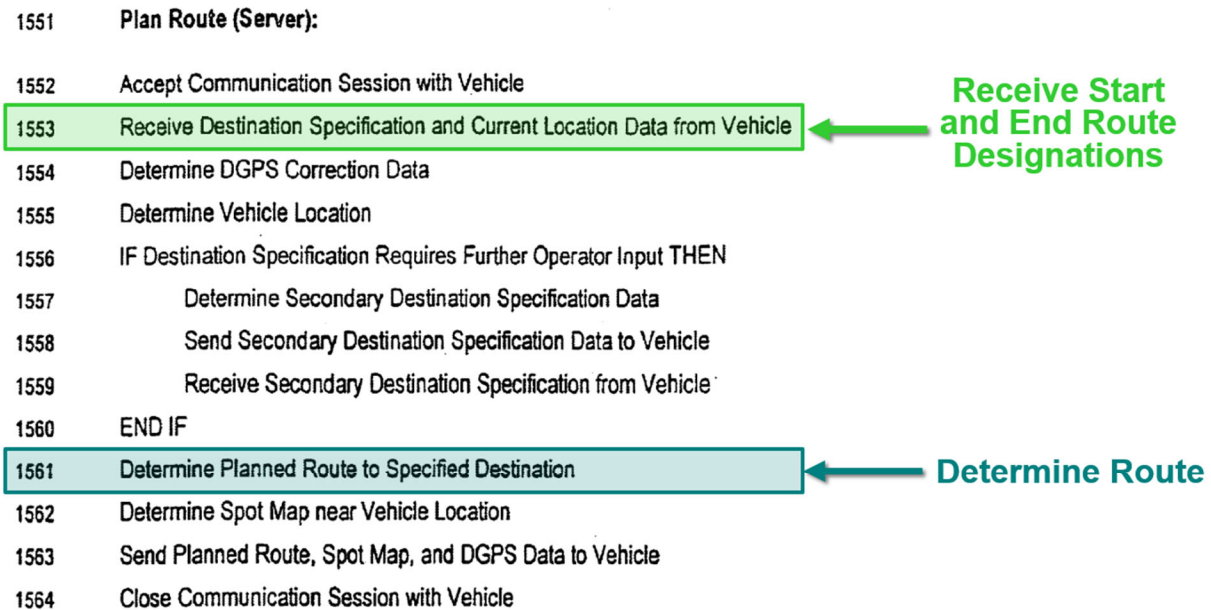


FIG. 15B

Knockeart's route is calculated based on "external information" 130, including real-time "traffic-related information," as discussed for Element 1[c]. *Id.*, 8:53-60. The route is "optimal" under the district court's construction of "recommended route obtained using a set of criteria," because it is recommended based on various criteria, such as "fastest route," "smallest total distance," "shortest expected travel time," and/or avoiding "congested" routes or "toll fees." *Id.*, 8:53-60, 10:43-47, 28:64-29:15, 43:33-38; Ex-1002 ¶142.

f. Element 1[e]: formatting the optimal route into a non-proprietary, natural language description;

Knockeart-McGrath teaches Element 1[e]. Ex-1002 ¶¶143-153.

Knockeart's route is formatted as links connected by nodes (annotated in Figure 8, below), where nodes correspond to “maneuvers” that the vehicle operator must carry out. Ex-1005, 10:55-11:4.

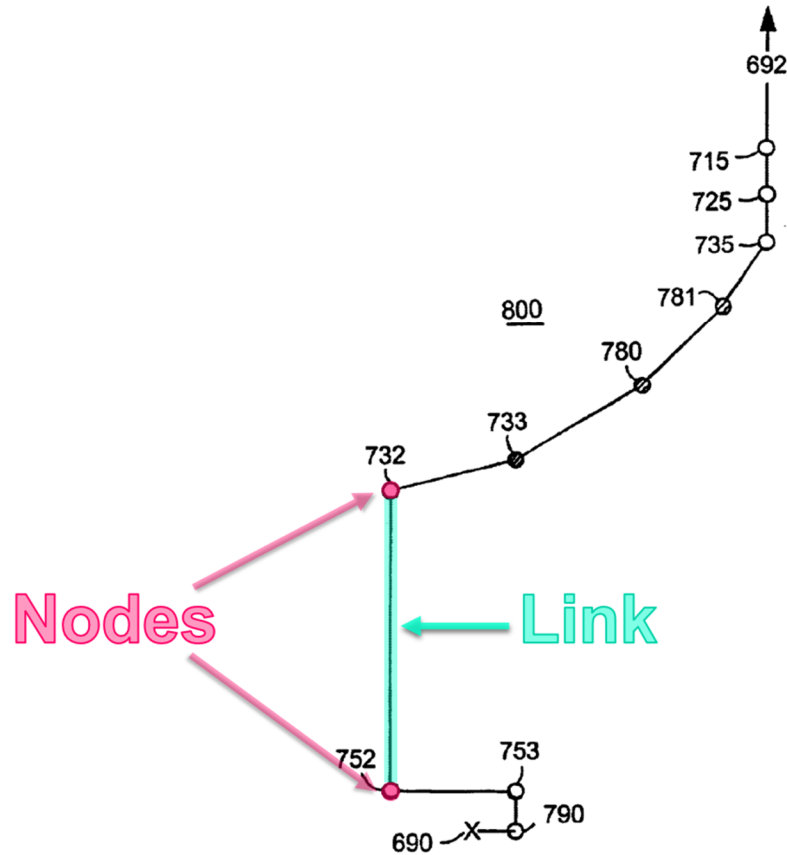


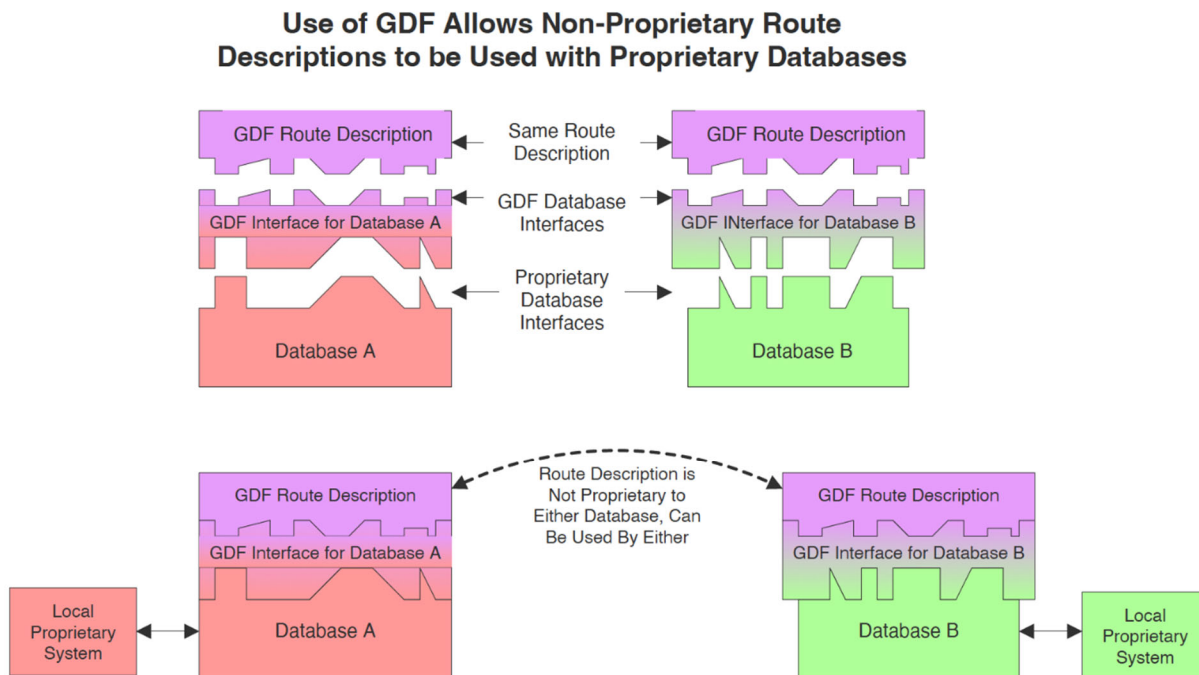
FIG 8

As explained in §XIII.A.1, Knockeart's route is calculated using data formatted according to “*the Geographic Data File (GDF) format, an international standard format.*” *Id.*, 15:67-16:13. A POSITA would have understood that the calculated route would also be formatted according to GDF. Ex-1002 ¶145; Ex-1005, 8:44-52, 15:42-58, 15:66-16:13, 29:15-60, 29:61-30:17, Figs. 8-9. Notably,

Knockeart explains that both the GDF-formatted map data and the calculated route include nodes connected by links. Ex-1005, 15:67-16:13 (“map in GDF format includes ... links and nodes”), 29:17-29 (route includes “a sequence of links” joined by nodes). Further, as explained in §XIII.A.1, Knockeart’s route includes information that McGrath teaches may be formatted according to GDF. *Compare* Ex-1005, 29:27-36, *with* Ex-1006, Table 1.

The GDF format used for Knockeart’s route is “non-proprietary” under the district court’s construction of a “format that can be used with mapping databases provided by other manufacturers.” Ex-1002 ¶146. As Petitioner’s expert explains, GDF was designed to be a “public open standard for describing and exchanging geographic data.” *Id.*, ¶146; *see also id.*, ¶¶74-95. Work on GDF started in the 1980s in Europe, with GDF 1.0 released in 1988 by the Committee of European Normalisation (CEN) Technical Committee 278, Working Group 7 (TC278/WG7), which had representatives from most of the 34 European Union nations, predominantly members of various European car makers and suppliers. *Id.* By 1996, three years before the ’743 Patent’s filing date, GDF 3.0 was released in a technical report by the International Organization for Standardization (“ISO”), as ISO TR14825:1996. *Id.* Thus, by 1996, the GDF format was well-known, industry-wide. *Id.*

GDF defines “an exchange format” that may be used to exchange mapping data between databases from different manufactures, thereby “avoid[ing] compatibility problems” that may otherwise arise due to differences in manufacturer formats. *Id.*, ¶147. As Petitioner’s expert explains, this is accomplished through the use of a “bi-directional interface,” illustrated in the below diagram, which translates between the GDF format and a manufacturer-specific (e.g., proprietary) format. *Id.*



Such translation is consistent with the '743 Patent’s description of the use of its non-proprietary format, where an “algorithm stored on the client” is used to convert a non-proprietary, natural language description into “the format required by the client.” Ex-1001, 3:34-45.

GDF is also a “natural language” format under the district court’s construction of “natural language” as “includes language spoken or written by humans.” Ex-1002 ¶149; *see also id.*, ¶¶74-95. Each link in Knockeart’s route includes “text fields,” such as “the name of the street associated with the link” and “the name of the street to be turned onto at the next maneuver point.” Ex-1005, 29:24-55. Street names correspond to language spoken or written by humans. Ex-1002 ¶149. Indeed, this information is similar to that of the ’743 Patent’s natural language format. Ex-1001, Fig. 5 (illustrating the use of street names and turning orientations as examples of natural language descriptions); Ex-1002 ¶149.

As explained in §XIII.A.1, a POSITA would have been motivated to combine Knockeart with McGrath. McGrath provides more details and examples of the GDF format, presenting GDF as an example of a “non-proprietary” format according to which “transaction updates,” for updating geographic data sets, are formatted. Ex-1006, 3:30-50, 13:9-29.

McGrath explains that GDF is “especially suitable for transferring geographical data sets from another format or to another format.” *Id.*, 3:39-42. Accordingly, “the GDF format may be used for transferring or providing geographical data sets from one entity to another entity,” *even though the entities may store the geographical data in different formats* (e.g., different proprietary formats). *Id.*, 3:42-60, 13:14-20. A POSITA would thus have understood the GDF

format in McGrath's system is agnostic to the client's particular database, format, and manufacturer. Ex-1002 ¶151.

McGrath explains that GDF is a "natural language" format under the district court's construction. *Id.*, ¶152. McGrath explains that a GDF-formatted data set includes "[e]lements," which "are classified into objects and their respective characteristics." Ex-1006, 4:54-60. McGrath provides examples of objects, including "'Road Element' object," "Node" object, and "'Prohibited Turn' relationship" object. *Id.*, Table 1, 6:59-63. McGrath explains that each object is associated with "characteristics," such as "text of a name" and/or "descriptive information." *Id.*, 5:17-50. Text in the form of "a name" and "descriptive information" (illustrated below for a "Road Element" and a "Route Identifier characteristic (characteristic type RT)," *id.*, 5:39-51, 7:50-60) is "natural language" because it "includes language spoken or written by humans." Ex-1002 ¶¶152-153.

object 1001,
characteristic RT, now has the value "US-101
North"

**Natural Language
Descriptions**

TABLE 1

Examples of Characteristics

Object	Characteristic Type	Characteristic Value
Road Element Node	Road Width X-Coordinate	6 Metres 12.34567° North

Examples of “natural language” GDF route descriptions provided by McGrath also include a “Name Attribute” characteristic, such as “Main Street,” “First Avenue,” “I-95,” etc., and a “Turn Restriction Attribute” characteristic such as “none,” or “left turn prohibited.” Ex-1006, 7:41-45, 7:65-67, Table 2.

g. Element 1[f]: downloading said non-proprietary, natural language description to the client;

Knockeart-McGrath teaches Element 1[f]. Ex-1002 ¶¶154-155.

Knockeart teaches this limitation under the district court’s construction of “the server sending the non-proprietary, natural language description and the client receiving the non-proprietary, natural language description.” *Id.*, ¶155. As annotated in Figures 15A-B below, Knockeart’s “server... transmits the computed route to the in-vehicle system [i.e., the client],” where it is received. Ex-1005,

Abstract; *id.*, 10:55-11:4 (route “is *downloaded from the server system to the in-vehicle system*”).

1551 **Plan Route (Server):**
1552 Accept Communication Session with Vehicle
1553 Receive Destination Specification and Current Location Data from Vehicle
1554 Determine DGPS Correction Data
1555 Determine Vehicle Location
1556 IF Destination Specification Requires Further Operator Input THEN
1557 Determine Secondary Destination Specification Data
1558 Send Secondary Destination Specification Data to Vehicle
1559 Receive Secondary Destination Specification from Vehicle
1560 END IF
1561 Determine Planned Route to Specified Destination
1562 Determine Spot Map near Vehicle Location
1563 Send Planned Route, Spot Map, and DGPS Data to Vehicle
1564 Close Communication Session with Vehicle

FIG. 15B

Server sends
GDF-formatted
route

1501 **Plan Route (In-Vehicle):**
1502 Accept Destination Specification from Operator
1503 Determine Current Location Data
1504 Establish Communication Session with Server
1505 Send Destination Specification and Current Location Data to Server
1506 IF Destination Specification Requires Server Interaction THEN
1507 Accept Secondary Destination Specification Data from Server
1508 Accept Secondary Destination Specification from Operator
1509 Send Secondary Destination Specification to Server
1510 END IF
1511 Wait for Server Response
1512 Receive Planned Route, Spot Map, and Differential GPS Data from Server
1513 Close Communication Session with Server

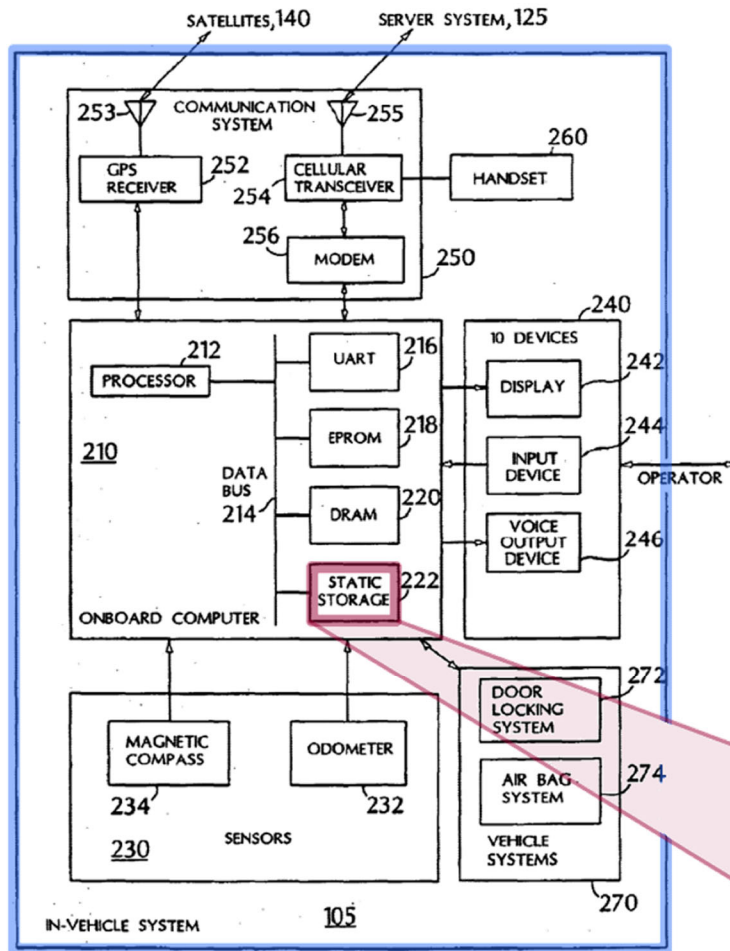
FIG. 15A

In-vehicle
system receives
GDF-formatted
route

h. Element 1[g]: reconstructing the optimal route by the client using a local mapping database; and

Knockeart-McGrath teaches Element 1[g]. Ex-1002 ¶¶156-161.

Knockeart’s in-vehicle unit (“client”) includes a database (annotated in Figures 2 and 4B, below) “to *store map-related information, such as main roads network* ... which is used during route planning and guidance procedures executed on onboard computer 210.” Ex-1005, 13:12-22, 6:4-12 (in-vehicle “storage for a map database”).



In-Vehicle System (Client)

FIG. 2

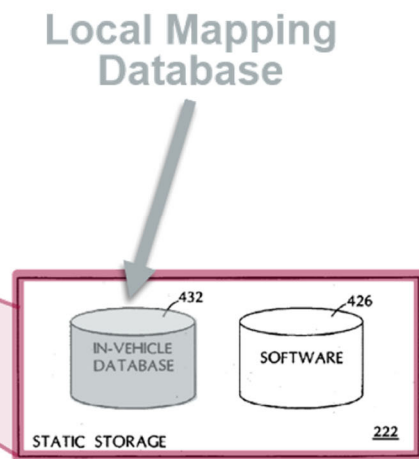


FIG. 4B

Knockcart teaches using this local database to reconstruct the optimal route. Ex-1002 ¶¶158-161.

First, the local database can be used to reconstruct the route during the guidance phase. *Id.*, ¶159. Specifically, Knockcart explains that “the system can take advantage of data in the in-vehicle database to reduce the amount of data” transmitted from the server to the client during this process, “by referencing stored street names or by using references to nodes in the main roads database network that is already stored in the vehicle.” Ex-1005, 29:65-67.

Second, Knockeart teaches that, when the vehicle diverges from the planned route, the in-vehicle system uses “the main roads map” in the local database to determine an updated optimal path that joins the originally-planned route at a point therein. *Id.*, 12:6-13, 12:22-26. In order to do this, Knockeart’s in-vehicle system must have first represented the original route provided by the server using the local database (i.e., “reconstruct[] ... using a local mapping database”), as illustrated in Figure 10 (annotated, below). Ex-1002 ¶160.

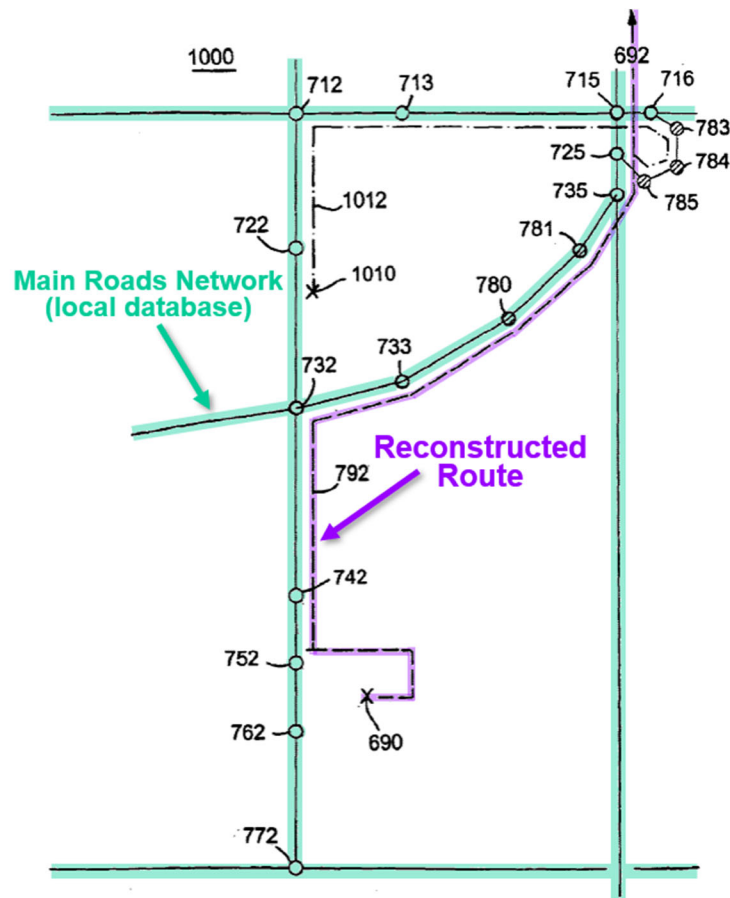


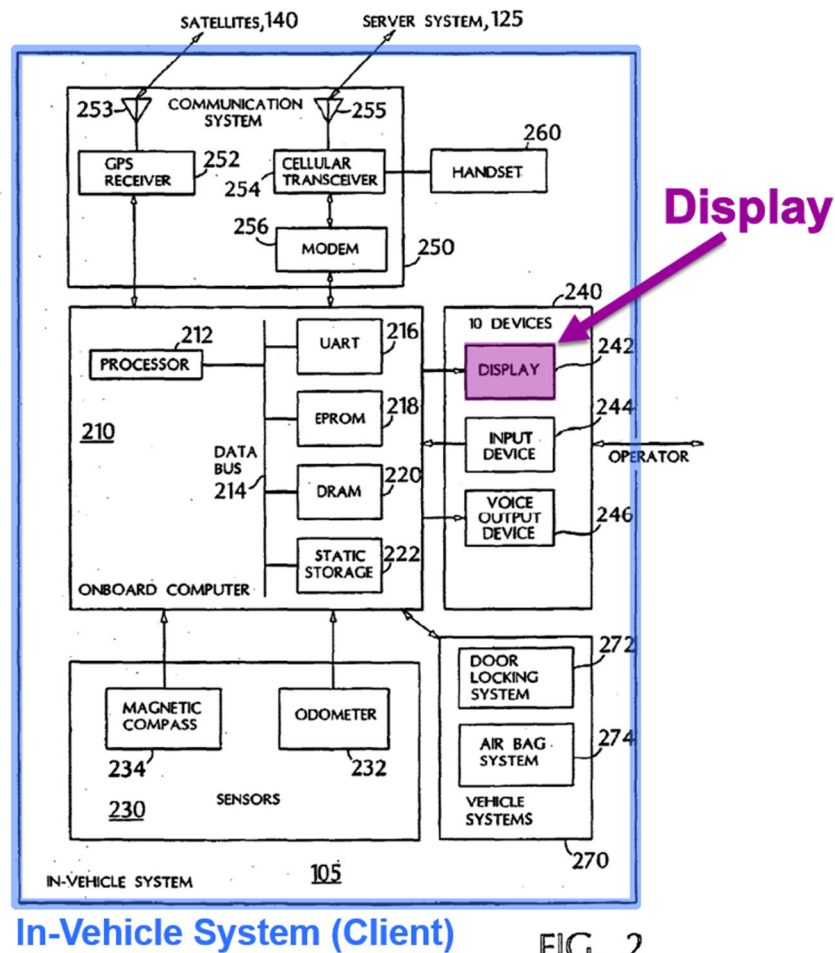
FIG 10

Third, Knockeart teaches that the in-vehicle system tracks the vehicle location and “displays the tracked location in conjunction with [a] spot map” (i.e., reconstructs the route). Ex-1005, 11:52-64. When the spot maps are downloaded from the server and stored on the client, they become part of the “local mapping database.” *Id.*, 11:19-32. Further, when a spot map is not available, a POSITA would have understood that the in-vehicle system would “reconstruct[]” the route by displaying the vehicle’s tracked location together with the locally-stored “preloaded main roads network,” as illustrated in annotated Figure 10, above. *Id.*, 11:65-12:5; Ex-1002 ¶161.

i. Element 1[h]: displaying said optimal route on a display system coupled to the client.

Knockeart-McGrath teaches Element 1[h]. Ex-1002 ¶¶162-164.

Knockeart’s in-vehicle unit includes a display system, annotated in Figure 2, below:



In-Vehicle System (Client)

FIG. 2

Knockeart's in-vehicle display "provide[s] a detailed map display to the operator that *can be used to provide map-based directions to the operator.*" Ex-1005, 13:40-54. For instance, the display presents "the initial portion of the planned route to the operator" on a map around the starting location. *Id.*, 11:38-43, 56-60.

3. Dependent Claims 2-7, and 12-14

- a. **Claim 2:** The method of claim 1, wherein said step of formatting includes the step of dividing the optimal route into one or more links, wherein each link includes at least a street name and a turning orientation.

Knockeart-McGrath teaches Claim 2. Ex-1002 ¶¶165-169.

Knockeart's route is formatted as "a sequence of links joined by nodes." Ex-1005, 10:55-57, Fig. 8. Each link includes at least a street name (e.g., "the name of the street associated with the link, and the name of the street to be turned onto at the next maneuver point") and a turning orientation (e.g., "turn left onto road 635," "messages such as 'turn right,' 'keep left,' etc.," the angle associated with the maneuver). *Id.*, 10:59-63, 29:31-32, 29:50-60.

- a. **Claim 3: The method of claim 2, wherein said step of reconstructing includes the steps of: searching said local mapping database for a closest match of said street name and said turning orientation for each of said links; and building the optimal route by combining each of said closest matches from said searching step.**

Knockeart-McGrath teaches Claim 3. Ex-1002 ¶¶170-178.

Knockeart-McGrath teaches searching the main roads network ("local mapping database") for a closest match of said street name. *Id.*, ¶¶171-175. Specifically, Knockeart explains that "the system can take advantage of data in the in-vehicle database to reduce the amount of data [downloaded from the server] ... by referencing stored street names ... in the main roads network that is already stored in the vehicle." Ex-1005, 29:61-67. A POSITA would have understood that this would involve searching the main roads network for "the name of the street" entering each maneuver point and "the name of the street to be turned onto at [that] maneuver

point” (*id.*, 29:50-55), to locate the maneuver point within the local database to display the route to the vehicle operator (i.e., reconstruct the route using the local database). Ex-1002 ¶174. In order to accommodate minor differences in how street names are stored (e.g., Avenue versus Ave.), a POSITA would have understood that such searching would involve searching for “a closest match.” *Id.*, ¶175.

Knockeart-McGrath also teaches searching the in-vehicle database for a closest match of said turning orientation. *Id.*, ¶¶176-177. Knockeart teaches sending “data related to the angles at which the intersecting streets join at the maneuver point, thereby allowing a relatively accurate graphical representation of the maneuver to be displayed.” Ex-1005, 29:56-60. A POSITA would have recognized that generating a graphical representation of a maneuver from a received angle in an efficient manner would have been done by searching locally-stored graphical representations of possible turning angles for a closest match to the received angle, and displaying that closest match. Ex-1002 ¶177 (explaining it was well-known to reconstruct routes using locally-stored graphical elements).

Finally, a POSITA would have understood that, where the route is confined to roads present in the main roads network, the entire route would be reconstructed in the above-described manner, by “combining each of said closest matches from said searching step.” *Id.*, ¶178.

- b. **Claim 4: The method of claim 1, wherein said accessing step comprises the step of accessing a traffic database comprising current traffic conditions; and querying said traffic database for determining current traffic conditions between locations defined by said start and end route designations.**

Knockeart-McGrath teaches Claim 4. Ex-1002 ¶¶179-180.

As explained for Element 1[c], Knockeart's server accesses an external traffic database containing traffic-related information "to determine a fastest route from a starting to a destination location." Ex-1005, 8:53-60. Obtaining traffic-related information to determine a fastest route requires querying the database for traffic conditions at locations along potential routes ("between locations defined by said start and end route designations") to evaluate which potential route is the fastest, because the travel time for a potential route will depend on traffic conditions. Ex-1002 ¶180.

- c. **Claim 5: The method of claim 1, wherein said real-time information includes one or more from the set of: current traffic conditions; highway ramp configurations; current weather conditions; constriction information; road restrictions; detour information; and event traffic information.**

Knockeart-McGrath teaches Claim 5. Ex-1002 ¶¶181-182.

As explained for Claim 4, Knockeart's server accesses real-time traffic information corresponding to "the *current traffic conditions* on the operator's trips."

Ex-1005, 8:53-60, 41:5-8. The traffic information also includes start/stop times for morning and evening “rush ‘hour’” events. *Id.*, 34:61-65.

d. Claim 6: The method of claim 1, wherein said wireless connection is accomplished using a cellular network.

Knockeart-McGrath teaches Claim 6. Ex-1002 ¶183. Knockeart’s in-vehicle system and server may communicate “over *a cellular telephone system.*” Ex-1005, Abstract, 8:15-20.

e. Claim 7: The method of claim 1, wherein said transmitting step includes the step of entering into a keypad data entry field, said start and stop route designations including a name for one or more of: a city; a state; a country; and a street.

Knockeart-McGrath teaches Claim 7. Ex-1002 ¶¶184-185.

Knockeart teaches a keyboard or keypad for entering a destination, including a “*city, street*, and number” of a street address. Ex-1005, 13:55-14:6 (“alphanumeric keyboard”), 25:27-29. While the current location is typically used as the starting point, Knockeart also recognizes that in other navigation systems “*the operator inputs* the desired destination [] and *the current location.*” *Id.*, 1:23-25. A POSITA would have recognized that enabling the operator to enter the starting point (as Knockeart recognizes was known) would improve Knockeart’s system by adding flexibility to the route-specification process. Ex-1002 ¶185. Further, Knockeart teaches enabling “an operator to specify a sequence of destinations” for a route “from the starting location to the first destination, and then from one destination to the

next.” Ex-1005, 44:4-12. Each user-specified intermediate destination could be viewed as a starting point for the next trip segment. Ex-1002 ¶185.

f. Claim 12: The method of claim 1, wherein said downloading step comprises the step of compressing said natural language description.

Knockeart-McGrath teaches Claim 12. Ex-1002 ¶186. Knockeart teaches that “[t]he planned route is downloaded as a sequence of route links *using a compressed format.*” Ex-1005, 29:24-55; *id.* 28:25-40 (client- and server-side modems negotiate a “compression” protocol for the data transmission).

g. Claim 13: The method of claim 1, wherein said calculating step further comprises the step of reading user-specific data in calculating the optimal route.

Knockeart-McGrath teaches Claim 13. Ex-1002 ¶¶187-188.

Knockeart employs user-specific data, such as alternative trips, to calculate the optimal route. Ex-1005, 41:21-22. Knockeart’s route-calculation process may consider user-specified preferences “such as *particular roads the user wants to avoid*” or “a time saving above which the user is willing to use a road that he or she otherwise wants to avoid.” *Id.*, 42:56-60.

h. Claim 14: The method of claim 1, wherein said computer network is the Internet.

Knockeart-McGrath teaches Claim 14. Ex-1002 ¶¶189-190.

Knockeart's server is connected to the Internet, over which it accesses "external information systems." Ex-1005, 15:30-33, Fig. 22, 42:28-30 (server is "coupled to the *Internet*").

4. Independent Claim 15

a. Element 15[pre]: A mobile navigation system comprising:

Knockeart-McGrath teaches Element 15[pre], to the extent it is limiting, for the reasons discussed for Element 1[pre].

b. Element 15[a]: a navigation computer;

Knockeart-McGrath teaches Element 15[a]. Ex-1002 ¶192. Onboard computer 210 of Knockeart's in-vehicle system, annotated in Figure 2 below, is a navigation computer, because it provides route guidance to a vehicle operator. Ex-1005, 6:12-18.

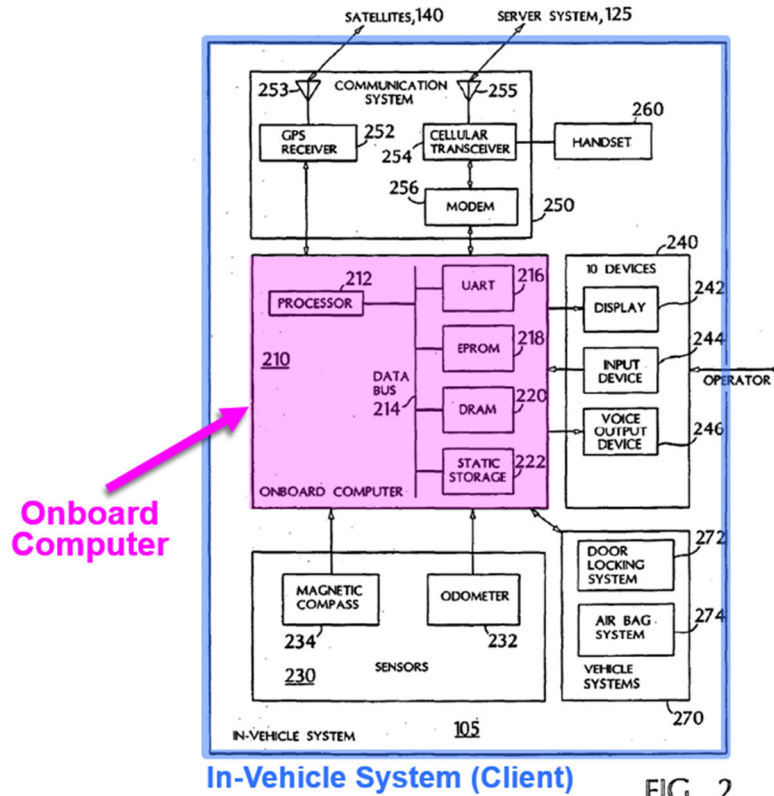
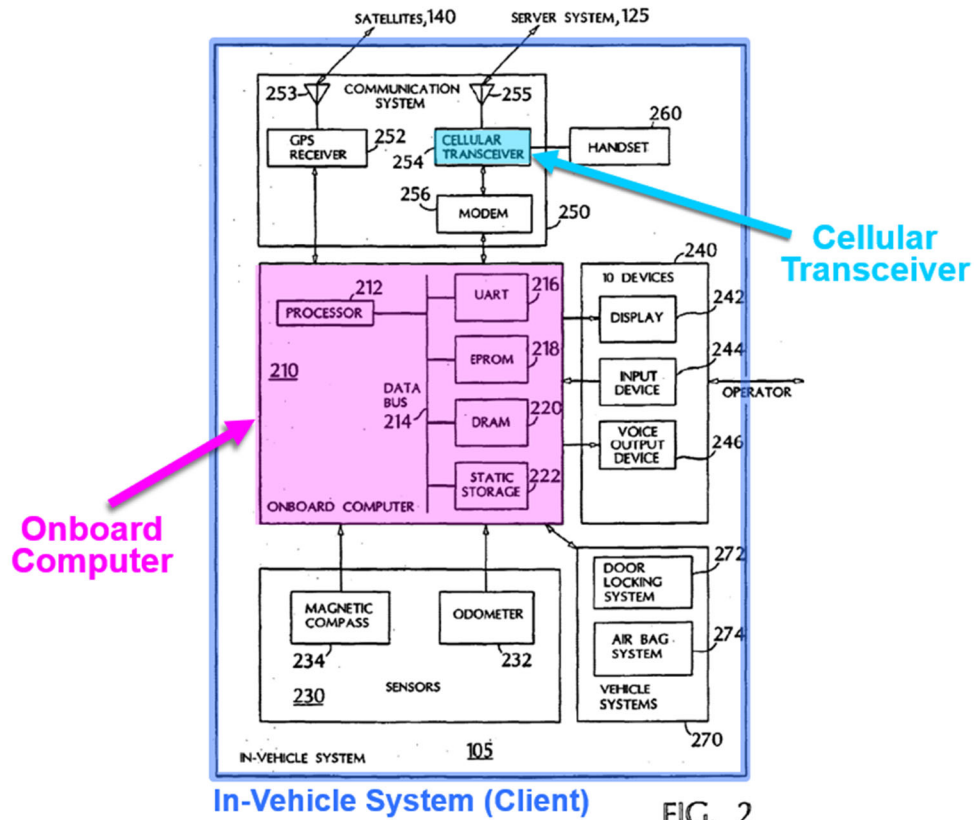


FIG. 2

- c. **Element 15[b]: a wireless transceiver coupled to said navigation computer for connecting with a navigation server, said navigation server for calculating optimal routes based on real-time information, said optimal routes being formatted using a non-proprietary, natural language description;**

Knockeart-McGrath teaches Element 15[b] for the reasons discussed for Elements 1[pre]-1[a] and 1[c]-[e], and the additional reasons below. Ex-1002 ¶¶193-194.

Knockeart's in-vehicle unit uses a "cellular transceiver" coupled to its onboard computer 210 ("navigation computer") (annotated in Figure 2, below) to communicate with the server. Ex-1015, 14:41-42.



- d. **Element 15[c]:** a mapping database coupled to said navigation computer for reconstructing said optimal route from said non-proprietary, natural language description; and

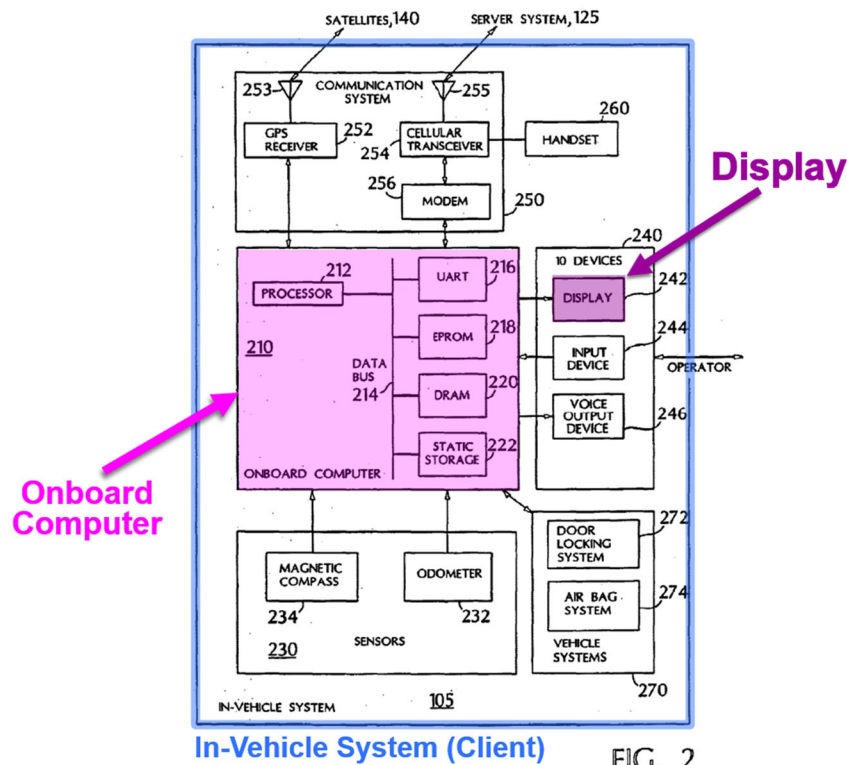
Knockeart-McGrath teaches Element 15[c] for the reasons explained for Element 1[g] and the additional reasons below. Ex-1002 ¶¶195-196.

Knockeart's "in-vehicle database 432" of static storage 222 is a mapping database. See §XIII.A.2.h. "Static storage 222 is a removable 40 MB flash memory system" that is "coupled" to processor 212 of onboard computer 210. Ex-1005, 13:12-22. Accordingly, static storage 222 is coupled to onboard computer 210 ("navigation computer"). Ex-1002 ¶196.

- e. **Element 15[d]: a display screen coupled to said navigation computer for displaying said optimal route using said mapping database.**

Knockeart-McGrath teaches Element 15[d] for the reasons explained for Element 1[h] and the additional reasons below. Ex-1002 ¶¶197-198.

Knockeart's in-vehicle unit "includes a display 242" coupled to its onboard computer 210 ("navigation computer") (annotated in Figure 2, below). Ex-1005, 13:40.



5. Dependent Claim 16

- a. **Element 16[a]: The mobile navigation system of claim 15, further comprising: a GPS receiver coupled to said navigation computer for monitoring position;**

Knockeart-McGrath teaches Element 16[a]. Ex-1002 ¶¶199-200.

Knockeart's in-vehicle unit "includes a GPS receiver 252" coupled to its onboard computer 210 ("navigation computer") (annotated in Figure 2, below). Ex-1005, 14:26-40.

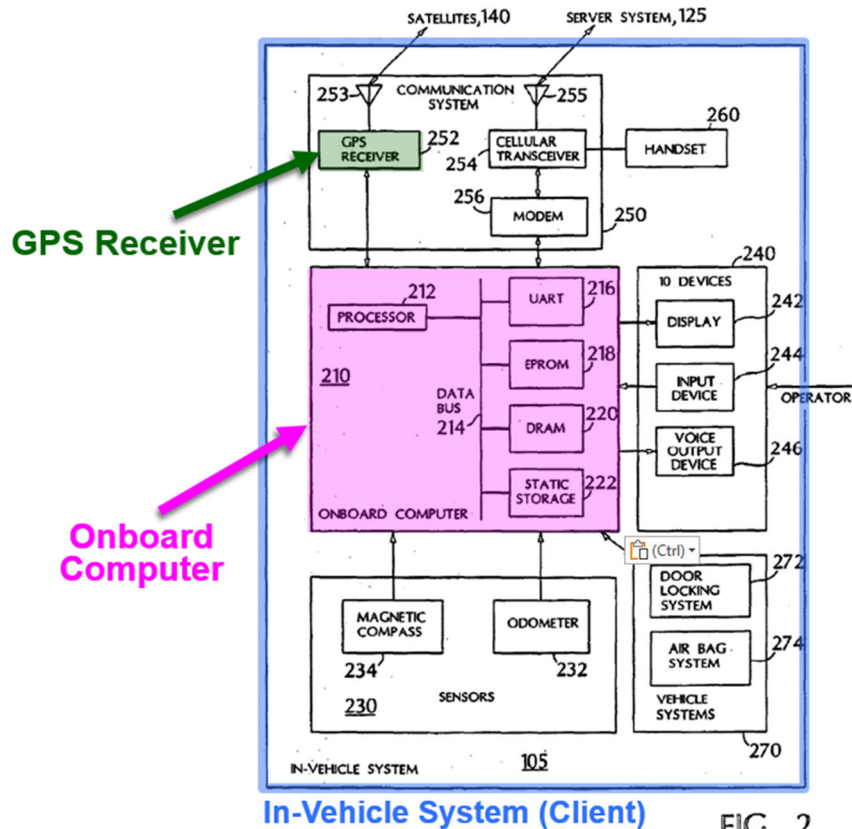


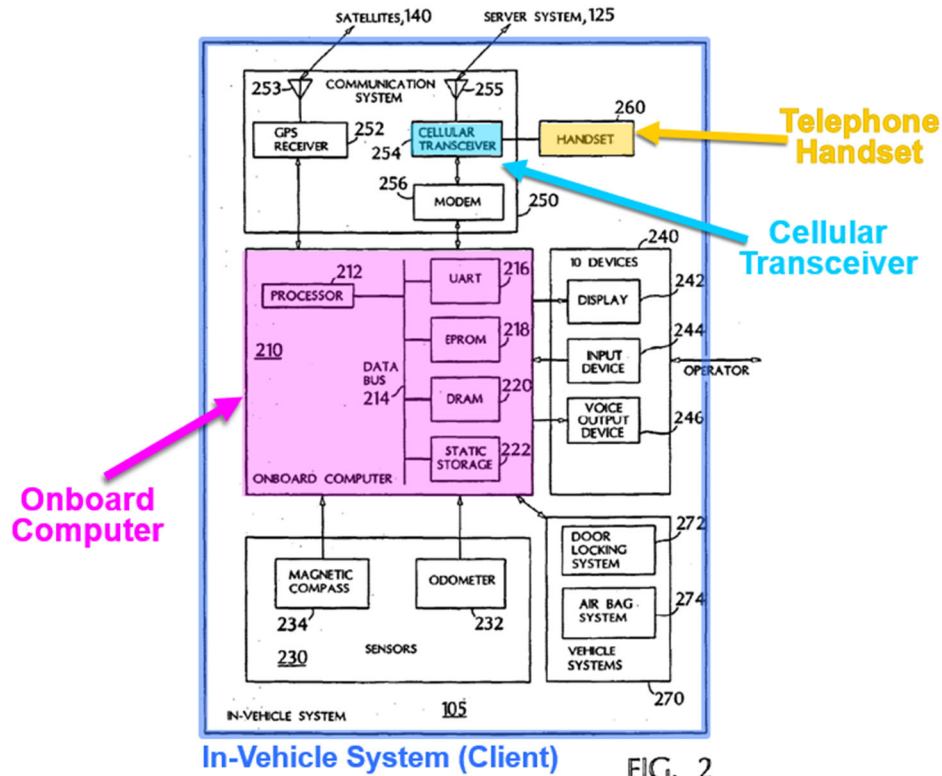
FIG. 2

- b. Element 16[b]: a telephonic device coupled to said wireless transceiver and said navigation computer for making and receiving telephone calls; and

Knockeart-McGrath teaches Element 16[b]. Ex-1002 ¶¶201-202.

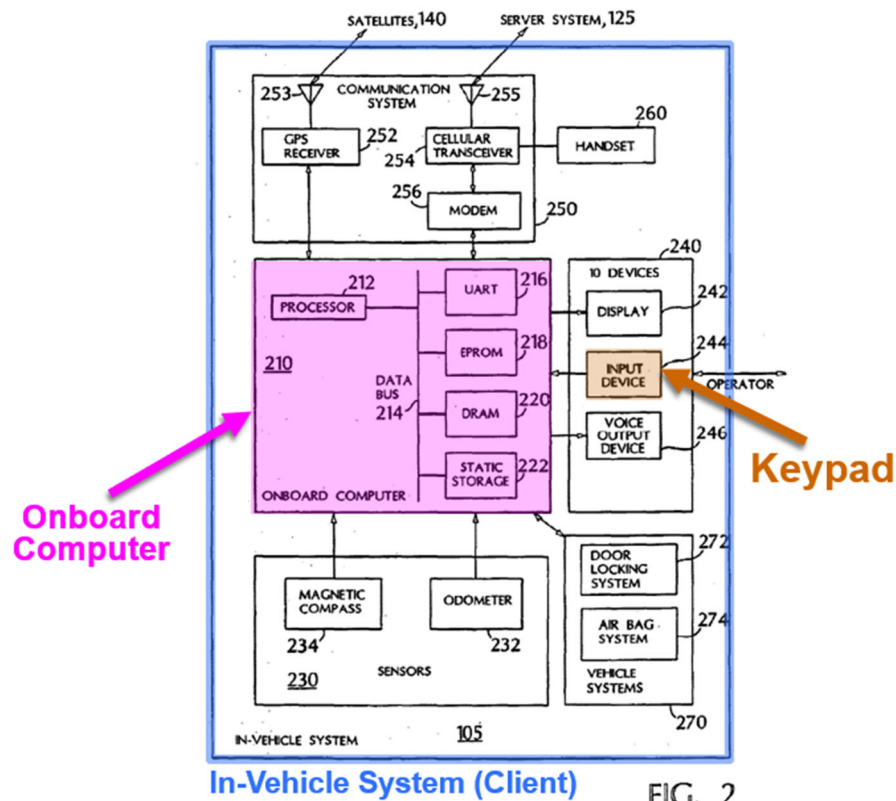
As annotated in Figure 2, below, Knockeart's in-vehicle system includes handset 260 coupled to transceiver 254, with which the vehicle operator can "place

standard telephone calls” and receive “inbound call[s].” Ex-1005, 14:48-51, 15:58-16:10.



- c. **Element 16[c]:** a keypad coupled to said navigation computer for entering start and end route designations.

Knockeart-McGrath teaches Element 16[c], for the reasons explained for Claim 7. Specifically, input device 244 of Knockeart’s in-vehicle unit (annotated in Figure 2, below) may be a keypad with “multiple push buttons,” or a keyboard, coupled to onboard computer 210. Ex-1005, 13:55-61; Ex-1002 ¶203.



6. Independent Claim 21

- a. **Element 21[pre]:** A method for providing an optimal route using real-time information from a server of a navigation system, the navigation system also comprising a client and said server coupled to a computer network, said method comprising the steps of:

Knockeart-McGrath teaches Element 21[pre], to the extent it is limiting, for the reasons explained for Element 1[pre].

- b. **Element 21[a]:** establishing a wireless connection with the client;

Knockeart-McGrath teaches Element 21[a] for the reasons explained for Element 1[a].

- c. **Element 21[b]: receiving at the server start and end route designations from the client;**

Knockeart-McGrath teaches Element 21[b] for the reasons explained for Element 1[b].

- d. **Element 21[c]: calculating at the server the optimal route based on real-time information at the server and said start and end route designations;**

Knockeart-McGrath teaches Element 21[c] for the reasons explained for Element 1[d].

- e. **Element 21[d]: formatting at the server the optimal route into a non-proprietary, natural language description;**

Knockeart-McGrath teaches Element 21[d] for the reasons explained for Element 1[e].

- f. **Element 21[e]: downloading from the server said non-proprietary, natural language description to the client**

Knockeart-McGrath teaches Element 21[e] for the reasons explained for Element 1[f].

- g. **Element 21[f]: so that the client can reconstruct the optimal route using a local mapping database**

Knockeart-McGrath teaches Element 21[f] for the reasons explained for Element 1[g].

- h. **Element 21[g]: and display said optimal route on a display system coupled to the client.**

Knockeart-McGrath teaches Element 21[g] for the reasons explained for Element 1[h].

7. Independent Claim 22

- a. Element 22[pre]: A method for providing an optimal route using real-time information at client of a navigation system, the navigation system also comprising a client and said server coupled to a computer network, said method comprising the steps of:**

Knockeart-McGrath teaches Element 22[pre], to the extent it is limiting, for the reasons explained for Element 1[pre].

- b. Element 22[a]: establishing a wireless connection with the server;**

Knockeart-McGrath teaches Element 22[a] for the reasons explained for Element 1[a].

- c. Element 22[b]: transmitting start and end route designations from the client to the server;**

Knockeart-McGrath teaches Element 22[b] for the reasons explained for Element 1[b].

- d. Element 22[c]: receiving from the server an optimal route formatted in a non-proprietary, natural language description and calculated based on real-time information and said start and end route designations;**

Knockeart-McGrath teaches Element 22[c] for the reasons explained for Elements 1[d]-[f].

- e. **Element 22[d]: reconstructing the optimal route using a local mapping database; and**

Knockeart-McGrath teaches Element 22[f] for the reasons explained for Element 1[g].

- f. **Element 22[e]: displaying said optimal route on a display system coupled to the client.**

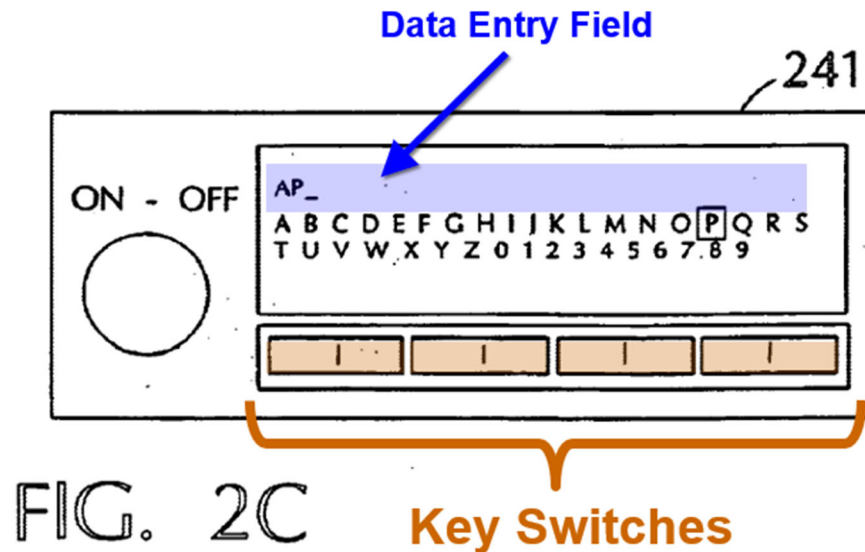
Knockeart-McGrath teaches Element 22[e] for the reasons explained for Element 1[h].

B. Ground 2: Claims 8-9 Are Obvious Over Knockeart-McGrath In View Of Geiser

1. **A POSITA would have been motivated to combine Knockeart-McGrath with Geiser and would have had a reasonable expectation of success**

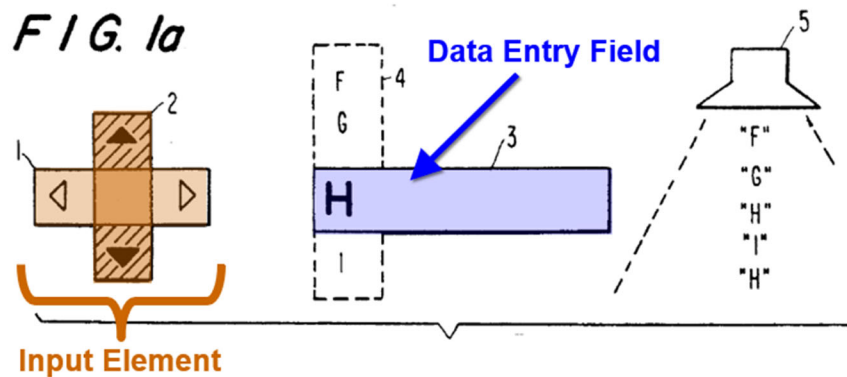
As explained in §XIII.A.1, a POSITA would have been motivated to combine Knockeart with McGrath. A POSITA would have been further motivated to combine Knockeart-McGrath with Geiser. Ex-1002 ¶¶218-224.

Knockeart uses a keypad (illustrated in annotated Figure 2C, below) for location entry. Ex-1005, 13:55-14:6, 25:44-46. For instance, “the operator enters letters of a spelling, or digits of a street address, by moving a cursor to a display of the desired letter or digit and selecting that letter or digit.” *Id.*, 26:2-6.



Knockeart teaches improving the efficiency of the location-entry process, explaining that a destination may be selected by “spelling a prefix of the name until it unambiguously specifies a full name.” Ex-1005, 25:65-26:2.

Geiser likewise discloses ways to expedite the location-entry process in a navigation system. Ex-1008, 1:55-58. Geiser uses an “input element” (illustrated in annotated Figure 1a, below) to enter an alpha-numeric location name (e.g., “place, street and street address”), by making “stepwise” selections of alpha-numeric characters. *Id.*, 2:43-45, 3:43-59, 3:61-64.



As will be explained for Claim 8 below, Geiser expedites the location entry process by narrowing the available characters from which to select, based on the already-entered characters. *Id.*, 1:68-2:3, 3:10-35.

A POSITA would have been motivated to modify Knockart's location-input method according to Geiser's teachings to further improve its efficiency. Ex-1002 ¶223. In particular, while Knockart teaches auto-completing a location name once a sufficient number of characters have been entered to "unambiguously" specify that name, a POSITA would have recognized that, for many locations, a user would still need to input a significant number of characters before an unambiguously specified entry is found. Ex-1005, 25:65-26:2; Ex-1002 ¶223. Accordingly, a POSITA would have been motivated to adopt Geiser's teachings to reduce the number of characters that must be selected from, and then entered before the system identifies the intended location.

A POSITA would have had a reasonable expectation of success in implementing Geiser's location-entry method in the Knockart-McGrath system.

Ex-1002 ¶224. As illustrated in Knockeart's Figure 2C and Geiser's Figure 1a, above, both systems include keys for selecting characters and data entry fields for displaying the entered characters. *Id.* Accordingly, configuring Knockeart's system to perform Geiser's method would simply involve simple programming of Knockeart's in-vehicle system. *Id.*

2. Claim 8:

- a. Element 8[a]: The method of claim 7, wherein said step of entering comprises the steps of: comparing data entered into the keypad data entry field with a database of allowable entries;**

Element 8[b]: determining a set of conforming data items associated with said entered data;

Knockeart-McGrath-Geiser teaches Elements 8[a]-[b]. Ex-1002 ¶¶225-229.

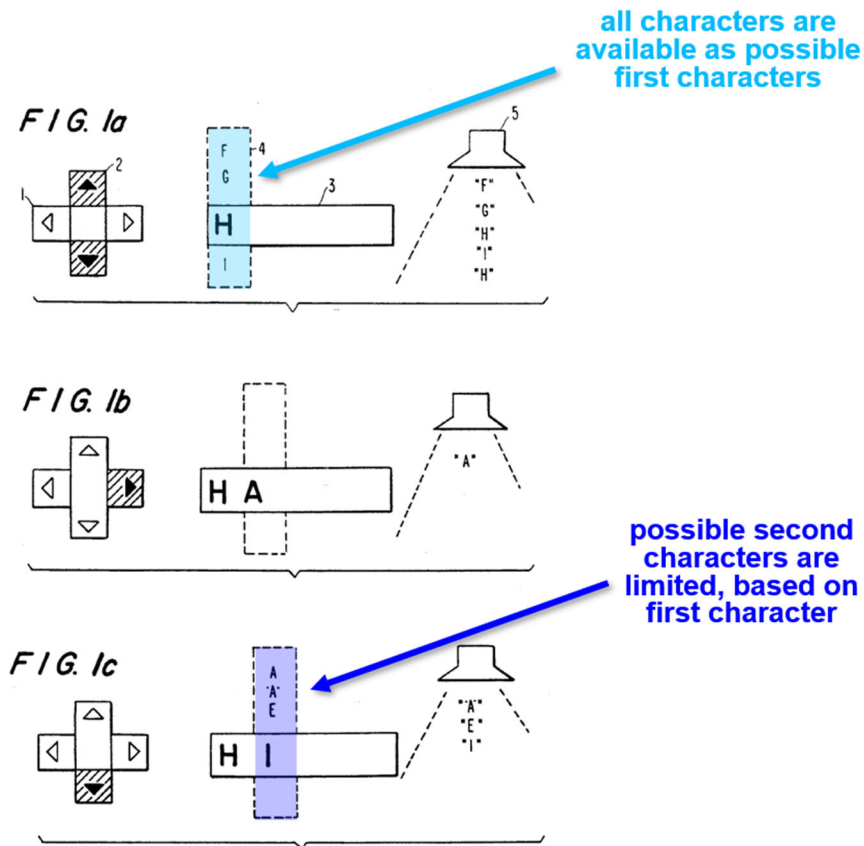
As explained in §XIII.B.1 (motivation to combine Knockeart-McGrath with Geiser), both Knockeart and Geiser disclose “keypad data entry fields.”

Each time a new character is entered in Geiser's data entry field, the set of entered characters is compared against destinations contained in a “destination list.” Ex-1008, 3:10-20. Geiser's “destination list” corresponds to a “database of allowable entries,” because it stores allowable destinations that may be entered by a user. Ex-1002 ¶227. While Geiser refers to the list as a “destination” list, a POSITA would have understood that the locations included within the list could equally be

used for starting points because the same location could both be a destination and a starting point (e.g., when leaving the destination). *Id.*

Geiser explains that this comparison is performed to shorten the time taken to enter a location (Ex-1008, 1:68-2:3), by “limiting the number of letters to be run through” during selection of the next character in the location name (*id.*, 3:10-16). Thus, for the next character that is to be selected, only those characters “which occur in this position in the subset of destination locations limited by the preceding letter positions” are presented to the user. *Id.*, 3:16-20. These characters correspond to “a set of conforming data items associated with said entered data.” Ex-1002 ¶¶228-229.

For example (see annotated Figures 1a-c, below), in response to a selection of “H” as the first character in the location name, the characters that may be selected as the second character are limited to only those that can possibly follow “H” in any potential location name. Ex-1008, 3:1-25, 4:2-8.



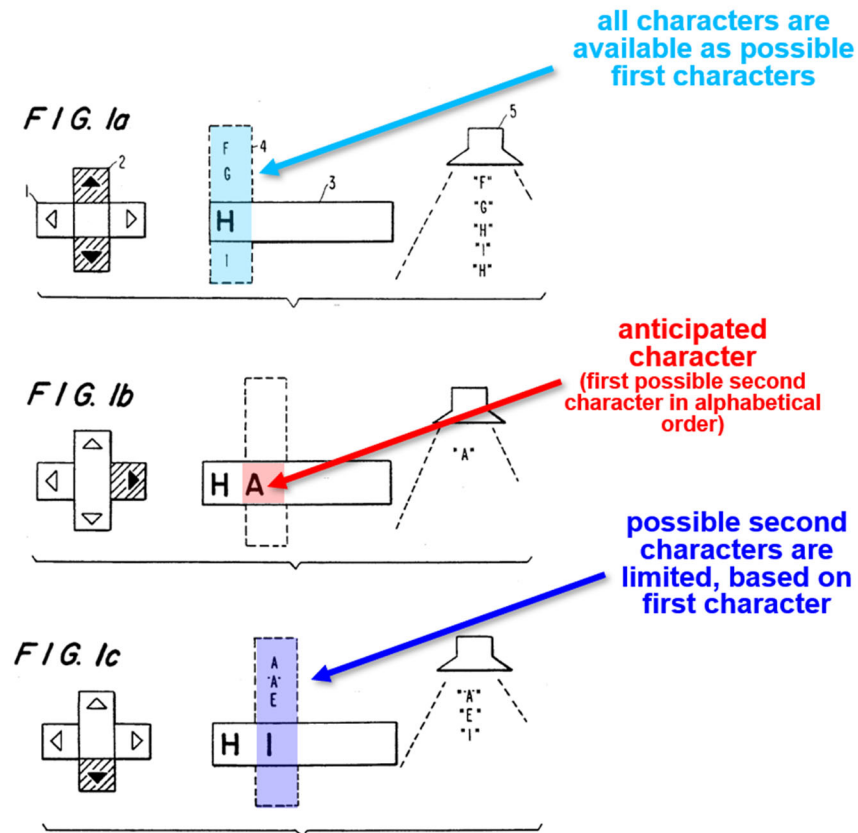
- b. **Element 8[c]:** applying a criterion to said set of conforming data items to determine an anticipated data item; and

Element 8[d]: displaying said anticipated data item in the data entry field.

Knockeart-McGrath-Geiser teaches Elements 8[c]-[d]. Ex-1002 ¶¶230-231.

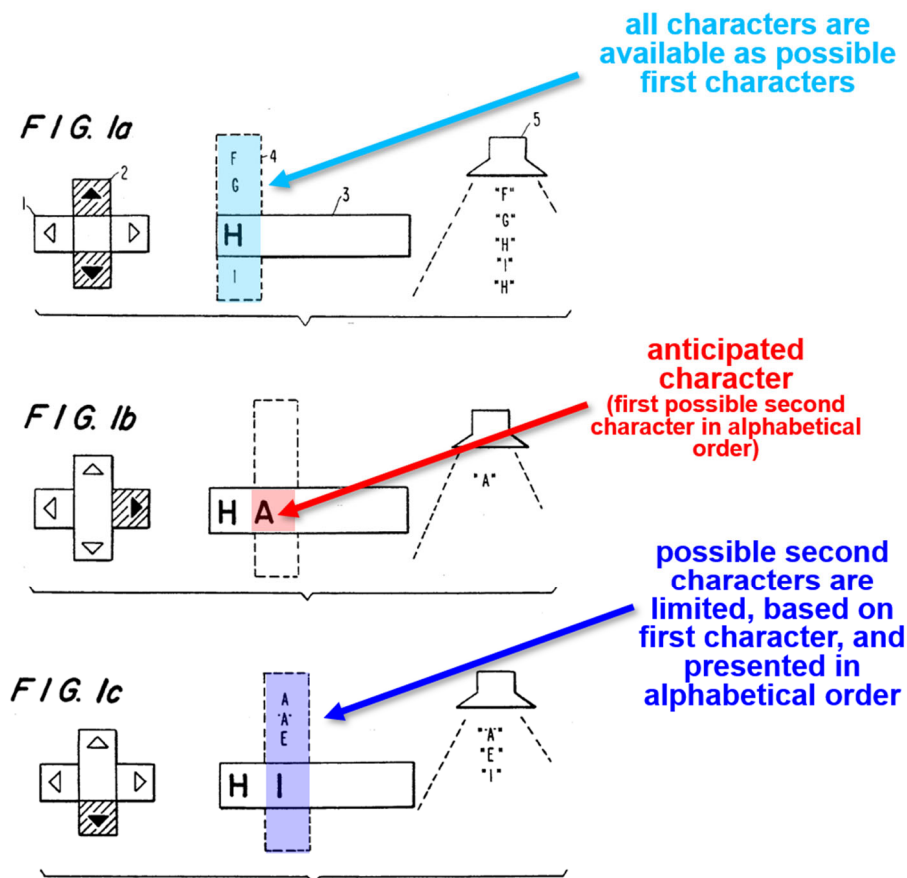
Geiser teaches that an alphabetical order criterion is applied to the set of conforming data items to determine an anticipated data item that is then displayed in Geiser's optical display ("data entry field"). *Id.*, ¶231. For instance, in annotated Figure 1b, below, the character "A" is displayed in Geiser's data entry field as the next anticipated character, where "A" corresponds alphabetically to the first

character in the list of characters that may follow the entered data, “H” (illustrated in annotated Figure 1c, below). *Id.*



3. **Claim 9: The method of claim 8, wherein said criterion defines a data item in said set of conforming data items that appears first alphabetically.**

Knockeart-McGrath-Geiser teaches Claim 9, for the reasons explained for Claim 8.



C. Ground 3: Claims 10-11 Are Obvious Over Knockeart-McGrath-Geiser In View Of Watanabe

1. Dependent Claims 10-11:

- a. Claims 10/11:** The method of claim 8, wherein said criterion defines a data item in said set of conforming data items that is used most [frequently/recently].

Knockeart-McGrath-Geiser-Watanabe teaches Claims 10-11. Ex-1002

¶¶233-237.

As explained in §XIII.B.1, a POSITA would have been motivated to combine Knockeart-McGrath with Geiser. A POSITA would have further been motivated to combine Knockeart-McGrath-Geiser with Watanabe. *Id.*, ¶¶234-237. Watanabe is

in the same field of art as Knockeart, McGrath, and Geiser, disclosing a vehicle navigation system with a “city name selection accelerator” that is designed to “simplify input operations of city names.” Ex-1009, Abstract.

Watanabe teaches applying criteria to the set of possible locations from which a user may select when requesting route guidance, to identify a subset of locations that the user is likely to select. *Id.* Specifically, Watanabe teaches presenting locations that “have been input in the past,” ordered according to the recency of their input (*id.*, 8:23-30), or their frequency (*id.*, 8:30-35).

A POSITA would have been motivated to use Watanabe’s recency and/or frequency criteria in Geiser’s location entry method to further Geiser’s stated goal of improving the efficiency of the location entry process (Ex-1008, 1:68-2:3). Ex-1002 ¶236. Specifically, a POSITA would have understood that additional efficiency gains could be achieved for Geiser’s method, by applying a recency/frequency criterion to the locations within Geiser’s list that conform with those characters already entered, to populate Geiser’s data entry field with the conforming location that is used “most frequently,” or “most recently.” *Id.* A POSITA would have had a reasonable expectation of success in doing so, as it amounts to a simple substitution of one known element (i.e., Geiser’s alphabetical criterion) for another (i.e., Watanabe’s frequency/recency criterion) to obtain predictable results (i.e., increased efficiency in the location-entry process). *Id.*, ¶237.

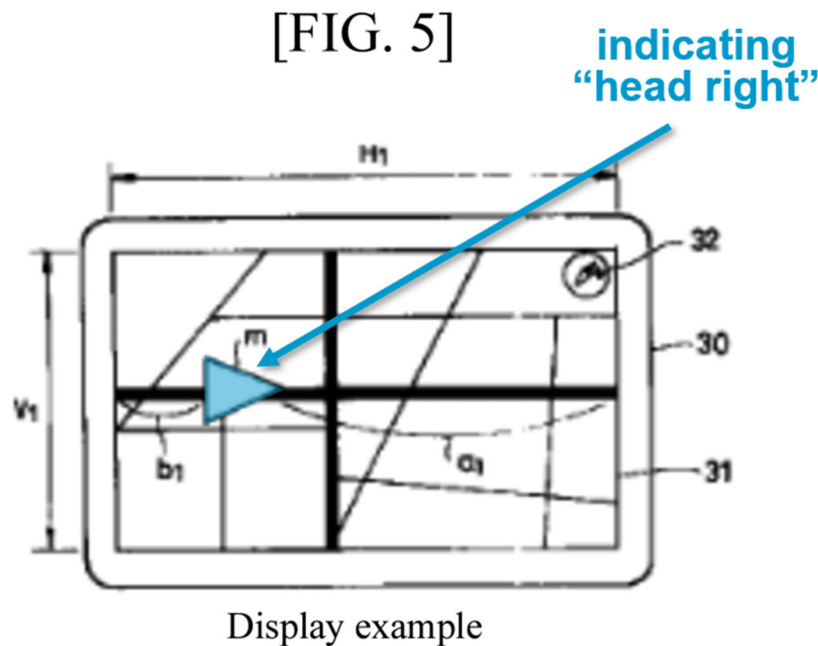
D. Ground 4: Claims 17-18 Are Obvious Over Knockeart-McGrath In View Of Nunokawa (Ex-1011)

1. Dependent Claims 17-18

- a. Claim 17-18: The mobile navigation system of claim 15, wherein said display screen is used to display the mapping database in a head [right/left] configuration.**

Knockeart-McGrath-Nunokawa teaches Claims 17-18. Ex-1002 ¶¶238-244.

Nunokawa teaches both a head right and a head left configuration for a map display screen. *Id.*, ¶¶239-241. For instance, Figure 5 of Nunokawa (annotated below) illustrates a head right configuration in which “the map is displayed having the right side of the screen set to the traveling direction.” Ex-1011, ¶27. A head left configuration can also be used, in which “the map may be displayed having the left side set to the same.” *Id.*



Nunokawa explains that displaying the road map in a head left/right configuration is advantageous for widescreen displays, as it “results in the amount of information being displayed ahead of the traveling direction to be increased” in comparison to a head North configuration. *Id.*, ¶25.

This increase in information improves “the operability of the navigation device,” by making it easy to confirm the next road to proceed on from the displayed screen” and reducing the frequency of scrolling and/or changing the scale of the map to see the upcoming road. *Id.*, ¶26.

A POSITA would have understood that vehicle displays may come in different shapes and would have been motivated to implement Nunokawa’s head right/left configurations in Knockeart’s in-vehicle unit display, when that display is wider than it is tall. Ex-1002 ¶244. Specifically, a POSITA would have understood that displaying a route in a head right/left configuration, as taught by Nunokawa, when Knockeart’s display is wider than it is tall, will improve the “operability” of the in-vehicle unit and increase the amount of travel information, as taught by Nunokawa. Ex-1011, ¶26; Ex-1002 ¶244.

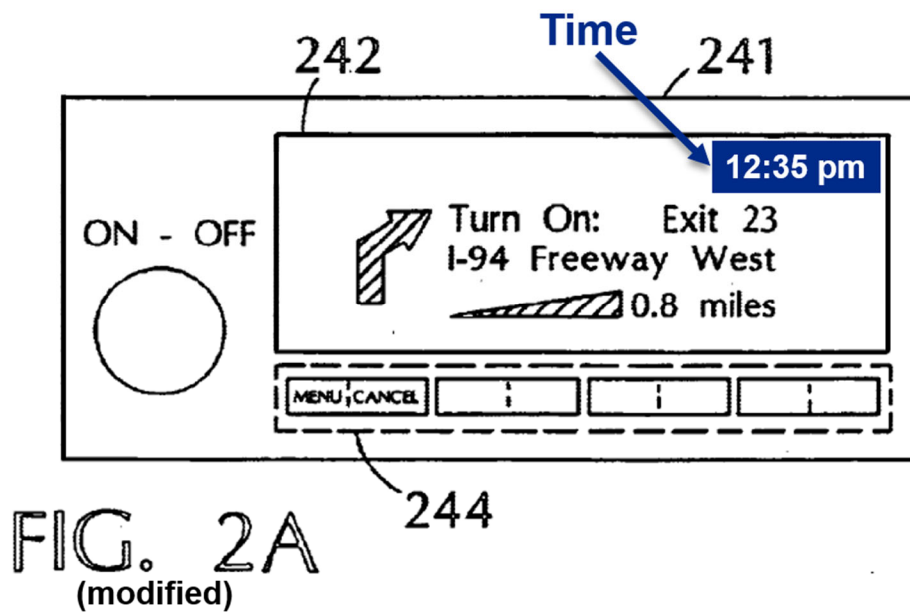
E. Ground 5: Claim 19 Is Obvious Over Knockeart-McGrath In View Of Endo (Ex-1013)

- 1. Claim 19: The mobile navigation system of claim 16, further including a clock coupled to said navigation computer, wherein said navigation computer is programmed to set said clock to an accurate local time in accordance with a time from said GPS receiver and a current time zone.**

Knockeart-McGrath-Endo teaches Claim 19. Ex-1002 ¶¶245-250.

Endo teaches correcting date/time data displayed on a portable navigation device. Ex-1013, ¶11. Endo uses a vehicle's current position, obtained using GPS, to identify the time zone in which the vehicle is currently located, and then using a "time difference" to correct the date/time displayed by the navigation device, when that date/time corresponds to a different time zone. *Id.*, ¶5. A POSITA would have understood that when this method is used to correct the date/time generated by a digital clock and displayed on the navigation system display, the clock is "coupled to said navigation computer." Ex-1002 ¶¶246-247.

A POSITA would have been motivated to implement Endo's date/time correction method in Knockeart's system. *Id.*, ¶248. Knockeart and Endo are analogous art, both directed to vehicle navigation systems. *Id.* A POSITA would have recognized that navigation systems often display date/time information together with a route (as illustrated, e.g., in modified Figure 2A, below). *Id.*, ¶¶248-249.



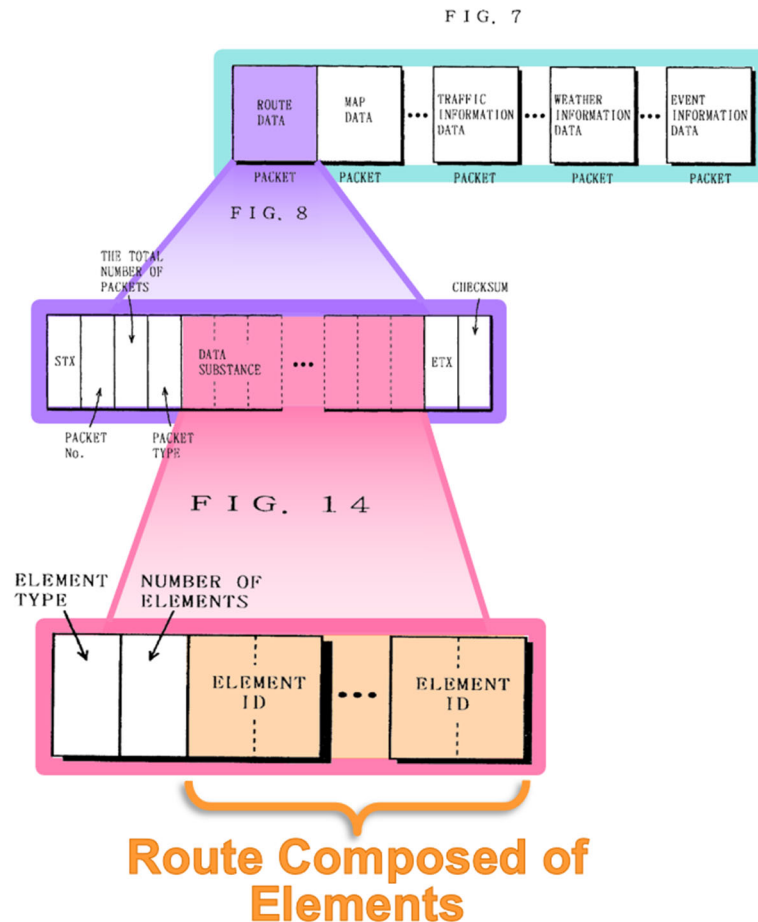
A POSITA seeking to include such data/time display in Knockeart's in-vehicle unit would have turned to Endo for implementation details. *Id.* Specifically, a POSITA would have recognized that implementing Endo's clock correction method within Knockeart's mobile terminal would provide the expected benefit of automatically correcting the remote terminal's time in a "convenient" and "simple" manner. Ex-1013, ¶¶5-6; Ex-1002 ¶250.

F. Ground 6: Claims 1-2, 4-7, 13-16, and 21-22 Are Obvious Over Nakano (Ex-1007) In View Of McGrath

1. A POSITA would have been motivated to combine Nakano with McGrath with a reasonable expectation of success

Nakano discloses a client-server navigation system, in which the server calculates "optimum" routes between client-specified locations. Ex-1007, Abstract, 11:63-12:6, 15:48-53. Nakano teaches transmitting the calculated routes to the client

in a format designed to reduce telecommunications costs. *Id.*, 16:3-5. Specifically, Nakano's route is formatted according to a set of element IDs (illustrated in Figures 7, 8, and 14, modified/combined below). *Id.*, 15:64-16:6.



McGrath similarly teaches the use of IDs for identifying map-related information as part of its GDF format. Ex-1002 ¶252. As explained in §XIII.A.1, McGrath teaches that geographic data formatted according to the GDF standard includes “[e]lements,” which “are classified into objects and their respective characteristics.” Ex-1006, 4:54-60. Each GDF object is assigned an “explicit Object

ID,” which “unambiguous[ly] identifi[es]” the object within the GDF-formatted dataset. *Id.*, 5:52-6:2, 7:50. McGrath explains that its GDF format is “especially suitable for transferring geographical data sets from another format or to another format,” and thus it “may be used for transferring or providing geographical data sets from one entity to another entity,” even though the different entities might store the geographical data in different formats. *Id.*, 3:42-60.

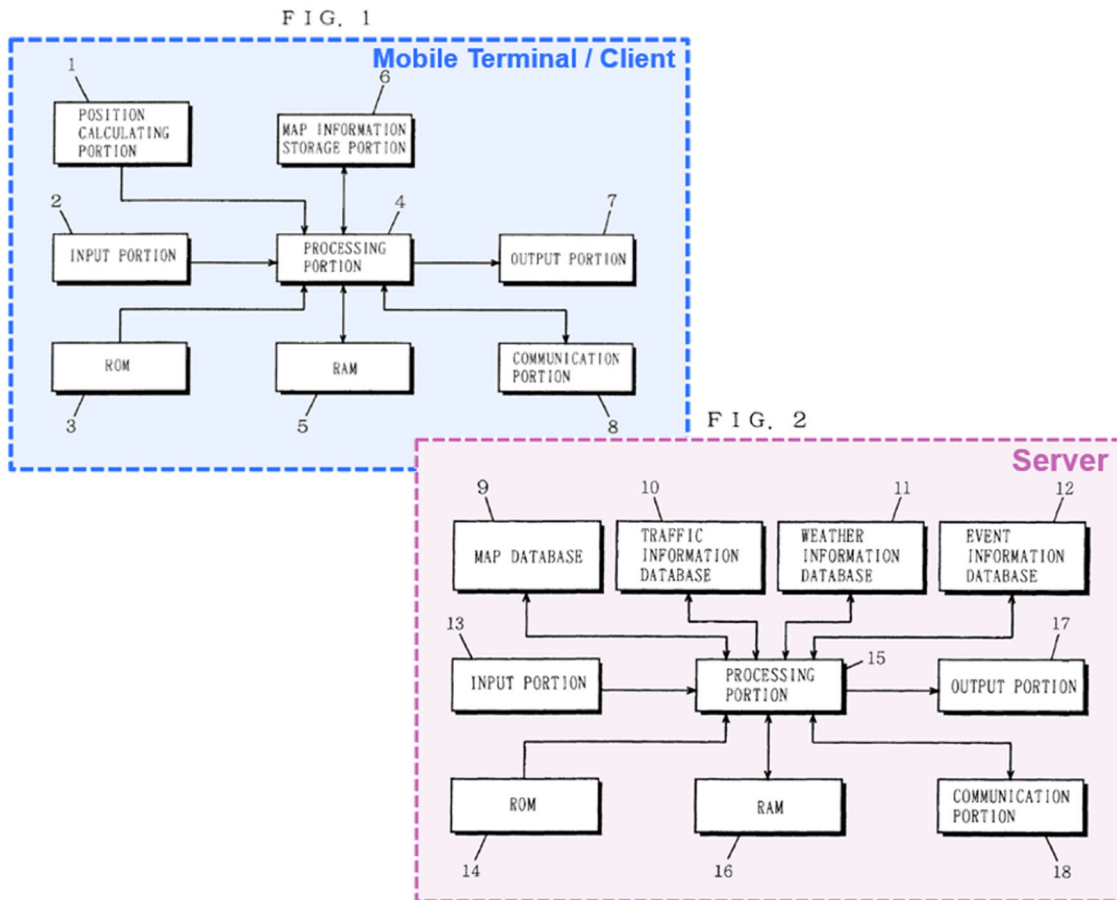
A POSITA would have been motivated to use McGrath’s GDF format in Nakano’s system to allow for a route calculated by Nakano’s server to be used with local client mapping databases from different manufactures (rather than, for example, only the same manufacturer as Nakano’s server mapping database), thereby increasing the versatility and interoperability of Nakano’s system. Ex-1002 ¶¶251-256. A POSITA would have had a reasonable expectation of success in configuring Nakano’s server to provide routes formatted according to GDF. *Id.*, ¶256. As explained above, both Nakano’s and McGrath’s formats include IDs corresponding to route-related elements—Nakano’s element IDs and McGrath’s object IDs. Ex-1007, 16:3-5; Ex-1006, 7:50-52. In the combined Nakano-McGrath system, in which Nakano’s route format is replaced with McGrath’s route format, a POSITA would have simply implemented McGrath’s object IDs in a similar manner to Nakano’s element IDs, to locate locally-stored route information. Ex-1002 ¶256.

2. Independent Claim 1

- a. Element 1[pre]: A method for providing an optimal route using real-time information for a navigation system comprising a client and a server, said server coupled to a computer network, said method comprising the steps of:**

Nakano-McGrath teaches the preamble of Claim 1. Ex-1002 ¶¶257-259.

Nakano discloses “a server/client-type map information providing system,” which includes a mobile terminal (annotated Figure 1, below) (the “client”) operated by a driver, and a remote server (annotated Figure 2, below). The client and server are both coupled to a “telecommunications” network, over which they exchange data. Ex-1007, 15:41-48, 10:18-23, 10:60-65. Nakano’s client and server use the telecommunications network, together with modems, to create a data connection between the client and server, thus establishing a computer network. *Id.*, 10:18-23 (client-side modem), 10:60-65 (server-side modem); Ex-1002 ¶258.



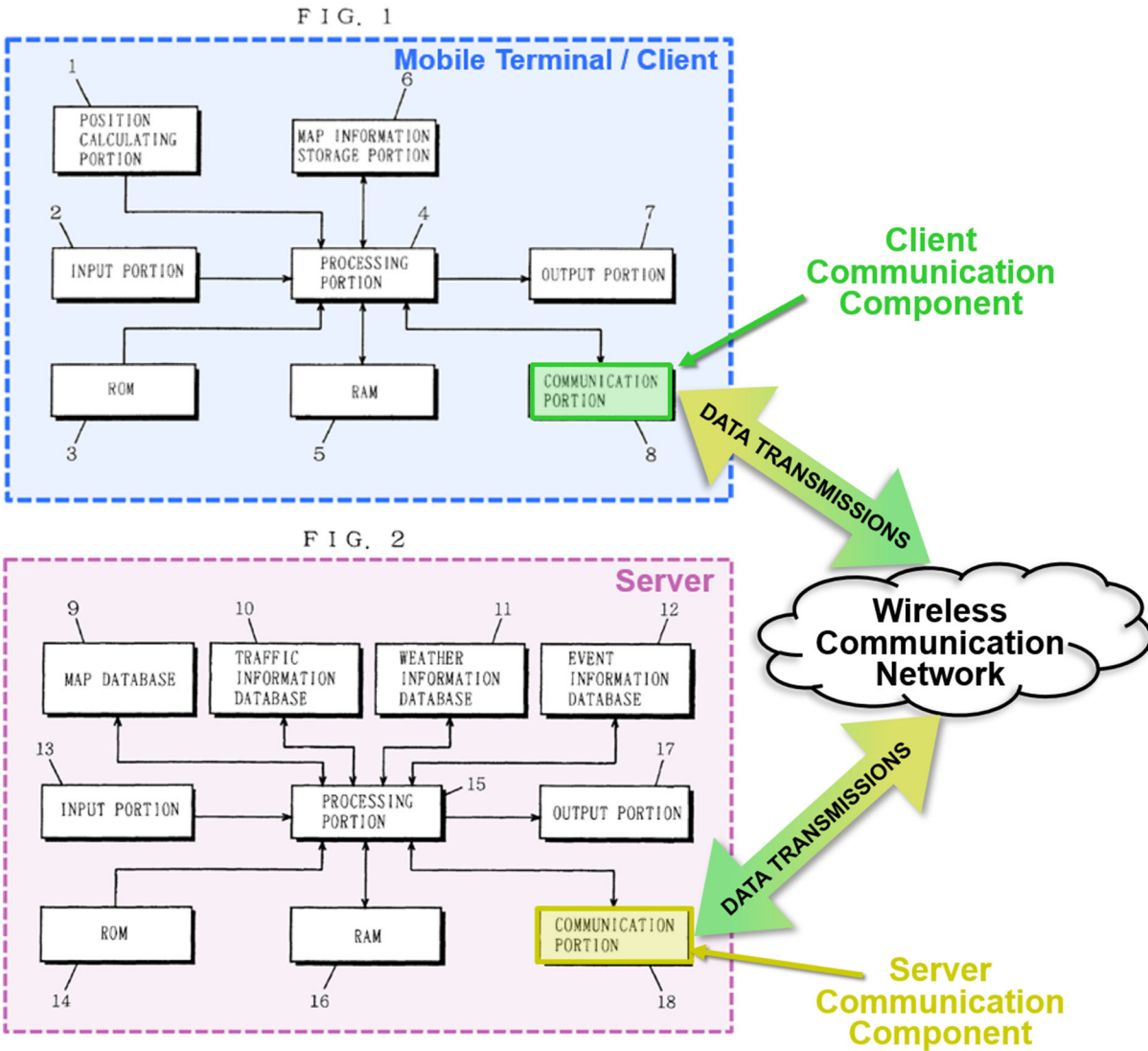
Nakano's client-server system is a "navigation system" and the server provides the client (i.e., the user's mobile terminal) with the "optimum" driving route. Ex-1007, 16:48-50. Specifically, in response to a client request for an "optimum route between arbitrary points," Nakano's server computes the optimum route, and provides it to the client for display to the user. *Id.*, 10:14-18, 10:58-60, 15:48-50, 18:42-45. Obtaining the optimal route is accomplished using real-time information, such as current traffic conditions. Ex-1002 ¶259. For instance, "[a]t route search, *reflecting the traffic information* stored in the traffic information database 10, *a route avoiding congestion*, for example, may be obtained." Ex-1007,

14:34-43. The resulting route is “optimal” under the district court’s construction because it corresponds to a “recommended route” obtained by the server “based on one or more criteria” (e.g., avoiding congestion). Ex-1002 ¶259.

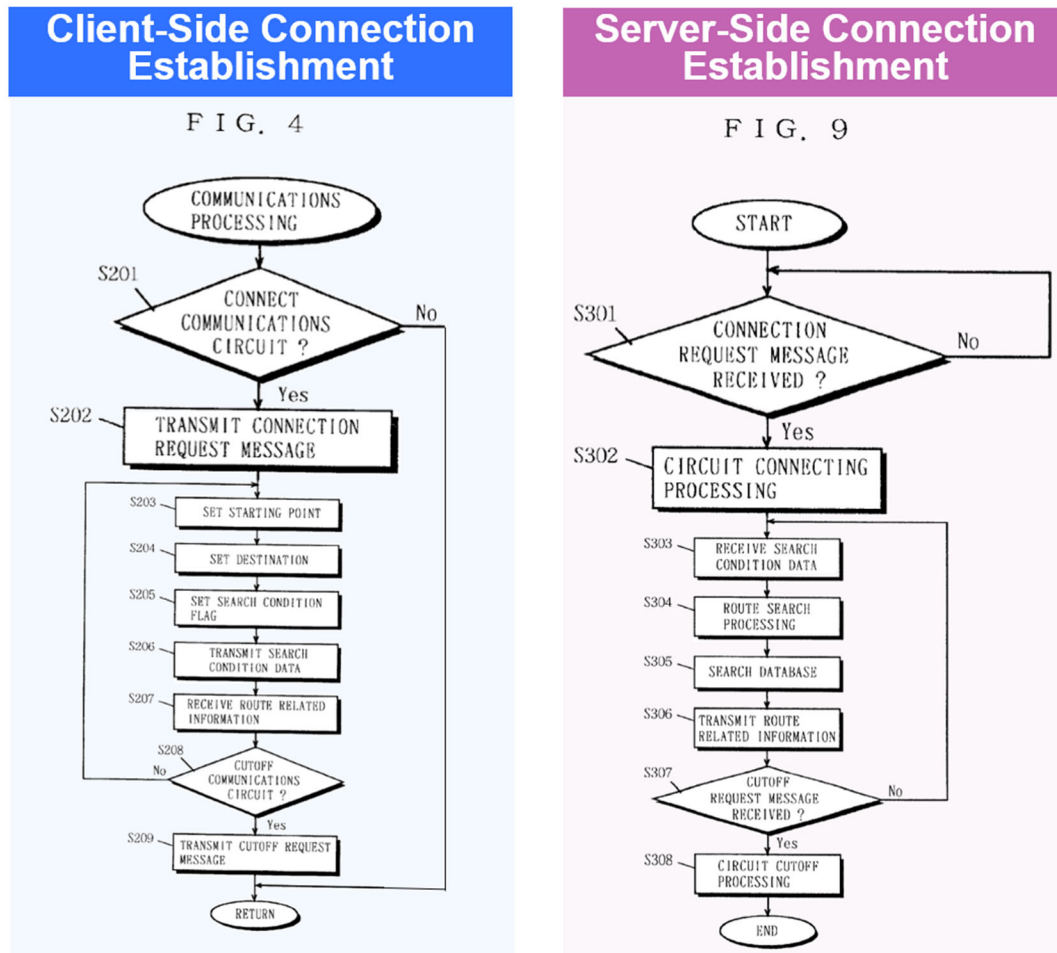
b. Element 1[a]: establishing a wireless connection between the client and the server;

Nakano-McGrath teaches Element 1[a]. Ex-1002 ¶¶260-262.

Nakano’s mobile terminal client and server communicate over a wireless network. Ex-1007, 15:41-48. Specifically, each of the mobile terminal and the server includes a “communication portion” that is used “to transmit/receive data” over the network, as annotated in Figures 1 and 2, below. *Id.*, 10:18-23 (mobile terminal), 10:60-65 (server). The communications circuit between Nakano’s server and mobile terminal may be a wireless network, as it includes a “*cellular* phone.” *Id.*, 10:18-23.



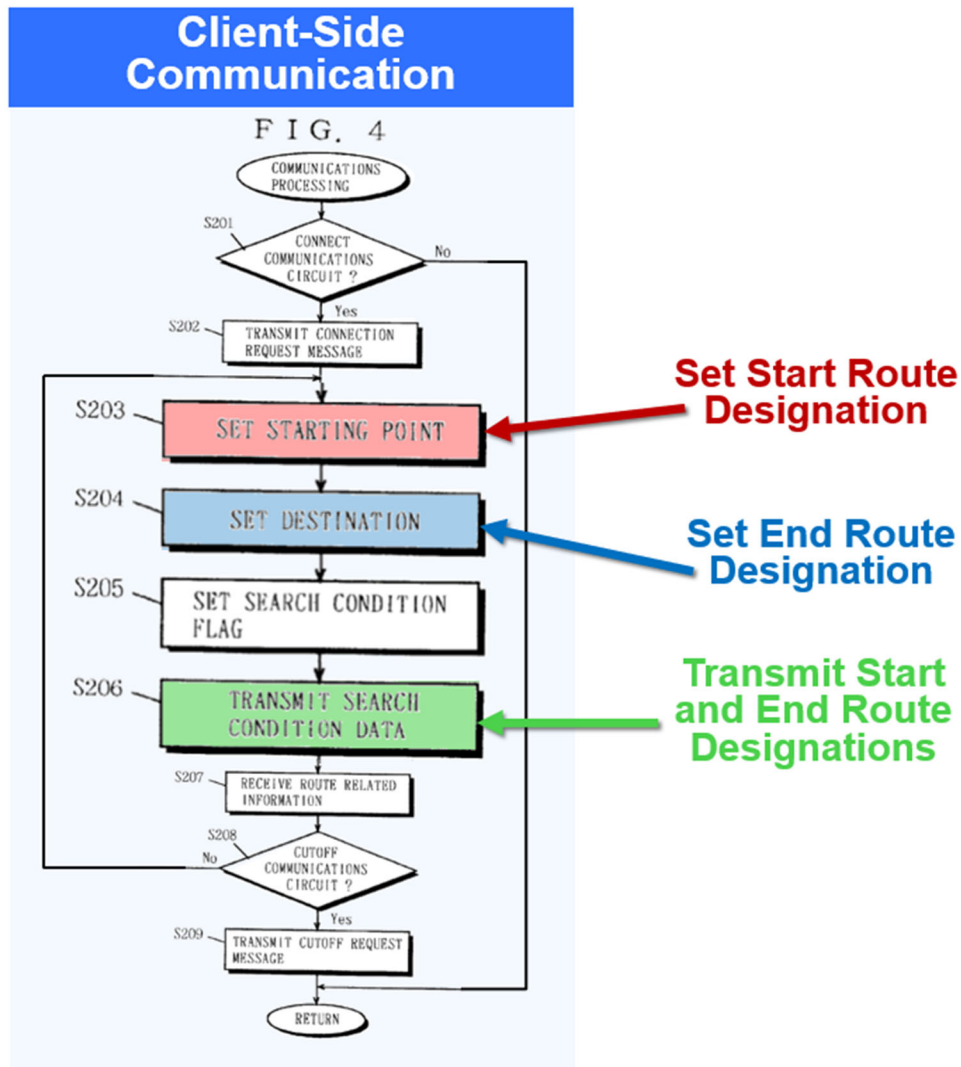
Establishment of this wireless connection is initiated by the vehicle driver, by instructing the terminal “to connect the communications circuit between the mobile terminal and the server.” *Id.*, 11:48-55. The client- and server-side connection establishment procedures are illustrated in annotated Figures 4 and 9, below. *Id.*, 11:56-61, 14:15-21.



c. Element 1[b]: transmitting start and end route designations from the client to the server;

Nakano-McGrath teaches Element 1[b], through Nakano's mobile device's transmission of a starting point and a destination to the server. Ex-1002 ¶¶263-265.

As illustrated in modified Figure 4, below, after a connection is established between Nakano's mobile device and server, the mobile device sets both "a starting point for route searching" (Ex-1007, 11:60-63) and a "destination" (*id.*, 12:1-6). Here, "the present vehicle position" may be set as the starting point, or "a point arbitrarily selected by the driver may be set." *Id.*, 11:63-67.



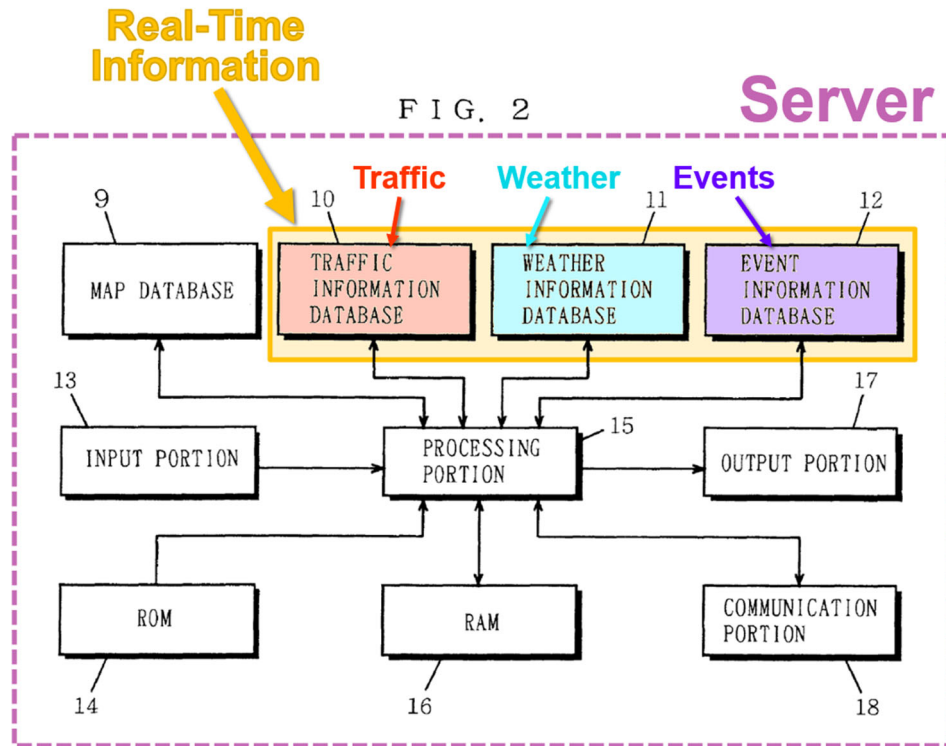
The mobile device then “transmits data including the search conditions of the starting point, [and] the destination” to the server. *Id.*, 12:13-16.

d. Element 1[c]: accessing real-time information by the server;

Nakano-McGrath teaches Element 1[c]. Ex-1002 ¶¶266-269.

Nakano’s system is capable of providing map-related information “with a high degree of real-time characteristics.” Ex-1007, 1:33-35. This is accomplished

using databases of real-time information, such as “traffic information, weather information, and event information,” as annotated in Figure 2, below. *Id.*, 9:34-38.



“Traffic information database 10” stores “information about congested roads” and “information about accidents,” and “weather information database 11” stores “weather forecasts and rainfall conditions.” *Id.*, 10:36-43.

Nakano’s server accesses the real-time information stored in databases 10-12 to determine an optimal route. *Id.*, 14:34-61. For instance, “[a]t route search,” the server accesses real-time traffic information “stored in the traffic information database 10,” to determine the optimal route as corresponding to one that “avoid[s] congestion.” *Id.*, 14:34-41.

e. Element 1[d]: calculating the optimal route by the server, based on the real-time information and said start and end route designations;

Nakano-McGrath teaches Element 1[d]. Ex-1002 ¶¶270-272.

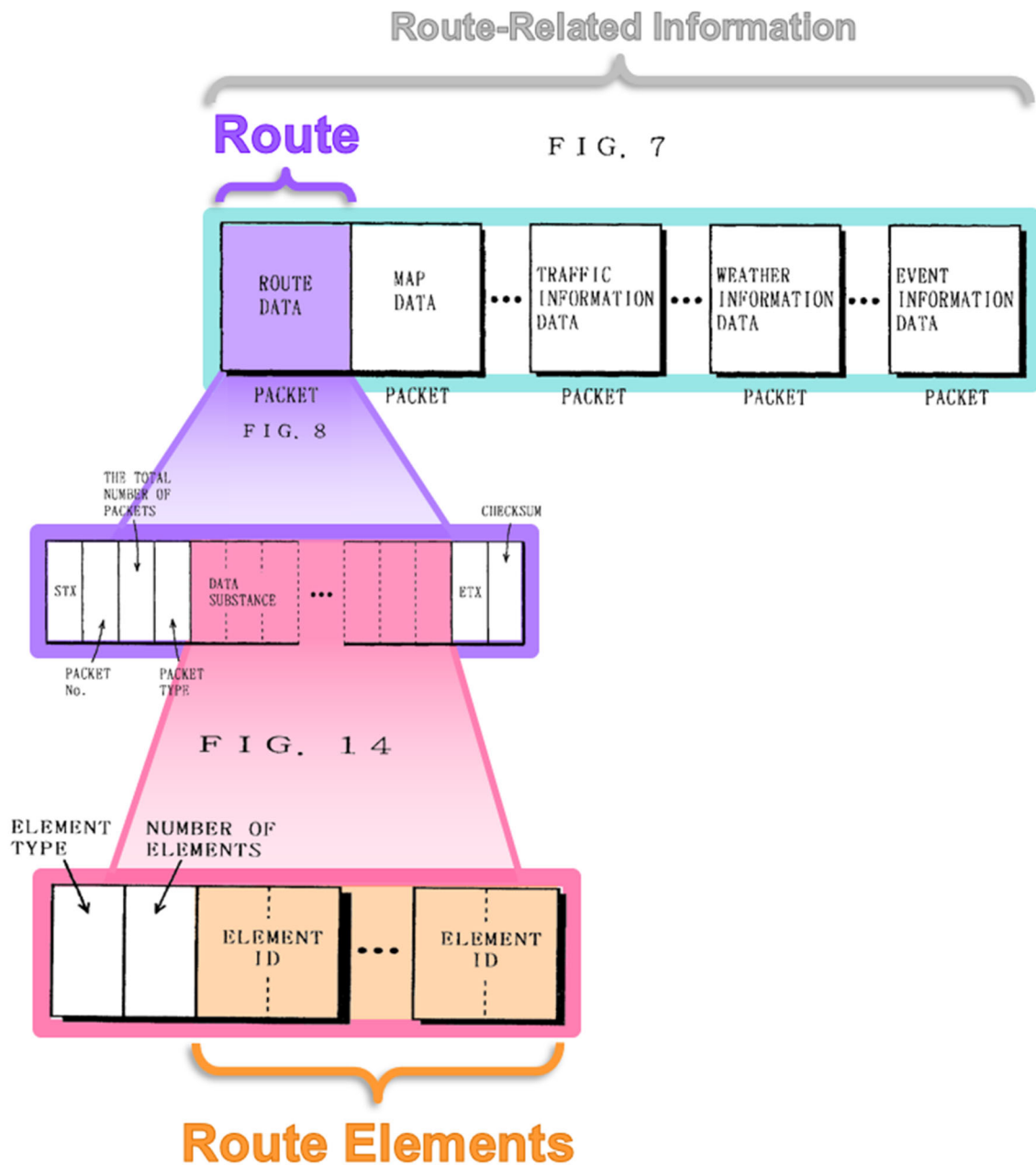
Based on “the search conditions of the starting point, [and] the destination” for the requested route, the server “performs route search processing,” using known route calculating methods, “such as the Dijkstra method.” Ex-1007, 14:22-33.

Nakano’s route search may use real-time traffic information to calculate the optimal route, such as one that “avoid[s] congestion.” *Id.*, 14:34-36. This is accomplished by “actively chang[ing]” the “travel time for each link recorded in the map database ... based on the congestion information and [] regulation information read from the traffic information database,” and applying the Dijkstra method “to the changed travel time for each link.” *Id.*, 14:36-43. The resulting route is an “optimal route” under the district court’s construction of “recommended route obtained using a set of criteria,” because it is recommended to the user based on a criterion of “avoid[ing] congestion.” Ex-1002 ¶272.

f. Element 1[e]: formatting the optimal route into a non-proprietary, natural language description;

Nakano-McGrath teaches Element 1[e]. Ex-1002 ¶¶273-278.

As explained in §XIII.F.1, Nakano’s route is formatted according to element IDs (as in Figures 7-8, and 14, modified/combined below). Ex-1007, 15:64-16:6.



Each element ID corresponds to a template stored locally at the client, and which may be used by the client for “restoring” the received route. *Id.*, 15:48-53, 17:26-18:6, Fig. 13. A POSITA would have understood that such use of Nakano’s element IDs to conserve network bandwidth resources relies on both the client and server

storing mapping data according to the same set of element IDs (e.g., the data was provided by the same manufacturer), so that the same element ID unambiguously identifies the same data stored at both the client and the server. Ex-1002 ¶275.

McGrath similarly teaches the use of IDs for map-related elements formatted according to the GDF standard. As explained in §§XIII.A.1, XIII.F.1, GDF includes “[e]lements,” which “are classified into objects and their respective characteristics.” Ex-1006, 4:54-60. Each GDF object is assigned an “explicit Object ID,” which “unambiguous[ly] identifi[es]” the object within the GDF-formatted dataset. *Id.*, 5:52-6:2, 7:50. For example, McGrath discloses a “Road Element” object, “with explicit Object ID 1001.” *Id.*, 7:50. Additionally, GDF objects can be “unambiguously” identified “by using a (sub)set of the characteristic data that defines the object.” *Id.*, 6:39-50. McGrath explains that its GDF format is “especially suitable for transferring geographical data sets from another format or to another format,” and thus it “may be used for transferring or providing geographical data sets from one entity to another entity,” even though the different entities might store the geographical data in different formats. *Id.*, 3:42-60.

As explained in §XIII.F.1, a POSITA would have been motivated to configure Nakano’s server to provide routes formatted in GDF, as taught by McGrath. Ex-1002 ¶277. In Nakano’s system, element IDs are used to locate information stored in the mobile terminal’s in-vehicle mapping database. Ex-1007, 17:52-57. McGrath

similarly explains that the GDF object IDs (and/or natural language text included along with the object ID) can be used to locate the corresponding database entries. Ex-1006, 5:65-6:54. In the combined Nakano-McGrath system, a POSITA would have simply implemented McGrath's object IDs in a similar manner to Nakano's element IDs, to locate locally-stored route-related information. Ex-1002 ¶278. As explained in §XIII.A.2.f (Ground 1, Element 1[e]), GDF is “non-proprietary” and uses “natural language,” under the district court's constructions of those terms. *Id.*

g. Element 1[f]: downloading said non-proprietary, natural language description to the client;

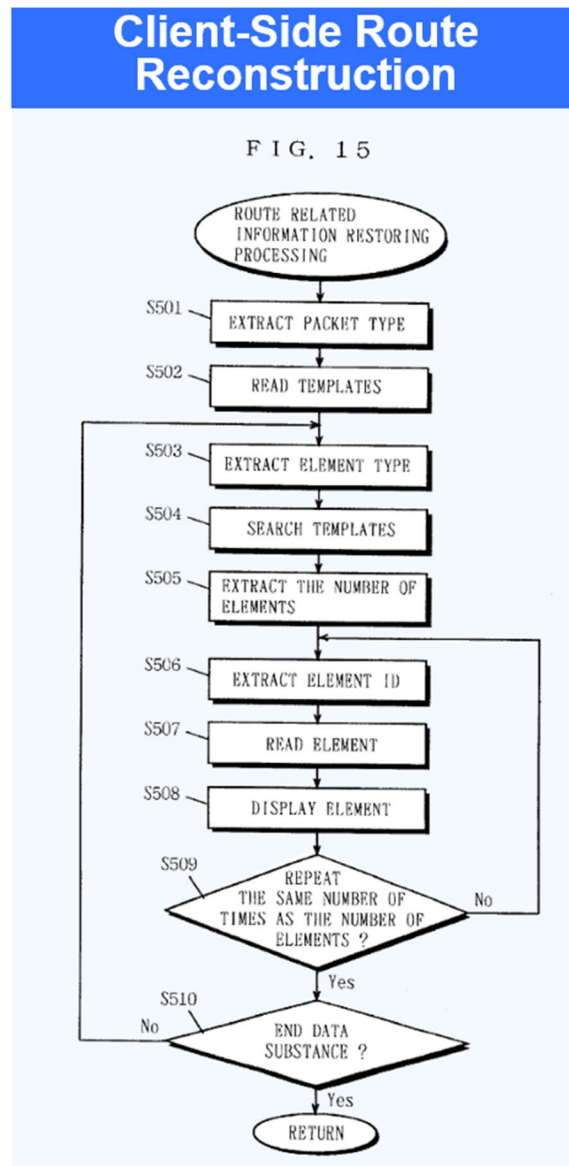
Nakano-McGrath teaches Element 1[f] under the district court's construction of “the server sending the non-proprietary, natural language description and the client receiving the non-proprietary, natural language description.” Ex-1002 ¶¶279-280.

As Nakano explains, after the server calculates the optimal route, that route “is downloaded from the server side to the mobile terminal side”—i.e., the server “transmit[s]” the route and the mobile terminal “receive[s]” it. Ex-1007, 15:26-31, Figs. 4, 9; Ex-1002 ¶280.

h. Element 1[g]: reconstructing the optimal route by the client using a local mapping database; and

Nakano-McGrath teaches Element 1[g]. Ex-1002 ¶¶281-285.

Nakano teaches reconstructing the optimal route at the client mobile terminal using a local mapping database. As explained for Element 1[e] above, Nakano's route format includes a set of element IDs corresponding to locally-stored mapping information. Figure 15, annotated below, describes the "restoring process" (Ex-1007, 17:26-30) by which Nakano's mobile terminal uses the route format and its IDs to reconstruct the route.

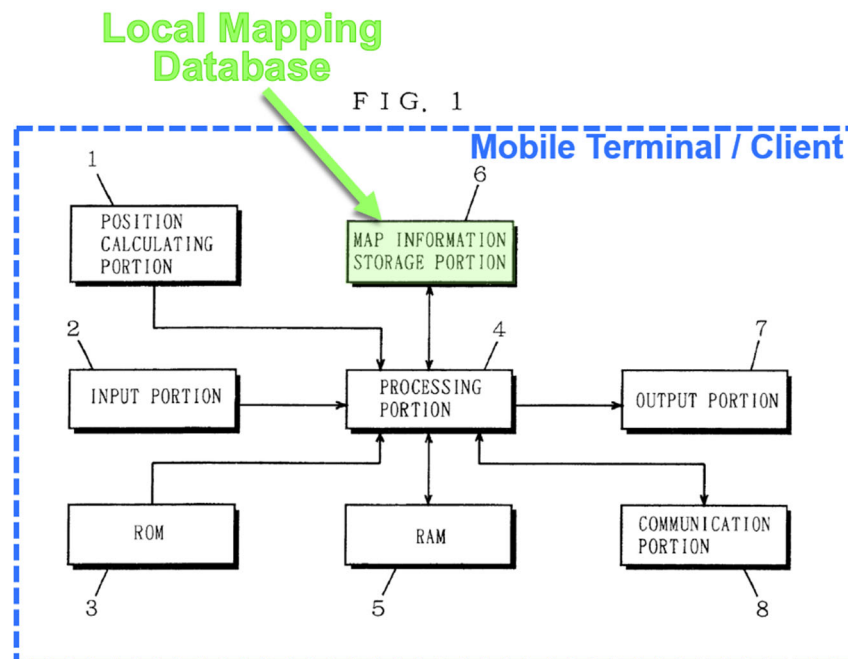


As illustrated, in response to receiving a route calculated by the server, Nakano's mobile terminal first extracts "an identifier indicating a type of the packet" (S501), and then reads templates from the local mapping database corresponding to that packet type (S502). *Id.*, 17:31-46. The terminal next extracts "the element type from the data substance of the received packet" (S503), and "selects a template including the same element type as that extracted" (S504). *Id.*, 17:41-46. The element type may correspond to a bitmap, or a character string. *Id.*, 17:49-52. Next, for each element within the data substance of the received packet, the terminal "extracts the element ID" (S506) and uses the ID to identify "the element stored in the map information storage portion 6." *Id.*, 17:54-57. After "read[ing] an element having the [extracted] element ID," Nakano's terminal causes "output portion 7 [to] display the element." *Id.*, 17:61-18:3. Accordingly, a POSITA would have understood that Nakano's route reconstruction process involves extracting element IDs from the received route, using those element IDs to locate route elements (e.g., templates) stored within Nakano's local mapping database, and presenting the elements to the user on the mobile terminal display. Ex-1002 ¶283.

As explained for Element 1[e], in the combined Nakano-McGrath system, the databases at the server and client would use McGrath's GDF format to describe routes. Reconstructing the GDF-formatted route in Nakano-McGrath would involve a similar process as Nakano, with Nakano's element IDs substituted with McGrath's

object IDs. *Id.*, ¶284. Similar to Nakano's element IDs that each correspond to route elements, each of McGrath's object IDs corresponds to an object of map-related information stored in McGrath's geographical data sets. Ex-1006, 4:54-60.

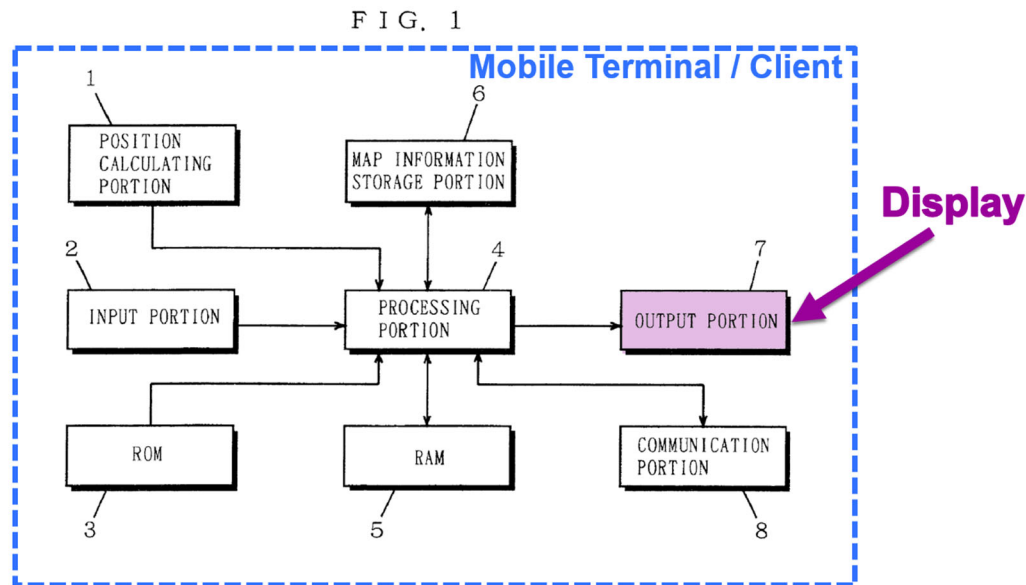
In the Nakano-McGrath system, Nakano's map information storage portion 6 ("local mapping database"), illustrated in annotated Figure 1, below, would store the route objects according to McGrath's object IDs, such that the object IDs could be used to identify and extract the objects as part of the route reconstruction process. Ex-1002 ¶285.



- i. **Element 1[h]: displaying said optimal route on a display system coupled to the client.**

Nakano-McGrath teaches Element 1[h]. Ex-1002 ¶¶286-287.

During the route reconstruction process, in response to identifying an element corresponding to an element ID included within Nakano's route format (an object ID included within the GDF format), the mobile terminal displays that element on "output portion 7." Ex-1007, 1-5. As annotated in Figure 1, below, output portion 7 is "constructed of ... a display." *Id.*, 10:14-18.



3. Dependent Claims 2, 4-7, and 12-14

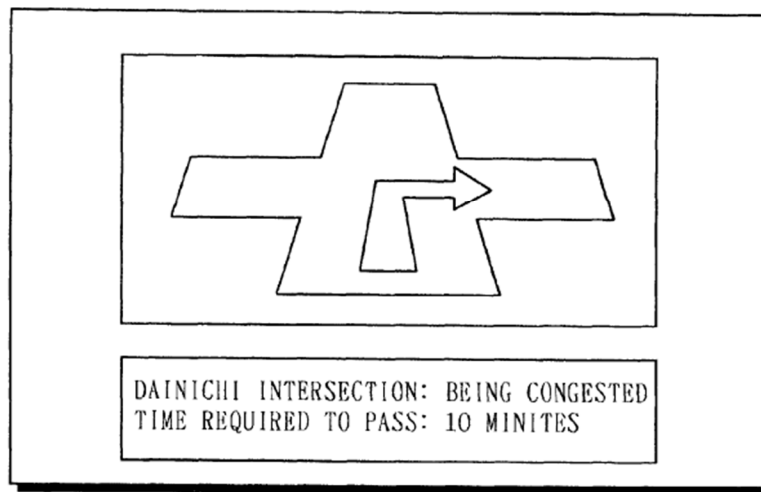
- a. **Claim 2: The method of claim 1, wherein said step of formatting includes the step of dividing the optimal route into one or more links, wherein each link includes at least a street name and a turning orientation.**

Nakano-McGrath teaches Element 2[a]. Ex-1002 ¶¶288-291.

Nakano represents routes with a set of nodes, connected by links (Ex-1007, 14:34-43), together with "elements," corresponding to additional route-related

information (*id.*, 17:19-21). As illustrated in Figure 12, below, Nakano's route elements include turning orientations:

F I G. 1 2



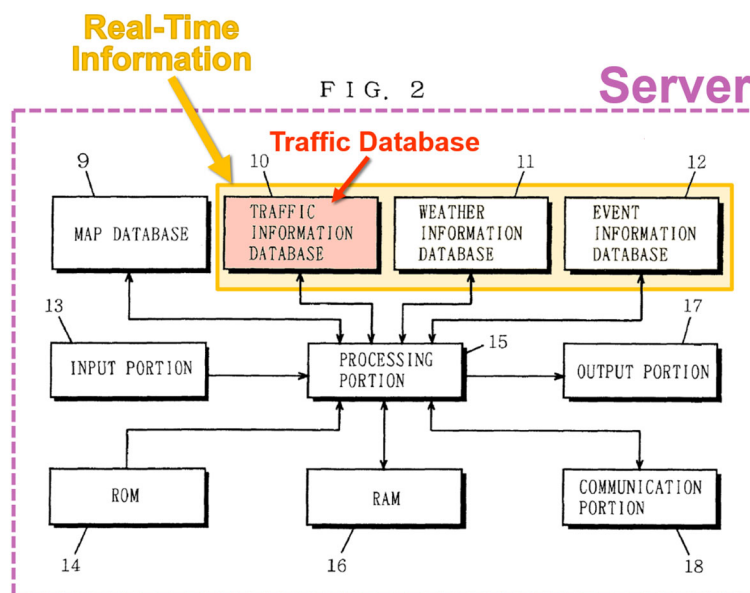
McGrath's GDF format also includes nodes, links (in the form of Road Elements between nodes and additional "[e]lements." Ex-1006, 4:54-50, 15:47-48. McGrath's elements "are classified into objects and their respective characteristics," including route-related information such as road names and turning restrictions. *Id.*, 4:54-60, Tables 1-2. McGrath explains that a "Road Element" object (i.e., the claimed "link") may have a "Name Attribute" characteristic corresponding to a street or highway name, such as "Main Street," "First Avenue," "US-101 North," "I-95," etc. *Id.*, 7:41-45, 7:65-67.

As explained in §XIII.F.1, a POSITA would have been motivated to format Nakano's route in McGrath's GDF format. A POSITA would have understood that,

when specifying a route using McGrath's GDF format, a "turning orientation" characteristic could be included for a "Road Element" object within the route, based at least on Nakano's disclosure of the inclusion of such information, to provide helpful information to the user, for use in navigating the route. Ex-1002 ¶291.

- b. Claim 4: The method of claim 1, wherein said accessing step comprises the step of accessing a traffic database comprising current traffic conditions; and querying said traffic database for determining current traffic conditions between locations defined by said start and end route designations.**

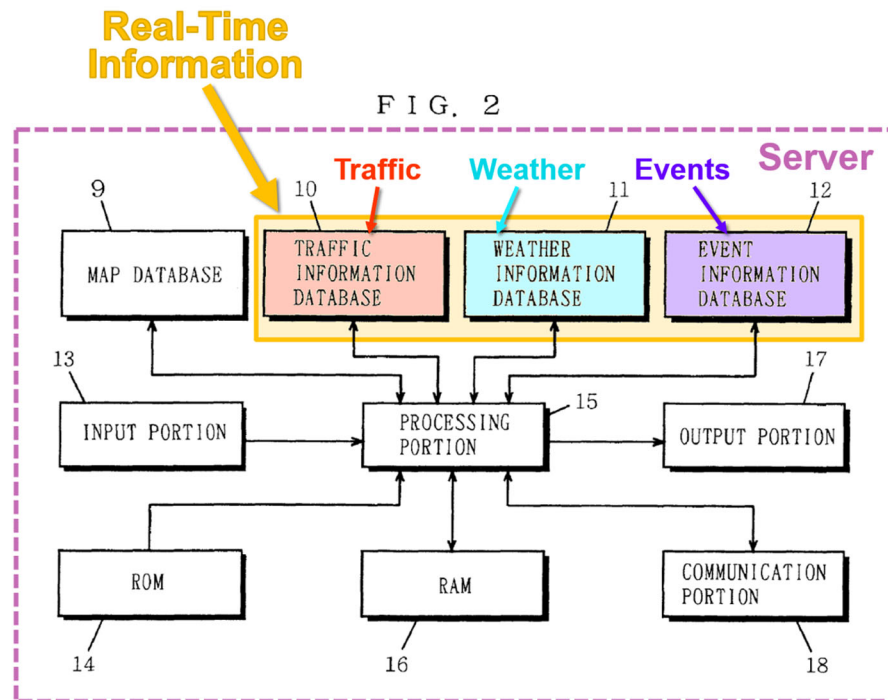
Nakano-McGrath teaches Claim 4. Ex-1002 ¶¶292-293. As explained for Element 1[c], Nakano's server accesses real-time traffic information "stored in a traffic information database 10" (as in annotated Figure 2, below), to determine an optimal route that "avoid[s] congestions." Ex-1007, 14:34-41.



During the route-search process, Nakano's server "actively change[s]" the "travel time for each link" within a potential route, "based on the congestion information ... from the traffic information database 10." *Id.*, 14:34-41. Changing the travel time for each link based on congestion information requires querying the database for current congestion information at the link positions, which are positions along the route "between locations defined by said start and end route designations." Ex-1002 ¶293.

- c. **Claim 5: The method of claim 1, wherein said real-time information includes one or more from the set of: current traffic conditions; highway ramp configurations; current weather conditions; constriction information; road restrictions; detour information; and event traffic information.**

Nakano-McGrath teaches Claim 5. Ex-1002 ¶¶294-295. As explained for Element 1[c], the real-time information includes "traffic information, weather information, and event information," as in annotated Figure 2, below. Ex-1007, 9:34-38.



- d. **Claim 6:** The method of claim 1, wherein said wireless connection is accomplished using a cellular network.

Nakano-McGrath teaches Claim 6. Ex-1002 ¶¶296. Nakano's mobile terminal uses "a *cellular* phone and a data communications modem" to "transmit/receive data" to "the server." Ex-1007, 10:18-23.

- e. **Claim 7:** The method of claim 1, wherein said transmitting step includes the step of entering into a keypad data entry field, said start and stop route designations including a name for one or more of: a city; a state; a country; and a street.

Nakano-McGrath renders obvious Claim 7. Ex-1002 ¶¶297-299.

As explained for Element 1[b], Nakano's mobile device sends both "a starting point" and a "destination" to the server for route searching. Ex-1007, 11:60-63, 12:1-6. Nakano explains that the vehicle driver may enter the destination using input

portion 2 of the mobile terminal. *Id.*, 12:1-3. The starting point may similarly be “selected by the driver.” *Id.*, 11:63-67; Ex-1002 ¶298.

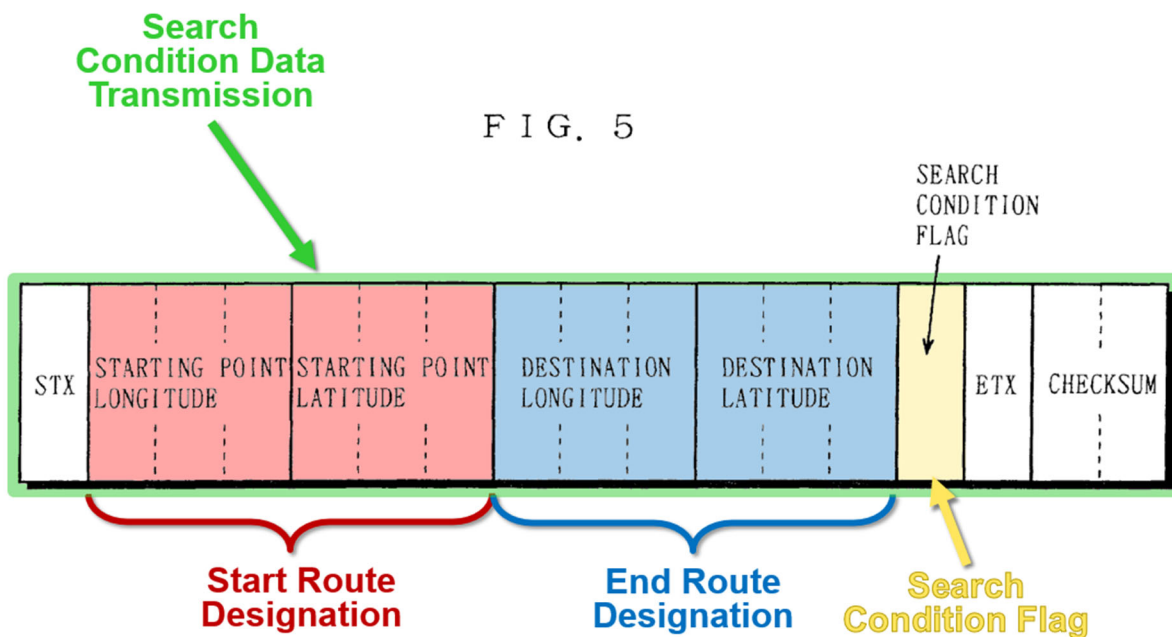
Input portion 2—used to set the starting and destination points by navigating to positions on a map—is “a body operational panel having a plurality of key switches.” Ex-1007, 9:65-67. A POSITA would have understood that a panel having a plurality of keys corresponds to a “keypad,” which could be used to enter alphanumeric characters. Ex-1002 ¶299. While Nakano discloses selecting locations by selecting points on a map, a POSITA would have been motivated to use Nakano’s keypad to enter specific location names. *Id.* Specifically, a POSITA would have understood that there are various ways to enter starting and destination points using a keypad, and that entering the addresses corresponding to those points (e.g., street numbers and names) was one such well-known method. *Id.* A POSITA would have recognized that entering specific addresses (as opposed to selecting points on a map) would improve the navigation process for the user by helping to ensure that the starting and destination points used by the server to calculate the route match (rather than approximate) the driver’s intended selections. *Id.* Further, a POSITA would have understood that an address will correspond to a specific point along a road link, while the same may not be true of any arbitrary point selected on a map. *Id.* For such an arbitrary map point, the nearest road link must first be determined before a route to/from the point can be calculated. *Id.* Accordingly, a

POSITA would have understood that using an address rather than a map point would consume less processing resources. *Id.*

- f. **Claim 13: The method of claim 1, wherein said calculating step further comprises the step of reading user-specific data in calculating the optimal route.**

Nakano-McGrath teaches Claim 13. Ex-1002 ¶¶300-302.

To request that Nakano's server perform route searching, the mobile device transmits user-specified search conditions (annotated in Figure 5, below) including "the starting point, the destination, and [a] search condition flag" to the server. Ex-1007, 12:12-16.



The search condition flag corresponds to a "condition at the time of route search (for example, giving a high priority to general roads or pay roads)" selected by the driver (*id.*, 12:7-12), for use by the server in identifying the optimum route (*id.*, 14:28-30).

Because each of the starting point, destination point, and search condition flag is set by the user (*id.*, 11:63-12:12), and used by the server to calculate the optimum route (*id.*, 14:22-30), they correspond to “user-specific data” read by the server “in calculating the optimal route.” Ex-1002 ¶302.

g. Claim 14: The method of claim 1, wherein said computer network is the Internet.

Nakano-McGrath renders obvious Claim 14. Ex-1002 ¶¶303-304.

McGrath teaches that a “central navigation system” may be connected to the Internet. Ex-1006, 1:66-2:1. A POSITA would have been motivated to connect Nakano’s central server to the Internet, as taught by McGrath, to enable the server to “collect and update[e]” the content of the server’s databases 10-12 from external sources storing such real-time information. Ex-1002 ¶304.

4. Independent Claim 15:

a. Element 15[pre]: A mobile navigation system comprising:

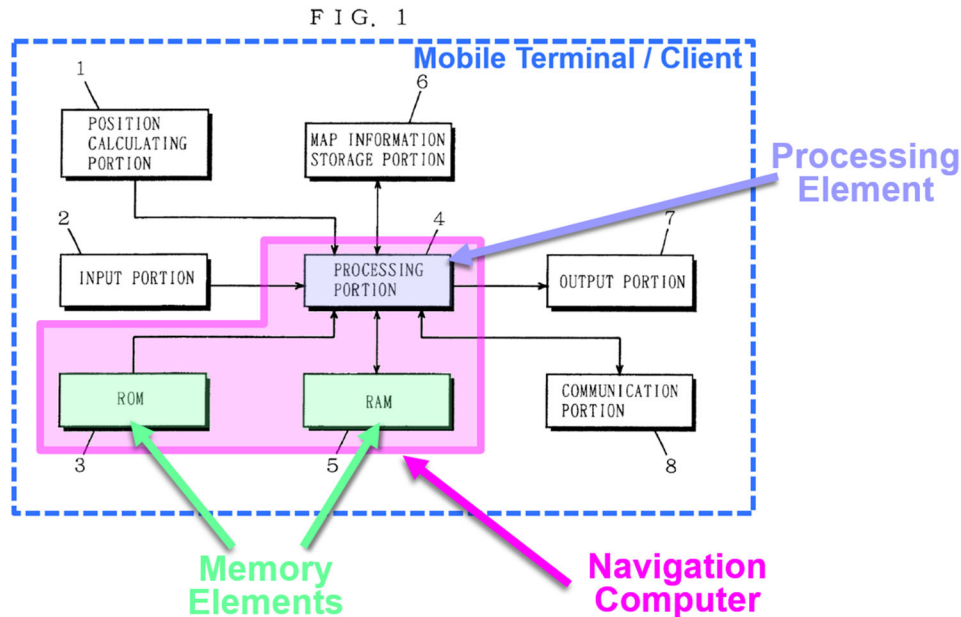
Nakano-McGrath teaches the preamble of Claim 15 for the reasons explained for Element 1[pre].

b. Element 15[a]: a navigation computer;

Nakano-McGrath teaches Element 15[a]. Ex-1002 ¶¶306-307.

The processing and memory elements within Nakano’s mobile terminal, annotated in Figure 1, below, correspond to a “navigation computer” because

“processing portion 4 controls the navigation system” according to software stored in the memory. Ex-1007, 10:6-13.

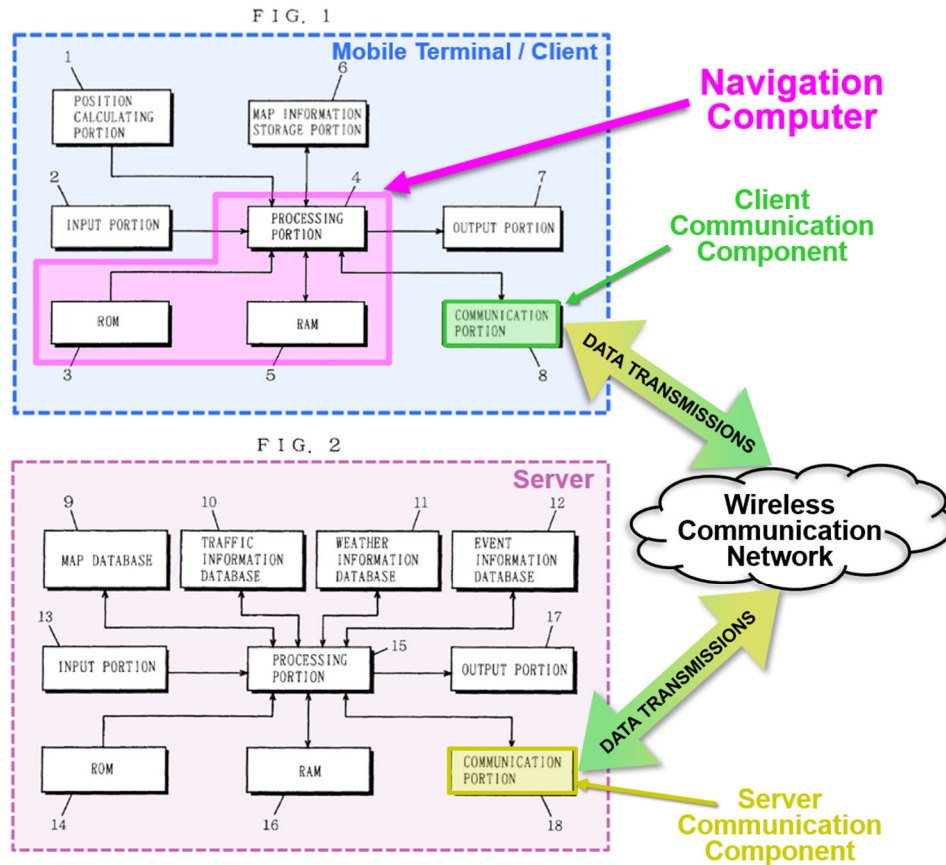


- c. **Element 15[b]:** a wireless transceiver coupled to said navigation computer for connecting with a navigation server, said navigation server for calculating optimal routes based on real-time information, said optimal routes being formatted using a non-proprietary, natural language description;

Nakano-McGrath teaches Element 15[b] for the reasons discussed for Elements 1[pre]-1[a], and 1[c]-[e], and the additional reasons below. Ex-1002 ¶¶308-310.

The “communication portion 8” of Nakano’s mobile terminal corresponds to a “wireless transceiver” because it communicates data over a wireless network, and it is coupled to the “navigation computer” that comprises the processing and memory elements shown in annotated Figure 1 below. Ex-1002 ¶¶309. Nakano’s mobile

terminal and server both include a “communication portion” to “transmit/receive data” to/from one another over a “telecommunications” network (Ex-1007, 15:46-48), as in annotated Figures 1 and 2, below. *Id.*, 10:18-21 (mobile terminal), 10:60-65 (server).

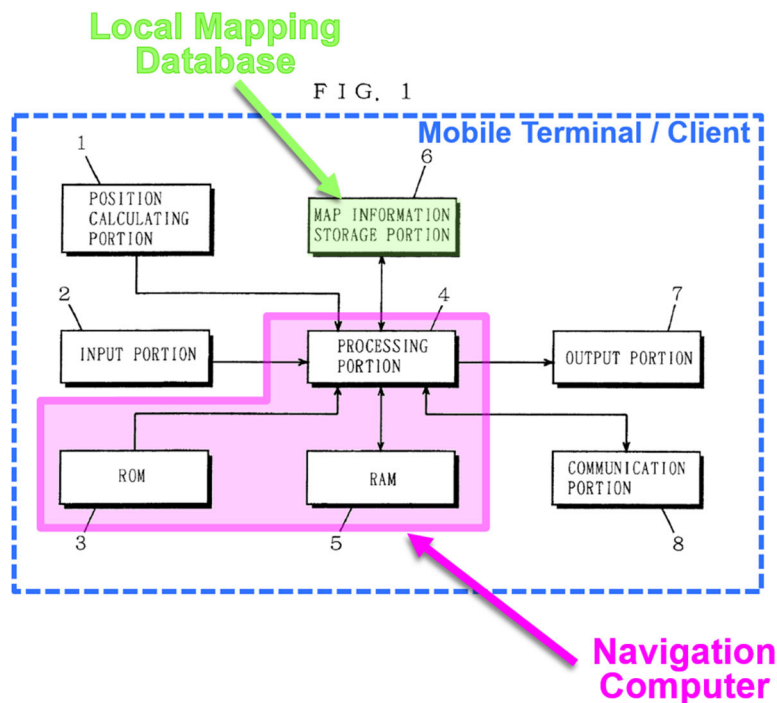


The mobile terminal’s communication portion may be constructed of “a cellular phone and a data communications modem.” *Id.*, 10:18-23. A POSITA would have understood that a cellular phone includes a transceiver. Ex-1002 ¶310.

- d. **Element 15[c]:** a mapping database coupled to said navigation computer for reconstructing said optimal route from said non-proprietary, natural language description; and

Nakano-McGrath teaches Element 15[c] for the reasons explained for Element 1[g], and the additional reasons below. Ex-1002 ¶¶311-312.

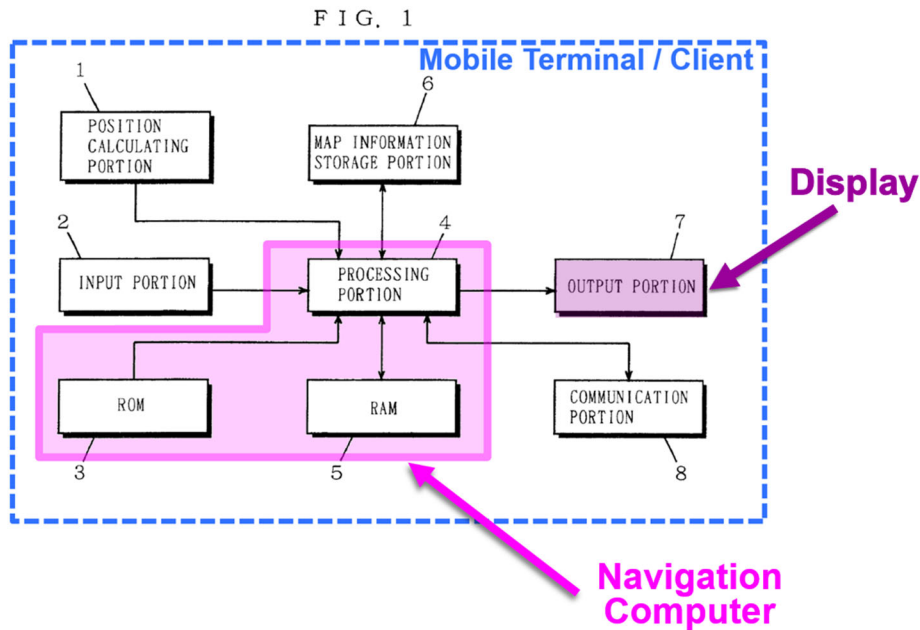
“[M]ap information storage portion 6” of Nakano’s mobile terminal corresponds to a “mapping database” (see §XIII.F.2.h), and it is coupled to the “navigation computer,” as annotated in Figure 1 below. Ex-1002 ¶312.



- e. **Element 15[d]:** a display screen coupled to said navigation computer for displaying said optimal route using said mapping database.

Nakano-McGrath teaches Element 15[d], for the reasons explained for Element 1[h], and the additional reasons below. Ex-1002 ¶¶313-314.

Display 7 is coupled to the “navigation computer” as annotated in Figure 1 below.



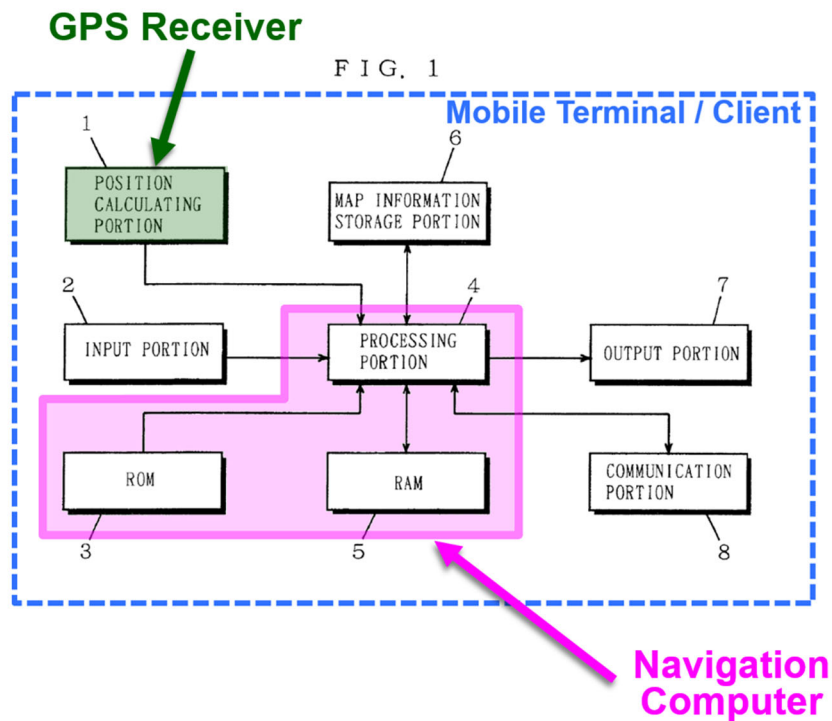
5. Dependent Claim 16:

- a. Element 16[a]: The mobile navigation system of claim 15, further comprising: a GPS receiver coupled to said navigation computer for monitoring position;**

Nakano-McGrath teaches Element 16[a]. Ex-1002 ¶¶315-317.

Nakano’s “position calculating portion 1” corresponds to “a GPS receiver coupled to said navigation computer for monitoring position.” *Id.*, ¶316. Nakano explains that “position calculating portion 1 calculates a present position of [the] vehicle” by “receiving radio waves from a GPS satellite.” Ex-1007, 9:56-64.

Position calculating portion 1 is coupled to processing portion 4 that is part of the “navigation computer,” as annotated in Figure 1, below.



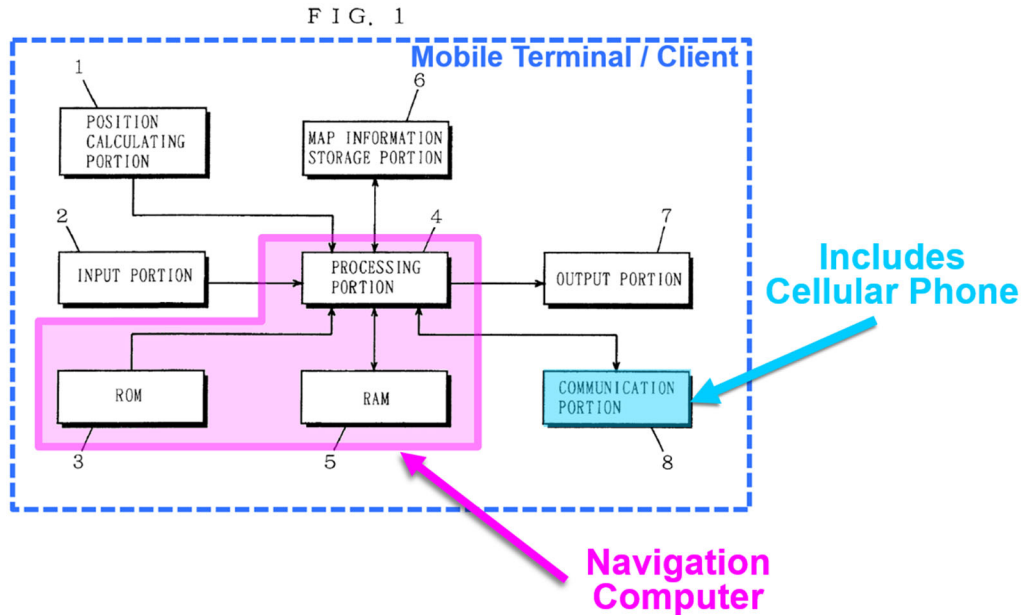
- b. Element 16[b]: a telephonic device coupled to said wireless transceiver and said navigation computer for making and receiving telephone calls; and**

Nakano-McGrath teaches Element 16[b]. Ex-1002 ¶¶318-320.

As explained for Element 15[b], the claimed “wireless transceiver” corresponds to the transceiver of a cellular phone (i.e., “a telephonic device for making and receiving telephone calls”) that is included within Nakano’s mobile terminal’s communication portion 8. Ex-1007, 10:18-23 (system includes “cellular phone”). The transceiver is a component of the cellular phone, and is thus coupled to the other components of the phone. Ex-1002 ¶¶319-320. Because the cellular phone is a component of communication portion 8, it is also coupled to processing

portion 4 that is part of the “navigation computer” (annotated in Figure 1, below).

Id.

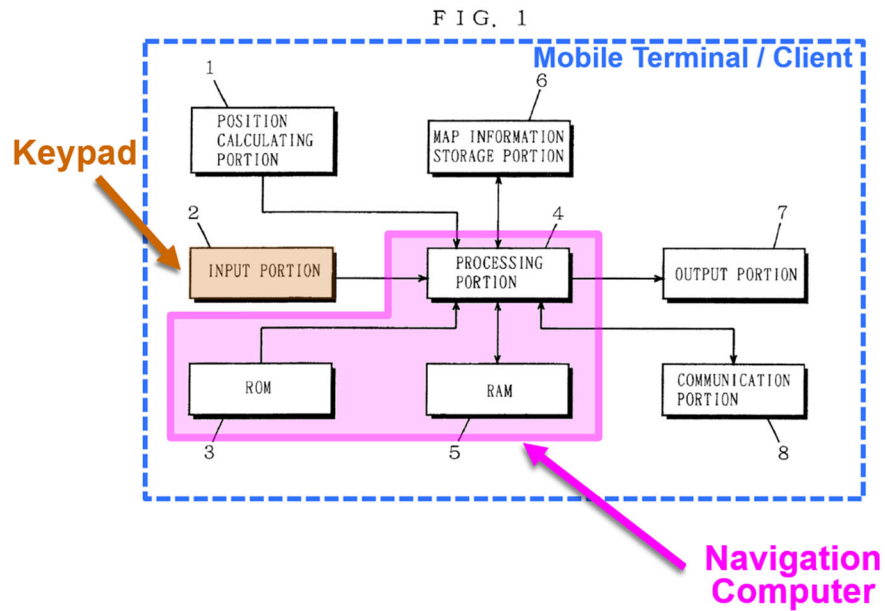


- c. **Element 16[c]: a keypad coupled to said navigation computer for entering start and end route designations.**

Nakano-McGrath teaches Element 16[c]. Ex-1002 ¶¶321-323.

As explained for Claim 7, input portion 2 of Nakano’s mobile terminal corresponds to “a keypad” “for entering start and end route designations,” because it “is realized by a body operational panel having a plurality of key switches” (Ex-1007, 9:65-67), and is used to enter both a starting point and a destination. *Id.*, 12:1-3 (destination), 11:63-67 (starting point); Ex-1002, ¶322.

Input portion 2 is coupled to processing portion 4 that is part of the “navigation computer,” as annotated in Figure 1, below.



6. Independent Claim 21:

a. Element 21[pre]

Nakano-McGrath teaches the preamble of Claim 21, to the extent it is limiting, for the reasons explained for Element 1[pre].

b. Element 21[a]

Nakano-McGrath teaches Element 21[a], for the reasons explained for Element 1[a].

c. Element 21[b]

Nakano-McGrath teaches Element 21[b] for the reasons explained for Element 1[b].

d. Element 21[c]

Nakano-McGrath teaches Element 21[c], for the reasons explained for Element 1[d].

e. Element 21[d]

Nakano-McGrath teaches Element 21[d], for the reasons explained for Element 1[e].

f. Element 21[e]

Nakano-McGrath teaches Element 21[e], for the reasons explained for Element 1[f].

7. Independent Claim 22:

a. Element 22[pre]

Nakano-McGrath teaches the preamble of Claim 22, to the extent it is limiting, for the reasons explained for Element 1[pre].

b. Element 22[a]

Nakano-McGrath teaches Element 22[a], for the reasons explained for Element 1[a].

c. Element 22[b]

Nakano-McGrath teaches Element 22[b], for the reasons explained for Element 1[b].

d. Element 22[c]

Nakano-McGrath teaches Element 22[c], for the reasons explained for Elements 1[d]-[f].

e. Element 22[d]

Nakano-McGrath teaches Element 22[d], for the reasons explained for Element 1[g].

f. Element 22[e]

Nakano-McGrath teaches Element 22[e], for the reasons explained for Element 1[h].

G. Ground 7: Claims 7-9 Are Obvious Over Nakano-McGrath In View Of Geiser (Ex-1008)

1. A POSITA would have been motivated to combine Nakano-McGrath with Geiser and would have had a reasonable expectation of success

As explained in §XIII.F.1, a POSITA would have been motivated to combine Nakano with McGrath. A POSITA would have been further motivated to combine Nakano-McGrath with Geiser, as explained below. Ex-1002 ¶¶336-343.

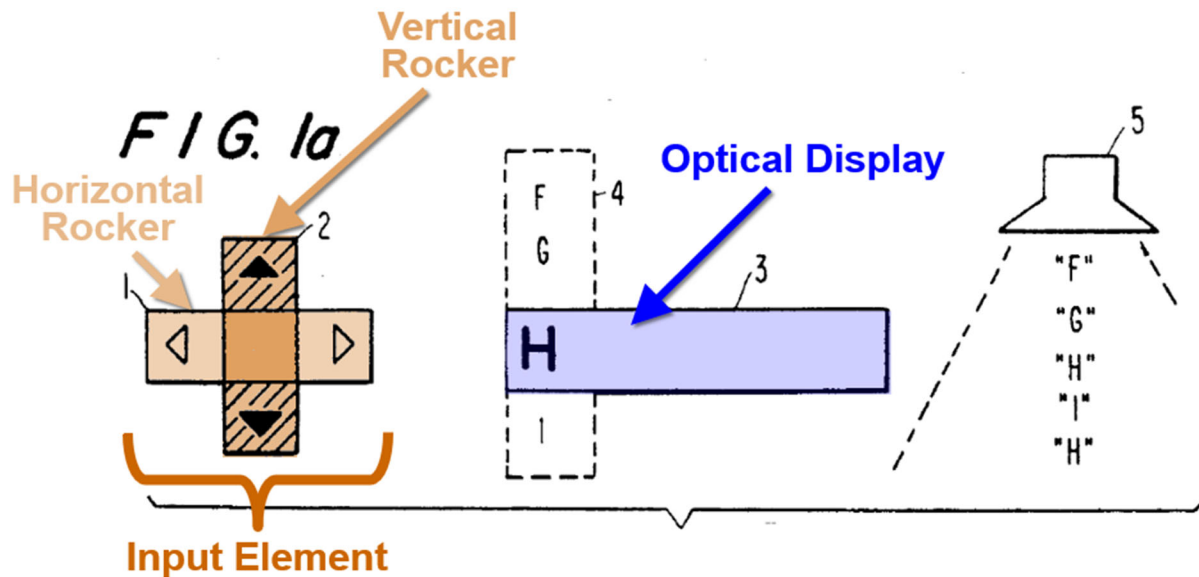
Nakano discloses a navigation system in which a driver uses a mobile terminal to select a starting point and a destination for a requested route. Ex-1007, 11:60-63, 12:1-6. In Nakano's system, a driver may set a starting point or destination by using a keypad to navigate to "an arbitrary point on the map" and "select[ing]" that point. *Id.*, 12:1-3.

As detailed in Ground 2, §XIII.B, Geiser similarly discloses a method for entering locations. Ex-1008, 1:55-58. Geiser uses an "input element" to enter an

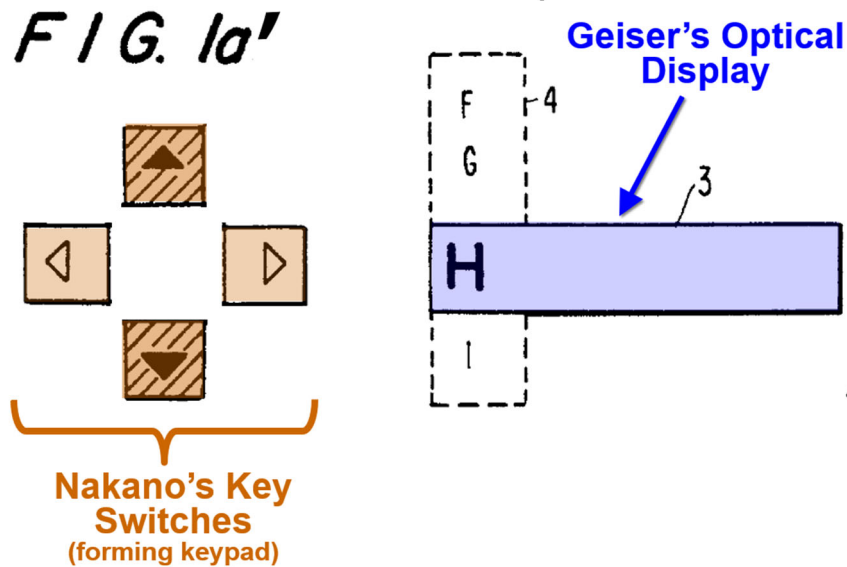
alpha-numeric location name (e.g., “place, street and street address”), by making “stepwise” selections of alpha-numeric characters. *Id.*, 2:43-45, 3:43-64.

A POSITA would have been motivated to include Geiser’s location-entry method in Nakano’s mobile terminal to improve Nakano’s location-entry process. Ex-1002 ¶339. In Nakano, a user enters a location by using a keypad to navigate to and select point on a map. Ex-1007, 11:63-12:6. A POSITA would have recognized that, for a location with which a driver is unfamiliar, the driver may have difficulty identifying the location on a map and/or may select the wrong point on the map, despite knowing the address. Ex-1002 ¶339. Thus, enabling the driver to directly enter the address, as taught by Geiser, may save the driver time and avoid driver error in the location-selection process. *Id.*

A POSITA would have had a reasonable expectation of success in implementing Geiser’s location-entry method in the Nakano-McGrath system. *Id.*, ¶340. In Geiser, as illustrated in annotated Figure 1a, below, location entry is performed using “a two-dimensional input element” consisting of “two rockers which are perpendicular to one another,” where horizontal rocker 1 “serves for the stepwise selection of the letter position,” and vertical rocker 2 “serves for running through the letter alphabet.” Ex-1008, 2:43-59. The characters selected using Geiser’s input element are displayed in “optical display 3.” *Id.*, 3:26-29.



For Nakano's mobile terminal, location entry is performed using input portion 2 (Ex-1007, 12:1-3), which takes the form of "a body operational panel having a plurality of key switches" (*id.*, 9:65-67). A POSITA would have understood that Nakano's keys would include at least two keys to move left/right and two key to move up/down on Nakano's display, to enable the user to use the keys to select a point on a map. Ex-1002 ¶343. A POSITA would have understood that configuring Nakano's input portion 2 for Geiser's location entry could be accomplished in a straightforward manner using four of Nakano's keys to perform the functions of Geiser's input element (as illustrated in modified Figure 1a', below), and adding Geiser's optical display. *Id.*



2. Dependent Claims 7-9:

- a. **Claim 7:** The method of claim 1, wherein said transmitting step includes the step of entering into a keypad data entry field, said start and stop route designations including a name for one or more of: a city; a state; a country; and a street.

Nakano-McGrath-Geiser teaches Claim 7. Ex-1002 ¶¶344-346.

As explained in §XIII.F.3.e, Nakano-McGrath teaches the use of a keypad to enter a starting point and a destination.

To the extent Nakano-McGrath does not explicitly teach using a keypad to enter a “name for one or more of: a city; a state; a country; and a street” Geiser teaches a location entry method (Ex-1008, 1:55-58) in which the locations entered include a “street address” (*id.*, 3:61-65). As explained in §XIII.G.1 (motivation to combine Nakano-McGrath-Geiser), in the combined Nakano-McGrath-Geiser system, Nakano’s “key switches” (Ex-1007, 9:65-67) would be used for entry of

alphanumeric location addresses, such as street names, as taught by Geiser. Ex-1002 ¶346.

b. Claim 8:

1. Element 8[a]-[b]

Nakano-McGrath-Geiser teaches Elements 8[a]-[b]. Ex-1002 ¶¶347-349.

Geiser teaches Elements 8[a]-[b] for the reasons explained in §XIII.B.2.a.

As explained in §XIII.G.1 (motivation to combine Nakano-McGrath-Geiser), in the combined Nakano-McGrath-Geiser system, Geiser's optical display would be added to the input portion of Nakano's mobile terminal and used for displaying the alphanumeric characters entered using Nakano's key switches, as modified by Geiser. Ex-1002 ¶349. In the Nakano-McGrath-Geiser system, Geiser's optical display corresponds to a "keypad data entry field," because it displays the alphanumeric data (Ex-1008, 3:26-29) entered using Nakano's key switches ("keypad"). Ex-1002 ¶349.

2. Elements 8[c]-[d]

Nakano-McGrath-Geiser teaches Elements 8[c]-[d] for the reasons explained in §XIII.B.2.b.

c. Claim 9

Nakano-McGrath-Geiser teach Claim 9, for the reasons explained in §XIII.B.3.

H. Ground 8: Claims 10 and 11 Are Obvious Over Nakano-McGrath-Geiser In View Of Watanabe (Ex-1009)

1. Dependent Claims 10-11:

a. Claims 10-11

Nakano-McGrath-Geiser-Watanabe teaches Claims 10-11. Ex-1002 ¶¶353-355.

As explained in §XIII.C.1, Watanabe teaches Claims 10-11. A POSITA would have been motivated to combine Nakano-McGrath with Geiser, as explained in §XIII.G.1. A POSITA would have further been motivated to combine Nakano-McGrath-Geiser with Watanabe. Ex-1002 ¶355. Watanabe is in the same field of art as Nakano, McGrath, and Geiser, disclosing a vehicle navigation system with a “city name selection accelerator” that is designed to “simplify input operations of city names.” Ex-1009, Abstract.

I. Ground 9: Claim 12 Is Obvious Over Nakano-McGrath In View of Knockeart

1. Claim 12: The method of claim 1, wherein said downloading step comprises the step of compressing said natural language description.

Nakano-McGrath-Knockeart teaches Claim 12. Ex-1002 ¶¶356-359.

Nakano and Knockeart both disclose the use of modems for transmitting data between client and server. Ex-1007, 10:18-23, 10:60-65; Ex-1005, 28:18-33. Knockeart explains that “[t]ypical modems carry out a negotiation phase in which compatible modulation, *compression*, and error correcting protocols are selected.”

Ex-1005, 28:27-29. Accordingly, when transmitting a route from the server to the client, the route “is downloaded ... using a *compressed format*.” *Id.*, 29:24-25.

A POSITA would have been motivated to configure Nakano’s modems to compress transmitted data (including the optimal route), as Knockeart describes compression as a feature of “typical modems” and because it would reduce the amount of data transmitted, thus lowering telecommunication costs. Ex-1002 ¶359. Indeed, Nakano highlights telecommunication costs as a central concern in transmitting data from client to server. Ex-1005, 15:59-63. Accordingly, a POSITA would have been motivated to search for references, such as Knockeart, disclosing ways to further reduce telecommunications costs. Ex-1002 ¶359. Knockeart is analogous art to Nakano, as both disclose client-server systems for vehicle navigation. *See* §§XII.A, C. A POSITA would have had a reasonable expectation of success in configuring Nakano’s modems to compress transmitted data, as taught by Knockeart, because it corresponds to the use of a “typical” well-known technique (i.e., data compression in modems described by Knockeart) to improve similar devices (i.e., Nakano’s modems) in the same way. Ex-1002 ¶359.

J. Ground 10: Claims 17 and 18 Are Obvious Over Nakano-McGrath In View Of Nunokawa

1. Dependent Claims 17-18:

a. Claims 17-18

Nakano-McGrath-Nunokawa teaches Claims 17-18. Ex-1002 ¶¶360-362.

As explained in §XIII.D.1, Nunokawa teaches Claims 17-18. A POSITA would have been motivated to implement Nunokawa's head right/left configurations in Nakano's mobile terminal, when the display of the output portion of the mobile terminal (Ex-1007, 14-18) is wider than it is tall. Ex-1002 ¶362. A POSITA would have understood that displaying the reconstructed route in a head right/left configuration on the display of Nakano's mobile terminal's output portion, as taught by Nunokawa, when that display is wider than it is tall, will improve the "operability" and increase the amount of travel information displayed on Nakano's mobile terminal, in the manner expressly taught by Nunokawa (Ex-1011, ¶26); Ex-1002 ¶362.

K. Ground 11: Claim 19 Is Obvious Over Nakano-McGrath In View Of Endo

1. Claim 19

Nakano-McGrath-Endo teaches Claim 19. Ex-1002 ¶¶363-365.

As explained in §XIII.E.1, Endo teaches Claim 19. A POSITA would have been motivated to implement Endo's method of date/time correction for navigation systems in Nakano's navigation system. Ex-1002 ¶365. A POSITA would have recognized that navigation systems often display date/time information together with a route, and would have turned to Endo for implementation details. *Id.* Specifically, a POSITA would have recognized that implementing Endo's clock correction method within Nakano's mobile terminal would provide the expected benefit of

automatically correcting the remote terminal's time in a "convenient" and "simple" manner. Ex-1013, ¶¶5-6; Ex-1002 ¶365.

XIV. DENIAL UNDER *FINTIV* IS NOT APPROPRIATE

Should PO argue against institution under *Fintiv*, Petitioner may serve a prior art stipulation and/or respectfully request leave for a Preliminary Reply to respond.

XV. CONCLUSION

The unpatentability grounds presented above are reasonably likely to prevail, post-grant review should be instituted, and Claims 1-19, and 21-22 should be cancelled as unpatentable over the prior art.

Respectfully Submitted,

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Petitioner certifies that this petition includes 13,914 words, as measured by Microsoft Word, exclusive of the table of contents, mandatory notices under §42.8, certificates of service, word count, and exhibits.

CERTIFICATE OF SERVICE (37 C.F.R. §42.6(e)(1))

The undersigned hereby certifies that the above document was served on July 19, 2024, by filing this document through the Patent Trial and Appeal Board P-TACTS System, as well as delivering a copy via express mail upon the following attorneys of record for PO:

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