

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner

v.

MAXELL, LTD.
Patent Owner

Case No. IPR2020-00408
U.S. Patent No. 6,430,498

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 6,430,498**

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I. INTRODUCTION

Petitioner Apple Inc. (“Petitioner”) requests an *Inter Partes* Review (“IPR”) of claims 1, 3-5, 7-11, and 13 (collectively, the “Challenged Claims”) of U.S. Patent No. 6,430,498 (“the ’498 Patent”). *’498 Patent* (Ex. 1001).

II. SUMMARY OF THE ’498 PATENT

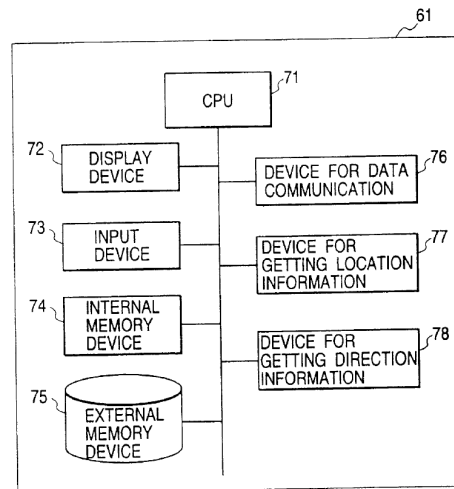
A. Description of the alleged invention of the ’498 Patent

The ’498 Patent generally describes “a portable terminal provided with the function of walking navigation, which can supply location-related information to the walking user.” *’498 Patent* (Ex. 1001), 1:10-13. According to the ’498 Patent, conventional navigation systems at the time of the invention were unsuitable for walking navigation because they were too large to be carried by a walking user, while maps provided by conventional map information services could not be displayed clearly on the small screens of portable telephones. *Id.* at 1:25-32; 1:40-46. The ’498 Patent purports to address these problems by providing a portable terminal that can “supply location information easier for the user to understand during walking.” *Id.* at 2:47-48.

The ’498 Patent describes a “portable terminal . . . with the function of walking navigation [that] is provided with data communication, input, and display devices just like those of ordinary portable telephones and PHS [Personal Handyphone System] terminals, as well as a device for getting location information and a device for getting direction information denoting the user’s present place.” *Id.*

at 2:56–62. Figure 10 of the '498 Patent depicts the primary components of the described portable device:

FIG. 10

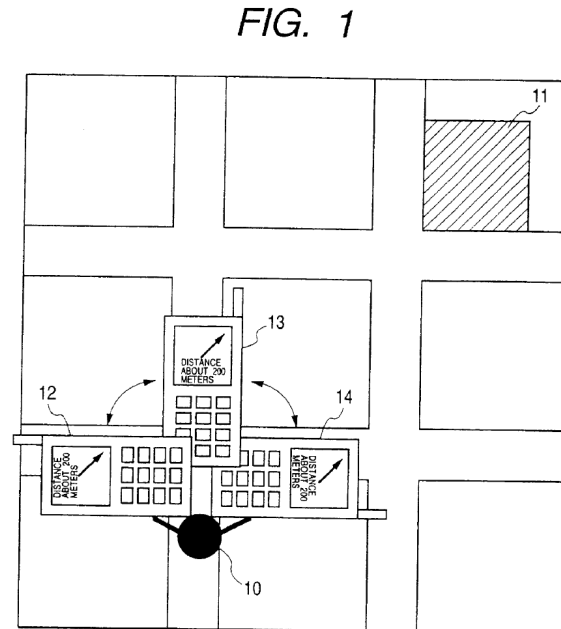


Id. at Fig. 10.

The portable terminal obtains location information and orientation information of the terminal from, for example, “device for getting location information” 77 and “device for getting direction information” 78 as depicted above.

Id. at Abstract, 2:60-65, 9:28-51. Based on this information, the portable terminal obtains and displays information such as route guidance for reaching a destination, which in some circumstances may be the location of another portable terminal. *Id.* at Abstract, 2:66-3:35; 8:33-36; Fig. 5. In one embodiment, the direction of a destination is indicated with an orientation of a line that always points in the

direction of the destination. *Id.* at Abstract. Figure 1, below, illustrates this direction-indicating line that adjusts as the device is rotated:



Id. at Fig. 1; *see also id.* at Figs 3(a) and 3(b) (showing other displays).

B. Summary of the prosecution history of the '498 Patent

The Application that resulted in the '498 Patent was filed on July 11, 2000 as US App. No. 09/613,634 and claims priority to Japanese Patent 11-197010, which was filed July 12, 1999. '498 *Patent* (Ex. 1001). For purposes of this proceeding, Petitioner applies July 12, 1999 as the priority date for the Challenged Claims.

On June 27, 2001, the Examiner rejected all claims of the application that resulted in the '498 Patent under 35 U.S.C. Section 102(b) as anticipated by U.S. Patent No. 5,146,231 to Ghaem et al. ("*Ghaem*"). '498 *Patent File History* (Ex.

1002), 112-13. Applicant argued that *Ghaem* required a user to input present position and destination information and therefore did not include devices for obtaining location information and direction information. *Id.* at 125.

The Examiner rejected all claims in a final rejection on November 19, 2001 as obvious over *Ghaem* in view of U.S. Patent No. 6,124,826 to Garthwaite et al. (“Garthwaite”) under 35 U.S.C. Section 103. *Id.* at 136. Applicant then cancelled all claims, replacing them with a new set of 13 claims. *Id.* at 144. The new claims introduced limitations relating to the display of the guidance information, including “wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points to supply route guidance information as said walking navigation information,” “wherein a local route around said present place is shown with a bent line and a direction of movement is shown with an arrow on said bent line to supply route guidance information as said walking navigation information” and “a full route from said starting point to said destination is shown with a bent line that is distinguished between starting and ending points and said present place is shown with a symbol on said line to supply said route guidance information as said walking navigation information.” *Id.* at 139-41, 143.

A Notice of Allowability issued on March 13, 2002, noting the display limitations distinguished the new claims from prior art of record. *Id.* at 148-50.

C. Level of skill of a person having ordinary skill in the art

A person having ordinary skill in the art (PHOSITA) at the time of the '498 Patent would have been a person having (i) a Bachelor degree (or higher degree) in an academic area emphasizing electrical engineering or computer engineering or equivalent and (ii) at least one year of experience working in the field of location- or sensor-based human-computer interaction. Additional industry experience or technical training may offset less formal education, while advanced degrees or additional formal education may offset lesser levels of industry experience. *Kotzin Decl.* (Ex. 1003), ¶¶ 35-36.

III. REQUIREMENTS FOR INTER PARTES REVIEW UNDER 37 C.F.R. § 42.104

A. Grounds for standing under 37 C.F.R. § 42.104(a)

Petitioner certifies that the '498 Patent is available for IPR and that the Petitioner is not barred or estopped from requesting IPR challenging the claims of the '498 Patent. Specifically, Petitioner states: (1) Petitioner is not the owner of the '498 Patent, (2) Petitioner has not filed a civil action challenging the validity of any claim of the '498 Patent, and (3) this Petition is filed less than one year after the Petitioner was served with a complaint alleging infringement of the '498 Patent.

B. Identification of challenge under 37 C.F.R. § 42.104(b) and relief requested

In view of the prior art and evidence presented, claims 1, 3-5, 7-11, and 13 of the '498 Patent are unpatentable and should be cancelled. 37 C.F.R. § 42.104(b)(1).

Further, based on the prior art references identified below, IPR of the Challenged Claims should be granted. 37 C.F.R. § 42.104(b)(2).

Proposed Grounds of Unpatentability	Exhibits
<u>Ground 1:</u> Claims 1, 3, 5, 7, and 8 are obvious under § 103(a) over U.S. Patent No. 6,067,502 to Hayashida et al. (“Hayashida”) in view of the knowledge of a person of ordinary skill in the art (“PHOSITA”).	EX1004,
<u>Ground 2:</u> Claims 3 and 7 are obvious under § 103(a) over U.S. Patent No. 6,067,502 to Hayashida et al. (“Hayashida”) in view of the knowledge of a person of ordinary skill in the art (“PHOSITA”) in further view of JPH09-311625 to <i>Ikeda</i> .	EX1004, EX1007
<u>Ground 3:</u> Claims 1, 3-5, 7-11, and 13 are obvious under § 103(a) over U.S. Patent No. 6,067,502 to Hayashida et al. (“Hayashida”) in view of Cyberguide: A Mobile Context-Aware Tour Guide by Abowd et al. (“ <i>Abowd</i> ”).	EX1004, EX1005
<u>Ground 4:</u> Claims 3, 7, 11, and 13 are obvious under § 103(a) over <i>Hayashida</i> in view of <i>Abowd</i> in further view of JPH09-311625.	EX1004, EX1005, EX1007

Section IV identifies where each element of the Challenged Claims is found in the prior art. 37 C.F.R. § 42.104(b)(4). The exhibit numbers of the supporting evidence relied upon to support the challenges are provided above and the relevance of the evidence to the challenges raised are provided in Section IV. 37 C.F.R. § 42.104(b)(5). **Exhibits EX1001–EX1041** are also attached.

C. The Board’s Discretion Under § 314(a)

i. The *General Plastic* Factors

An IPR was previously filed by another, unrelated petitioner challenging claims 1-13 of the ’498 Patent. *ASUSTeK Computer Inc. et al. v. Maxell, Ltd.*, IPR2019-00071, Paper 7 at 2 (PTAB Mar. 14, 2019) (“the ’498 IPR”) (Ex. 1014). The Board declined to institute because Petitioner failed to identify sufficient corresponding structure in certain limitations governed by 35 U.S.C. § 112 ¶ 6. *Id.* at 11. Applying the *General Plastic* factors weighs in favor of institution of the present IPR. *General Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, slip op. at 16 (PTAB Sept. 6, 2017) (Paper 19) (precedential as to § II.B.4.i).

Factor 1: Petitioner has not previously filed a petition against the ’498 Patent. Patent Owner asserted the ’498 Patent against ASUSTeK in a lawsuit filed March 22, 2019. *The ’498 IPR*, Paper 7 at 2. In a separate lawsuit filed nearly 1 year later on March 15, 2019, Patent Owner asserted the ’498 Patent against Petitioner. *Maxell, Ltd. v. Apple Inc.*, 5:19-cv-00036, No. 1 (E.D. Tex. March 15, 2019) (“*Maxell Complaint*”) (Ex. 1010). There is no relationship between ASUSTeK and Petitioner with respect to the Challenged Patent or Patent Owner. Therefore, factor 1 favors institution.

Factor 2: The references in the grounds of unpatentability in the present IPR (*Hayashida*, *Abowd*, and *Ikeda*) were located by Petitioner’s counsel since the March

15, 2019, filing of the *Maxell v. Apple* litigation. Therefore, factor 2 favors institution.

Factor 3: A preliminary response and an institution decision were issued in the '498 IPR prior to the filing of the present Petition. Therefore, factor 3 weighs against institution.

Factor 4: Petitioner and its counsel commenced prior-art searches no earlier than approximately May 2019 and continued to perform prior art searching as late as August/September 2019. The references applied in this IPR were located in the May-September timeframe. Petitioner then immediately proceeded to preparing the present IPR along with IPR petitions directed to the nine other patents asserted in the litigation by Patent Owner, which the Board can appreciate takes significant time to prepare. There has been no delay between the time of locating the presently-applied base references and filing of this IPR. Therefore, factor 4 favors institution.

Factor 5: Petitioner was not sued by Patent Owner until March 15, 2019, nearly 1 year after ASUSTeK was sued. With respect to the timing of filing of this IPR from when Petitioner was sued, Petitioner has been diligently engaged, searching for prior art and preparing this IPR petition. Therefore, factor 5 favors institution.

Factors 6 and 7: The Board's finite resources will not be adversely affected by this IPR. The '498 IPR involved different prior art references, so the Board will

not be repeating work or engaging in duplicative efforts. These factors also favor institution.

Because the majority of the *General Plastic* factors favor institution, Petitioner respectfully requests the Board not exercise its discretion under § 314(a) to deny this Petition.

ii. Petitioner Has Not Delayed in Filing This Petition

While there is a parallel district court proceeding involving the '498 patent, no preliminary injunction motion has been filed, the district court has not been presented with or invested any time in the analysis of prior art invalidity issues, and no *Markman* hearing has been held. (**Ex. 1041**, *Maxell v. Apple Docket Control Order*). Apple also timely filed its petition within the statutorily prescribed 1-year window. Declining to institute IPR here in view of the co-pending district court litigation would essentially render nugatory the 1-year filing period of § 315(b). Notably, § 315(b) originally contained only a 6-month filing window which was amended to 1-year prior to passage of the America Invents Act to “afford defendants a reasonable opportunity to identify and understand the patent claims that are relevant to the litigation” before having to file an IPR petition. 157 Cong. Rec. S5429 (daily ed. Sept. 8, 2011) (statement of Sen. Kyl). Moreover, making the status of the district court litigation a threshold consideration before institution also ignores the common scenario, contemplated by Congress, of obtaining a district court stay based

on institution. *Cf.* 157 Cong. Rec. S1363 (daily ed. Mar. 8, 2011) (statement of Sen. Chuck Schumer); H. Rep. No. 112-98, Part I, at 48 (2011). For these reasons, and those explained below, the instant petition should be instituted.

D. Claim construction under 37 C.F.R. § 42.104(b)(3)

In this proceeding, claims are interpreted under the same standard applied by Article III courts (i.e., the *Phillips* standard). *See* 37 C.F.R. § 42.100(b); *see also* 83 Fed. Reg. 197 (Oct. 11, 2018); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). Under this standard, words in a claim are given their plain meaning, which is the meaning understood by a person of ordinary skill in the art in view of the patent and file history. *Phillips*, 415 F.3d 1303, 1312-13. Dictionaries or other extrinsic sources may assist in determining the plain and ordinary meaning but cannot override a meaning that is unambiguous from the intrinsic evidence. *Id.*

Certain Challenged Claims recite the generic term “device” for performing a specific function. Because “device” is a “nonce word” that can operate as a substitute for “means,” the claim construction principles of 35 U.S.C. § 112, ¶ 6 (“112-6”) must be applied to these limitations. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1350 (Fed. Cir. 2015) (“[N]once words that reflect nothing more than verbal constructs may be used in a claim in a manner that is tantamount to using the word ‘means’ because they typically do not connote sufficiently definite structure and therefore may invoke § 112, para. 6.”) (internal quotations omitted). Corresponding

structure for each 112-6 limitation is identified below, and Petitioner proposes that the claimed functions recited in each of these limitations be given its plain and ordinary meaning that the term would have to one of ordinary skill in the art.

A number of terms in Challenged Claims have previously been construed by the Board as well as district court, and Patent Owner and Petitioner have submitted claim construction briefing in parallel district court litigation. *Maxell Ltd. v. Apple Inc.*, 5:19-cv-00036, No. 99 (“*Joint Claim Construction and Prehearing Statement*”) (Ex. 1011) and No. 136 (“*Opening Claim Construction Brief*”) (Ex. 1012) (E.D.Tex. Nov. 18, 2019). Petitioner identifies below relevant citations to these prior and ongoing claim construction undertakings.

1. “a device for getting location information denoting a present place of said portable terminal”

Claims 1, 6, and 10 recite “a device for getting location information denoting a present place of said portable terminal.” ’498 Patent (Ex. 1001), 10:32-33; 10:62-63; 11:30-31. A prior Board ruled that this limitation is governed by 112-6¹ and found the corresponding structure is “(1) a wireless or cellular antenna, or a GPS, or a Personal Handyphone System [PHS]; and (2) an infrared ray sensor; and (3) a

¹ Petitioner notes that a separate Board also found the limitation is governed by 112-6 with respect to related U.S. Patent No. 6,748,317 (the “’317 Patent”) (Ex. 1040), and declined to institute because the petitioner failed to identify corresponding structure *ZTE Corporation et al. v. Maxell, Ltd.*, IPR2018-00235, Paper 9 at 10.

control unit for analyzing received data, with the control unit calculating location information as disclosed in the '498 Patent at 5:48-56, and Fig. 2.” *ASUSTeK Computer Inc. et al. v. Maxell, Ltd.*, IPR2019-00071, Paper 7 (Ex. 1014), at 7-9. The Board expressly noted in that proceeding that “Patent Owner does not dispute this construction.” *Id.* at 9. Patent Owner’s concession made during this prior IPR proceeding should be relied on to support a finding of prosecution disclaimer during claim construction. *Aylus Networks, Inc. v. Apple Inc.*, 856 F.3d 1353, 1359 (Fed. Cir. 2017). Patent Owner should not be allowed to argue claims in one way in order to maintain their patentability and in a different way against accused infringers in subsequent proceedings. *Id.*

For a number of reasons, Petitioner proposes the Board adopt the same construction in this proceeding. First, the proposed structure aligns with the intrinsic record, which teaches three distinct components for getting location information—a wireless receiver (e.g., wireless or cellular antenna, GPS, or PHS), an infrared ray sensor, and a control unit for analyzing received data to determine location information. *See, e.g., '498 Patent* (Ex. 1001) at 4:9-11 (“For example, such a wireless antenna as a GPS, a PHS, etc., **as well as an infrared ray sensor** is used to measure location information.”); 9:39-44 (“The device for getting location information 77 is provided with [1] such a wireless antenna, a GPS, a PHS, or the like; [2] such a data receiver as an infrared ray sensor, or the like; and [3] a control

unit for analyzing received data, thereby calculating location information.”) (emphases added).

Second, a PHOSITA would have understood that infrared beacons were a common solution for navigation systems generally as well as for walking navigation systems. A PHOSITA would have recognized that navigation systems at the time of the '498 Patent often used infrared beacons to correct GPS positions. *Kotzin Decl.* at ¶¶ 43-45, 127-128 (discussing the need for corrective information due to Selective Availability of GPS signals). And a PHOSITA would also have recognized that walking navigation systems often demanded location information indoors where traditional location technology such as GPS is not available. *Id.* at ¶¶ 45, 128. The goal of '498 Patent is to provide location and navigation information, specifically to a walking user. '498 Patent (Ex. 1001), 1:11-13. Although satellite positioning technology such as GPS was well-established for determining a location outdoors, it was known at the time of the '498 Patent that these technologies were not suitable for determining a location when indoors. *Kotzin Decl.* (Ex. 1003), ¶¶ 45, 128 (discussing known ineffectiveness of GPS when indoors). A PHOSITA would have further known at the time of the '498 Patent that infrared beacons were a solution to provide location information indoors. *Id.* at ¶¶ 45, 128.

Because Patent Owner did not dispute the proposed construction in a prior proceeding, the intrinsic record supports this prior construction, and the construction

is consistent with the known limitations of satellite-based positioning at the time of the '498 Patent, this prior construction should be adopted here.²

2. “a device for getting direction information denoting an orientation of said portable terminal”

Claims 1, 5, and 10 recite “a device for getting [a] direction information denoting an orientation of said portable terminal.” *'498 Patent* (Ex. 1001), 10:34-35; 10:64-65; 12:1-2. As with the first term, a prior Board found that this limitation is governed by 112-6 with respect to related U.S. Patent No. 6,748,317. *ZTE Corporation et al. v. Maxell, Ltd.*, IPR2018-00235, Paper 9 (Ex. 1013), at 10. And both Petitioner and Patent Owner agree in current parallel litigation that this term should in fact be construed pursuant to 112-6. *Joint Claim Construction and Prehearing Statement*, (Ex. 1011), 2, *Opening Claim Construction Brief* (Ex. 1012), 26.

Further, both Petitioner and Patent Owner agree that the corresponding structure is “a compass, a gyroscope, and/or sensor such as a clinometer in conjunction with a CPU, or equivalents thereof.” (*Joint Claim Construction and Prehearing Statement* (Ex. 1011), 2), which is the express definition set forth in the

² Petitioner notes that to the extent the Board adopts the construction put forth by Patent Owner in district court litigation, the structures identified by Petitioner in the prior art satisfy this construction.

'498 Patent. Namely, the '498 Patent expressly defines the structure of the devices as follows:

The device for getting direction information 78 is provided with a compass, a gyro, such a sensor as a clinometer, and a control unit for analyzing sensor-measured data, thereby calculating direction information.

'498 *Patent* (Ex. 1001), 9:48-51. The specification further provides that the CPU performs analysis of sensor-measured data to get direction information. *Id.* at 4:14-30, 5:56-62, and Fig. 2.

IV. THERE IS A REASONABLE LIKELIHOOD THAT THE CHALLENGED CLAIMS OF THE '498 PATENT ARE UNPATENTABLE

A. Ground 1: *Hayashida* in view of the Knowledge of a PHOSITA renders claims 1, 3, 5, and 7-8 obvious

Overview of the Prior Art

Hayashida was filed on August 21, 1997 and issued on May 23, 2000 and is prior art to the '498 Patent under at least 35 U.S.C. § 102(e) (pre-AIA) ("§ 102(e)").³

Hayashida was not cited or considered during prosecution of the '498 Patent.

³ To the extent Patent Owner attempts to swear behind the August 21, 1997 priority date, Petitioner reserves the right to rely on the disclosures of *Hayashida*'s foreign priority applications to demonstrate its status as prior art under 102(e) should be assessed at an earlier date.

Hayashida is directed to a navigation system. *Hayashida* (Ex. 1004), Abstract.

The system described by *Hayashida* uses a satellite GPS system and land-based beacon system to obtain the location of the user as well as an electronic compass and gyroscope to obtain the traveling direction of the user. *Id.* at 7:60-8:8. *Hayashida* uses this information to retrieve information such as destinations and routes to destinations. *Id.* at 54:33-46. *Hayashida* teaches that this information may be presented to the user through various techniques, including the display of whole routes, sections of routes, and simple maps that allow the user to grasp the information in an intuitive manner. *Id.* at 21:15-50, 22:32-39. While the specific details of *Hayashida*'s system are described within the context of a vehicle-based navigation system embodiment, *Hayashida* expressly contemplates that its invention is applicable to portable "carrying-type navigation device[s]" for use by pedestrians. *Id.* at 76:13-20.

Because *Hayashida*, like the '498 Patent, teaches a small portable "carrying-type navigation device" for pedestrians that includes both wireless data connectivity and satellite and land-based beacon positioning, *Hayashida* is in the same field of endeavor as the '498 Patent. Compare *id.* at 7:60-8:8, 76:13-20 with '498 Patent (Ex. 1001) at 2:30-55; *Kotzin Decl.* (Ex. 1003), ¶¶ 56-60. *Hayashida* is reasonably pertinent to the claims in the '498 Patent because both *Hayashida* and the '498 Patent are concerned with displaying various position, destination, and direction

information in a manner that the user can clearly grasp. *Compare Hayashida* (Ex. 1004) at 58:37-43; *see also id.* at 50:64-51:2 (discussing display of position and direction of previous guide route); *with '498 Patent* (Ex. 1001) at 6:12-13 (“[T]he information is thus displayed more easily for the walker to understand.”); *see also id.* at 10:17-22 (teaching a “user-friendly interface that enables the walker (user) to understand condition inputs intuitively.”); *Kotzin Decl.* (Ex. 1003), ¶ 60.

i. Claim 1

1[P]. A portable terminal with the function of walking navigation, comprising:

To the extent that the preamble is limiting, *Hayashida* teaches a portable terminal with the function of walking navigation:

“[T]his invention may be applied to the **carrying-type navigation device** in addition to the navigation device which is attached to the movement bodies such as the car. In other words, **this invention may be applied to the small navigation device which can be accompanied by the human and which is used in a cycling, a travel, a mountaineering, a hike, a fishing or so on.**⁴

Hayashida (Ex. 1004), 76:13-20.

⁴ Unless otherwise indicated, all emphasis added by Petitioner.

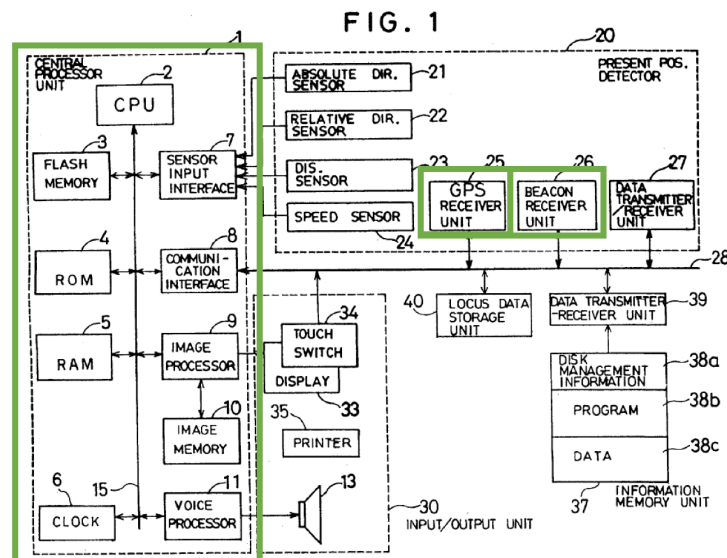
[1(a)] a device for getting location information denoting a present place of said portable terminal; and

As discussed above in Section III(D)(1), the corresponding structure for this limitation is “(1) a wireless or cellular antenna, or a GPS, or a Personal Handyphone System [PHS]; and (2) an infrared ray sensor; and (3) a control unit for analyzing received data, with the control unit calculating location information as disclosed in the ’498 Patent at 5:48-56, and Fig. 2.” Satisfying this limitation, *Hayashida* teaches a device (i.e., central processor 1, including CPU 2, and present position detector 20, including GPS receiver 25, and beacon receiver 26) for getting location information (i.e., latitude and longitude information) denoting a present place of said portable terminal.⁵ *Kotzin Decl.* (Ex. 1003), ¶¶ 61-62.

Specifically, *Hayashida* teaches that central processor 1, including CPU 2, controls the operation of the navigation device. *Hayashida* (Ex. 1004, 6:47-49 (“A central processor 1 controls the operation of the whole navigation device. The central processor 1 is comprised with a CPU 2...”; 6:65-67. (“These programs 38b correspond to various processing by each flow chart to mention later and are executed in CPU 2.”) “[P]resent position detector 20 outputs data for detecting the present position of the car.” *Id.* at 7:60-61. Present position detector 20, includes

⁵ To the extent the Board adopts the construction put forth by Patent Owner for this limitation, Petitioner notes that the identified structure satisfies this broader construction as well.

GPS receiver 25 and beacon receiver 26, which provide information related to the present position of the navigation device. *Id.* at 7:50-54. GPS receiver unit 25 receives GPS signals to detect position data such as longitude and latitude, while beacon receiver 26 receives VICS data, which are used for correcting an error in the position of the vehicle detected by GPS receiver 25. *Id.* at 7:66-8:8. *Hayashida's* device for getting location information is depicted below:



Id. at Fig. 1.

A PHOSITA would have known that VICS was a specific Japan-based beacon system that utilized infrared technology to communicate information to beacon receivers such as those disclosed by *Hayashida*. *Kotzin Decl.* (Ex. 1003), ¶¶ 61, 42-45 (describing VICS and PICS). Further, a PHOSITA would have understood that correcting a GPS-based position with beacon information in a pedestrian context (e.g., in a hiking/traveling application expressly disclosed by *Hayashida*) is an

obvious application of the *Hayashida* teachings. *Id.* at ¶ 62. *Hayashida* expressly discloses correcting GPS position with beacon information only in the context of vehicle-based navigation. But a PHOSITA would have known that VICS data had been expanded to pedestrian applications, referred to as Pedestrian Information and Communication System (PICS) and that such pedestrian-focused VICS information could be easily deployed on *Hayashida*'s pedestrian-focused embodiments to provide more accurate positioning than GPS was capable of providing alone. *Id.* at ¶¶ 62, 42-45. A PHOSITA would have recognized that this supplemental positioning information would have been particularly beneficial in urban environments with tall structures that were well known at the time to have caused problems with GPS-positioning due to blocked GPS satellite signals. *Id.* at ¶¶ 62, 42-45. Indeed, such infrared systems could even be used to allow the navigation system to function indoors. *Id.* at ¶¶ 62, 42-45.

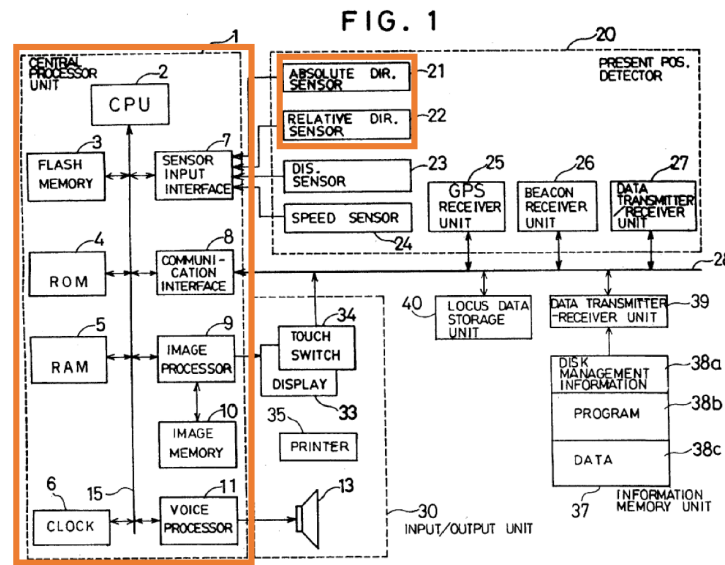
Although *Hayashida* describes this navigation device in the context of a vehicle navigation application, a PHOSITA would have understood that both a GPS and infrared ray sensor controlled by a CPU would be desirable in a portable embodiment for pedestrians, as portable devices at the time commonly included these components for getting location information. *Kotzin Decl.* (Ex. 1003), ¶¶ 62, 41-45.

Accordingly, *Hayashida* renders obvious a central processor including a CPU, a GPS, and an infrared ray sensor, which perform the claimed function of getting location information denoting the present place of said portable terminal, in a portable carrying-type navigation device for walking navigation.

[1(b)] a device for getting direction information denoting an orientation of said portable terminal,

As discussed above in Section III(D)(2), the corresponding structure for this limitation is “a compass, a gyroscope, and/or sensor such as a clinometer in conjunction with a CPU, or equivalents thereof.” Satisfying this limitation, *Hayashida* teaches a device (i.e., central processor 1, including CPU 2, and present position detector 20, including absolute direction sensor 21, and relative direction sensor 22) for getting direction information (i.e., the direction of travel) denoting an orientation of said portable terminal. *Kotzin Decl.* (Ex. 1003), ¶¶ 63-64.

Specifically, *Hayashida* teaches that central processor 1, including CPU 2, controls the operation of the navigation device. *Hayashida* (Ex. 1004), 6:47-49; 6:65-67. “[P]resent position detector 20 outputs data for detecting the present position of the car.” *Id.* at 7:60-61. *Hayashida*’s device for getting direction information is depicted below:

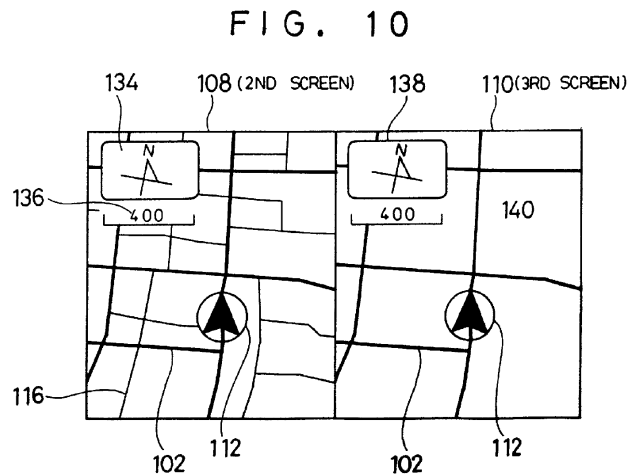


Hayashida (Ex. 1004), Fig. 1.

Present position detector 20, includes absolute direction sensor 21 and relative direction sensor 22, which provide information relating to the direction of travel of the car (i.e., direction information). *Id.* at 7:28-42, 13:35-41. A PHOSITA would have recognized that the direction of travel of a car is reflective of the orientation of the navigation device. *Kotzin Decl.* (Ex. 1003), ¶ 63. *Hayashida* explains that absolute direction sensor 21 may be a terrestrial magnetism sensor, which detects terrestrial magnetism (i.e., south-and-north direction), output as absolute direction data ZD. *Id.* at 7:31-36, 10:58-61. A PHOSITA would have understood this is describing a compass. *Kotzin Decl.* (Ex. 1003), ¶ 63. *Hayashida* also explains that relative direction sensor 22 may be a gyroscope, which outputs a relative angle of

direction of travel of the car with respect to the absolute direction data ZD, output as relative direction angle D θ . *Hayashida* (Ex. 1004), 7:36-42, 10:61-64.

Hayashida explains that the determined position of the vehicle is collated with map data stored in a data 38c of the information memory unit 37, and the present position on the map screen is corrected and is indicated more correctly. *Id.* at 13:41-45. As depicted below, the present position symbol generated from this information denotes orientation:



Id. at Fig. 10; *see also id.* at Figs. 14 and 16 (showing symbol 112), Figs. 9, 20, 23-26, 28-31, 41-46, 50-52, and 73 (showing symbol 100).

A PHOSITA would further have recognized that *Hayashida's* orientation teachings are equally applicable to *Hayashida's* expressly contemplated portable device embodiment for pedestrians. *Kotzin Decl.* (Ex. 1003), ¶¶ 64, 46. Although *Hayashida* describes this navigation device in the context of a vehicle navigation application, a PHOSITA would have understood that the features described would

be desirable in a portable embodiment for pedestrians, as portable devices at the time commonly included this feature. *Id.* at ¶¶ 64, 46 (explaining that it was well known for pedestrian devices to include orientation functionality such as a compass sensor and citing numerous background documents confirming this understanding). Additionally, a PHOSITA would have recognized that while vehicles are typically limited to driving along roads, pedestrians have more freedom to walk along paths that are not defined by roads and therefore would have a greater need for a device that determines a precise orientation. *Id.* at ¶¶ 64, 46.

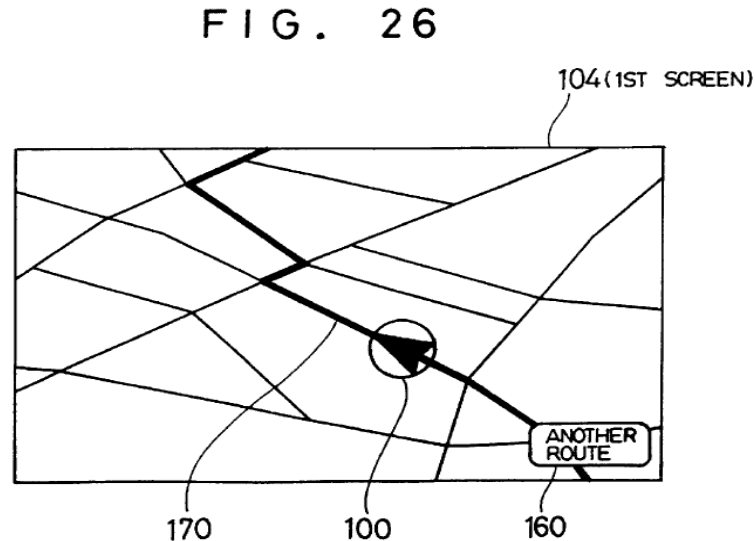
Accordingly, *Hayashida* renders obvious implementing a central processor including a CPU and a gyroscope and a compass that perform the claimed function of getting direction information denoting the orientation of the portable terminal, in a portable carrying-type navigation device for walking navigation.

[1(c)(i)] wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points

Hayashida discloses that said display displays positions of said destination and said present place, and a relation of said direction and a direction from said present place to said destination. *Hayashida* teaches a variety of display techniques for use in navigation devices.

In one embodiment, *Hayashida* discloses “simultaneously displaying different classifications of routes in the same scale, or different routes from a present

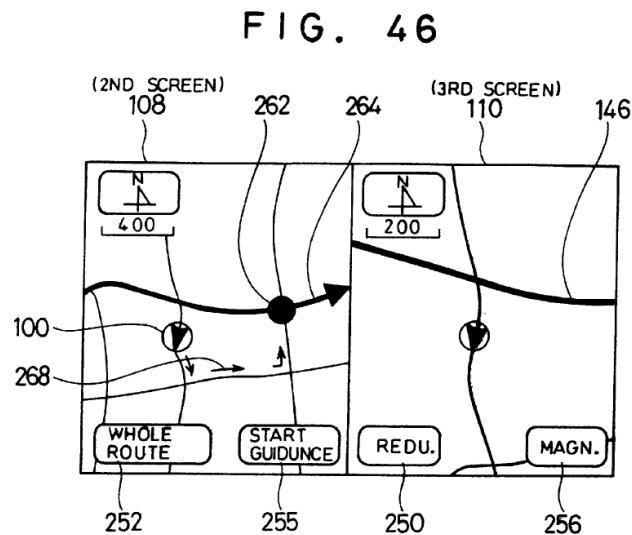
position or starting point to a destination.” *Hayashida* (Ex. 1004), at Abstract; *see also id.* at 15:64-16:4 (teaching display of a whole route or a part of a route). In the route display technique taught by *Hayashida*, routes that are depicted as long bent lines as depicted below:



Id. at Fig. 26. *Hayashida* explains that these routes are generated by connection data, which represent road connections, which in turn is represented by other types of data, including shape data and length data. *Id.* at 12:6-56. A PHOSITA would have understood that each connection is an orientation of a line. *Kotzin Decl.* (Ex. 1003), ¶¶ 73-74. Indeed, *Hayashida* explains that shape data indicates the direction of the road. *Id.* at 25:67-26:1. And a PHOSITA would have understood that a direction of a road is an orientation. *Id.* at ¶ 74. A PHOSITA would further have recognized that each connection within a depicted route represents a length of a line. *Id.* Finally, a PHOSITA would have recognized that the route itself is a length of a line. *Id.* Indeed,

Hayashida explains that “[t]he length data represent a length from the start point to the end point of a road, lengths from the start point to the nodes, and lengths among the nodes.” *Id.* at 12:55-58.

Hayashida teaches that the route itself may be an arrow (symbol 264), or alternatively, may be made up of several bent line arrows (symbol 268), each of which indicate a direction of movement, as depicted in Figure 46:

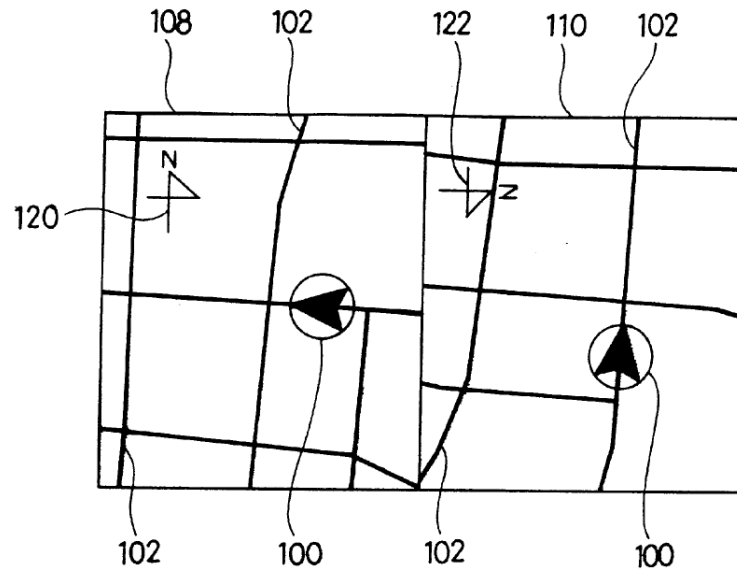


Id. at Fig. 46. Accordingly, said orientation and length of said line is distinguished between starting and ending points. *Kotzin Decl.* (Ex. 1003), ¶ 78.

When displaying a route, *Hayashida* teaches a head up map display, which is a map where the upper portion of the map is the direction of progress. *Hayashida* (Ex. 1004), 2:10-12; *see also id.* at 23:39-42 (“[At] the map of the head up, a direction of a traveling by the car always becomes a top of the screen.”). A head up

map, compared to a north up map (i.e., a map where the north is always shown at the top of the screen), is illustrated in the following figure:

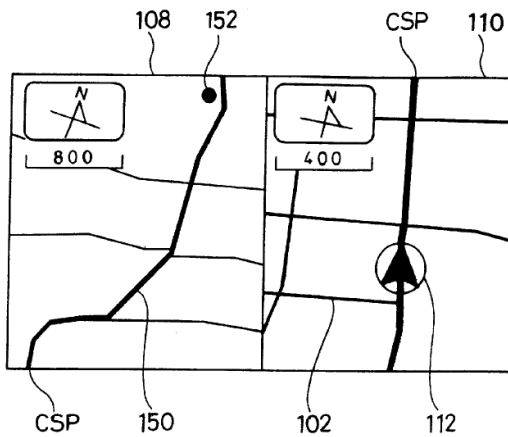
FIG. 20



Id. at Fig. 20. This head up map changes in accordance with direction information (i.e., $D\theta$). *Id.* at 43:31-40. A PHOSITA would further recognize the head up display applied to a route display to be an orientation of the route lines and of the entire route (i.e., an orientation and a length of a line). *Kotzin Decl.* (Ex. 1003), ¶ 78.

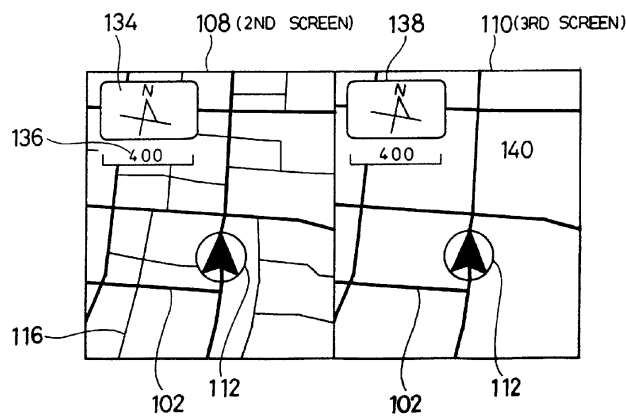
Hayashida also teaches a variety of symbols, which mark destinations, including a star, a circle, a triangle, a square, a fork, a glass, a bag, a flag and a house and so on. *Id.* at 64:38-42. Such a destination symbol is depicted in the following figure as symbol 152:

FIG. 16



Id. at Fig. 16. *Hayashida* further teaches a symbol in the form of a circle with an arrow that designates a present position (i.e., present place) along the route. *Id.* at 17:58-59; *see also id.* at 37:12-13 (referring to symbol 100). This symbol is depicted in the following figure as symbol 112:

FIG. 10



Id. at Fig. 10; *see also id.* at Figs. 14 and 16 (showing symbol 112), Figs. 9, 20, 23-26, 28-31, 41-46, 50-52, and 73 (showing symbol 100). A PHOSITA would have recognized that depicting such symbols along a route would distinguish the route

line from starting and ending points. *Kotzin Decl.* at ¶¶ 75-76. For example, when a route is initialized, a present position would also be a starting point, while a destination would be an end point. *Id.*; see also *Hayashida* (Ex. 1004), 11:9-14 (teaching storage of start point data SP and end point of route ED).

To the extent Patent Owner argues that this limitation requires depicting a length of line that changes in length according to distance traveled, such a modification to *Hayashida* would have been obvious. *Hayashida* teaches the use of different colors and patterns to distinguish between routes. For example, *Hayashida* teaches “[t]he guide route is displayed on the map in a manner that it can be easily discriminated. For example, the guide route and the road other than the guide route are indicated in different colors, so that the two can be discriminated from each other.” *Id.* at 14:5-9, 65:54-56; see also e.g., *id.* at 45:51-53 (“Furthermore, in the actual display screen, the return route is displayed in the different color from or the same color as the previous guide route 146.”). *Hayashida* also teaches patterns, such as a dotted line or arrows. See e.g., *id.* at Fig. 29 (showing a dotted line and solid line), Fig. 46 (showing arrows and a solid line).

It would have been obvious to apply this feature to the route to show the length of the route that has already been traveled compared to what is left to travel by changing the color or pattern of the line. *Kotzin Decl.* (Ex. 1003), ¶ 80. Such a modification would require little modification as the various colors and patterns are

already taught by *Hayashida*. *Id.* A PHOSITA would have been motivated to make such a modification to further assist the user with grasping location and direction information—another goal of *Hayashida*'s display. *Id.*; *Hayashida* (Ex. 1004), 14:6-9, 31:34-38; *see also id.* at 50:64-61:4 (discussing display of position and direction of previous guide route), 58:37-43 (teaching display to allow a user to clearly grasp surroundings).

[1(c)(ii)] to supply route guidance information as said walking navigation information.

Hayashida teaches that route guidance information is supplied as navigation information. *Hayashida* teaches “[t]he guide route data MW stored in the RAM 5 represent an optimum route or a recommended route up to the destination, and are found by a processing for searching a route.” *Hayashida* (Ex. 1004), 11:25-28. The guide route data MW are constituted by connections from a start point to an end point. *Id.* at 11:30-33. The processing of a guidance display is executed based on the sent guide route data. *Hayashida* (Ex. 1004), 75:46-49. “The figure data to be displayed are used for route guidance and map showing on the display 33.” *Id.* at 7:14-16.

Although *Hayashida* describes this navigation device in the context of a vehicle navigation application, it would have been obvious that the features described would be desirable in a portable embodiment for pedestrians. Indeed, *Hayashida* expressly notes that the described invention is applicable to portable

navigation devices for pedestrians (e.g., hiking, mountaineering, traveling). *Id.* at 76:13-20. *Hayashida* further teaches that routes may include backlanes, which may be footpaths. *Id.* at 12:21-25; *see also id.* at 10:6-14 (discussing display of backlanes).

Implementing route guidance for a pedestrian application would have been straightforward. *Hayashida* teaches that various functions such as the guidance beginning, searching the return route and identifying the route only operate at slow speeds. *Hayashida* (Ex. 1004), 50:10-14. Accordingly, a PHOSITA would have recognized that a pedestrian embodiment would have been particularly well-suited for these functions, given that pedestrians move more slowly than vehicles. *Kotzin Decl.* (Ex. 1003), ¶ 71. Additionally, it would have been obvious that the features described would be desirable in a portable embodiment for pedestrians, as portable devices at the time commonly included these features. *Kotzin Decl.* (Ex. 1003), ¶¶ 73, 52 (teaching display of routes as bent lines), 79, 55 (teaching head up display), 75-76, 53 (teaching display of starting and end points), 78, 54 (teaching display of arrows). Accordingly, providing pedestrian route guidance would have been a straightforward application of *Hayashida's* teachings, that would not have required undue experimentation and which would have yielded predictable results. *Id.* at ¶ 71.

In sum, it would have been obvious to implement each of *Hayashida's* expressly disclosed display features and functionalities mapped above in both *Hayashida's* expressly described vehicle embodiment and its expressly described pedestrian embodiment.

ii. Claim 3

3. A portable terminal with the function of walking navigation according to claim 1, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

As discussed above, it would have been obvious to implement *Hayashida's* teachings in a portable carrying-type navigation device, including its teaching that orientation is determined using a compass. *See* Section IV(A)(i), claim limitation [1(b)], *supra*.

It would have been obvious that there are a number of ways to determine the orientation of a navigation device. *Kotzin Decl.* (Ex. 1003), ¶¶ 65, 47. For example, in the context of a vehicle navigation system, orientation would be determined with respect to the fixed position of the navigation system within the vehicle. *Id.*, at ¶ 65. In contrast, A PHOSITA would have recognized that a different approach would be required to determine an orientation in a handheld navigation device that can be freely moved about with respect to the user. *Id.* A PHOSITA would have known that one such method would be to use the orientation of the device's display as a reference point. *Id.* at ¶¶ 65, 47. Indeed, it was well-known that handheld devices

were intended to be used (or even required to be used) in a particular orientation with respect to the user, such that the user would be able to view the screen. *Id.* For example, when a user held the device in the recommended/mandatory manner, the display on the device would be oriented in a specific manner and consistent with regard to an expected direction of travel. *Id.* It would have been obvious to implement this function using a direction sensor in the device—said device also incorporating a fixedly mounted display. *Id.* This sensor would have been calibrated in such a manner that a direction indicated on the display properly associated with a defined forward movement of the device. *Id.* Accordingly, the orientation of a display would be consistent across all users giving accurate results regardless of the person using the device. *Id.* That the recommended/mandatory orientation of the device would be used as a reference point for purposes of orientation-focused tasks in a handheld navigation device would have been obvious to any PHOSITA familiar with human-machine interactions. *Id.*

iii. Claim 5

5[P]. A portable terminal with the function of walking navigation, comprising:

See Section (IV)(A)(i), Claim 1 preamble, *supra*.

[5(a)] a device for getting location information denoting a present place of said portable terminal; and

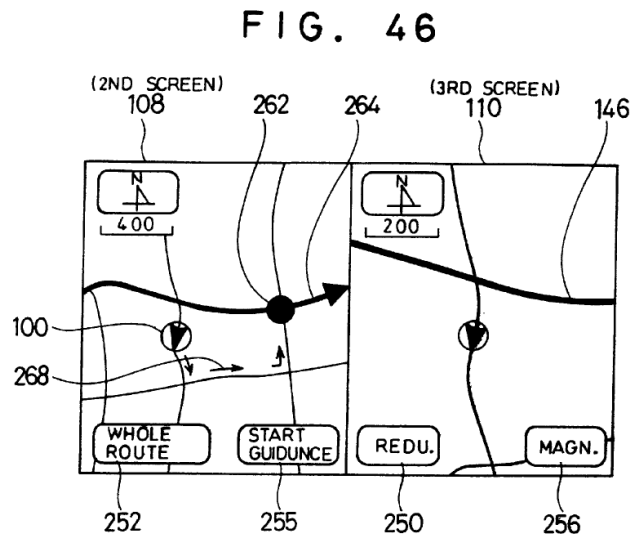
See Section IV(A)(i), claim [1(a)], *supra*.

[5(b)] a device for getting direction information denoting an orientation of said portable terminal,

See Section IV(A)(i), claim [1(b)], supra.

[5(c)(i)] wherein a local route around said present place is shown with a bent line and a direction of movement is shown with an arrow on said bent line

Hayashida teaches that routes may be displayed as bent lines and that a present position symbol, which indicates a direction of movement by a pointer arrow, is displayed on said route. Section IV(A)(i), claim [1(c)(i)], *supra*. *Hayashida* further teaches that the route itself may include an arrow (symbol 264), which indicates a direction of movement, as depicted in Figure 46:



Id. at Fig. 46. A PHOSITA would have recognized such a route to be a local route because the route depicts only a portion of the route, as opposed to the whole route (which would be viewed by a user via the “whole route” button shown on the screen).

Kotzin Decl (Ex. 1003), ¶ 72.

Hayashida teaches that in some instances the displayed route may include backlanes. *Hayashida* (Ex. 1004), 16:63-17:6. A backlane display may be displayed automatically or may be manually selected by a user by pressing a “details” button, should the user wish to see more details of the surrounding area. *Id.* at 22:9-14 (teaching automatic backlane display based on speed of car); 72:24-29 (teaching manual selection of backlane display). *Hayashida* explains that backlanes are narrower than a predetermined width, such as footpaths or lanes. *Id.* at 12:21-25, 10:6-14. In the same manner that a portion of the full route may be depicted in a zoomed-in mode (i.e., displaying a local version of the route), a PHOSITA would have understood that the backlanes are also local route display. *Kotzin Decl* (Ex. 1003), ¶ 72.

[5(c)(ii)] to supply route guidance information as said walking navigation information.

In addition to the reasons discussed above in Section IV(A)(i), claim limitation [1(c)(ii)], *supra*, it would have been obvious that such a display technique would be desirable in a portable embodiment for pedestrians and would therefore have included such a display in a portable carrying-type navigation device disclosed by *Hayashida*. *Kotzin Decl* (Ex. 1003), ¶¶ 71-72. Indeed, *Hayashida*’s backlane display includes footpaths, which would only be useful to pedestrians. *Id.* at ¶ 71. *Hayashida* further teaches that backlanes would only be useful at slower speeds. *Hayashida* (Ex. 1004), 22:9-16. A PHOSITA would understand that because

pedestrians would walk more slowly than a moving vehicle, such a display would be applicable to the pedestrian embodiment. *Kotzin Decl* (Ex. 1003), ¶ 71. A PHOSITA would have been further motivated to include the backlane display in a pedestrian application because a PHOSITA would have recognized that portable devices at the time typically included route displays. *Id.* at ¶¶ 71, 52. And because *Hayashida* already teaches this functionality, such a modification would not have required undue experimentation and would have yielded predictable results. *Id.* at ¶ 71.

iv. Claim 7

7. The portable terminal with said function of walking navigation according to claim 5, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Section IV(A)(ii), Claims 5 and 3, *supra*.

v. Claim 8

8. The portable terminal with said function of walking navigation according to claim 5, wherein neighborhood guidance information is retrieved in a direction from said present place so as to supply said neighborhood guidance information as said walking navigation information.

Hayashida teaches a function where a user is able to retrieve various facilities along a route, including destinations such as gas stations, restaurants, or other stores. *Hayashida* (Ex. 1004), 10:2-14, 51:43-56. This retrieval may be further limited to a specific area, such as a postcode. *Id.* at 58:27-30, 58:45-49. *Hayashida* discloses that this information is retrieved in the moving direction of the user. *Id.* at 55:43-48. The

results, including various information of distance and position are displayed to a user so the user can grasp the relation of the facilities to the guide route. *Id.* at 58:37-43. A PHOSITA would recognize the retrieval and display of these facilities as the retrieval of neighborhood guidance information in a direction from said present place so as to supply said neighborhood guidance information as said walking navigation information. *Kotzin Decl.* (Ex. 1003), ¶¶ 69-70.

Although *Hayashida* teaches this function in the context of a vehicle, it would have been obvious to include such a function in a carrying-type embodiment for pedestrians. *Kotzin Decl.* (Ex. 1003), ¶ 70. For example, *Hayashida* teaches that routes may include backlanes, which may be footpaths. *Id.* at 12:21-25; *see also id.* at 10:6-14 (discussing display of backlanes). A PHOSITA would have recognized that footpaths would not have been applicable to a vehicle embodiment. *Kotzin Decl.* (Ex. 1003), ¶ 70.

A PHOSITA would have had a reasonable expectation of success in implementing these features because *Hayashida* teaches that various functions such as the guidance beginning, searching the return route and identifying the route only operate at slow speeds. *Hayashida* (Ex. 1004), 50:10-14. Accordingly, a PHOSITA would have recognized that a pedestrian embodiment would allow these functions to operate, given that pedestrians move much more slowly than vehicles. *Kotzin Decl.* (Ex. 1003), ¶ 70. Additionally, a PHOSITA would have recognized that such

a function was common in portable navigation devices at the time. *Id.*; *see also id.* at ¶ 53 (discussing prior art displays superimposing navigation information over a map of the surrounding area).

B. Ground 2: Hayashida in view of the Knowledge of a PHOSITA in further view of *Ikeda* renders Claims 3 and 7 obvious

Overview of the Prior Art

Hayashida is described in detail in Section IV(A) above. Japanese Patent Application H9-311625 to *Ikeda* (Ex. 1006) was published on December 2, 1997 and is prior art to the '498 Patent under at least 35 U.S.C. § 102(b) (pre-AIA) (“§ 102(b)”).⁶ *Ikeda* was not cited or considered during prosecution of the '498 Patent.

Ikeda relates to a map image display method in a portable navigation device that changes according to a state of a main body of the display device. *Ikeda* (Ex. 1007), [0001]. A CPU 10 controls the display of navigation information based on the detection information from the sensor unit 17, detection information from the GPS receiver 18. *Id.* at [0017]; *see also id.* at [0011] (“A CPU 10 is provided as a part that performs overall operation control.”). GPS receiver 18 obtains current-position information by a so-called GPS (global positioning system) including position information (latitude/longitude). *Id.* at [0015]. The sensor unit 17 is

⁶ Petitioner cites to a certified English translation of Japanese Patent Application H9-311625 (Ex. 1007).

equipped with at least one sensor that can detect movement such as an acceleration sensor, velocity sensors, or a magnetic-field sensor. *Id.* at [0023]; *see also id.* at [0022] (“[T]he present example also detects an orientation posture of the electronic map device 1 in terms of absolute orientation. As such, the sensor unit 17 is equipped with an orientation sensor such as an electronic compass.”).

Because *Ikeda*, like the ’498 Patent, teaches a small portable “carrying-type navigation device” for pedestrians that obtains both location and direction information, *Ikeda* is in the same field of endeavor as the ’498 Patent. *Compare id.* at [0015], [0017], [0022] *with* ’498 Patent (Ex. 1001) at 2:45-65; *see also Kotzin Decl.* (Ex. 1003), ¶¶ 82-83. Further, *Ikeda* is reasonably pertinent to the claims in the ’498 Patent because *Ikeda* is directed to display of navigation from the perspective of the user, so as to make the information easier to understand for the user. *Compare Ikeda* (Ex. 1007), [0003]-[0004], [0076] *with* ’498 Patent (Ex. 1001) at 2:45-65; *see also Kotzin Decl.* (Ex. 1003), ¶¶ 82-83. Therefore, *Hayashida* is also analogous to the claimed invention in the ’498 Patent. *Kotzin Decl.* (Ex. 1003), ¶ 83

i. Claim 3

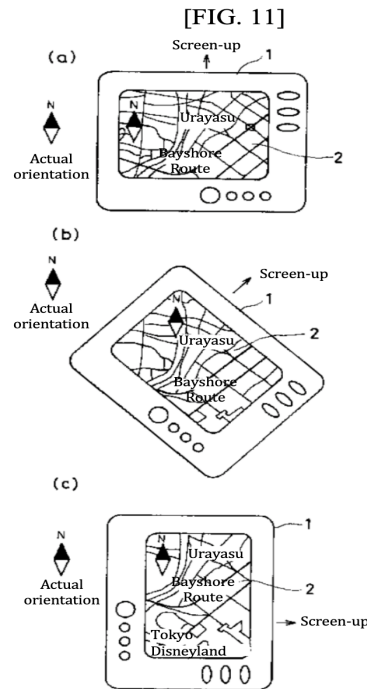
3. A portable terminal with the function of walking navigation according to claim 1, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

As discussed above, *Hayashida* teaches a portable navigation device according to Claim 1. Section IV(A)(i), Claim 1, *supra*. *Hayashida*’s portable

navigation device includes CPU 2 and present position detector 20 (including absolute direction sensor 21 and relative direction sensor 22) for getting direction information denoting an orientation of said portable terminal. *Id.*

Ikeda teaches a similar direction getting device, sensor unit 17. The sensor unit 17 is provided with an incline sensor function of detecting an incline state of the main body, an orientation sensor function of detecting an absolute orientation (north, south, east, and west), and a movement sensor function of detecting movement of the main body (movement direction and movement amount) and is equipped with various sensors necessary for these functions. *Ikeda* (Ex. 1007), [0018]; *see also id.* at [0024] (“The sensor unit 17 detects inclines, movements, and directions in terms of absolute orientation of the main body of the electronic map device such as those illustrated in FIG. 3, FIG. 4, and FIG. 5 above and is equipped with sensors necessary for such.”). *Ikeda* teaches that when the navigation device is moved, the movement direction and the movement amount are detected in terms of screen-up, -down, -left, and -right. *Ikeda* (Ex. 1007), [0023], Fig. 2. These movements are detected in terms of absolute orientation and aligns cardinal directions of the map image with actual cardinal directions by providing a display that uses the actual orientation of the device to match the actual cardinal direction. *See id.* at [0003], [0022], [0049]. The resulting display shows from the user’s perspective, a map reflecting actual cardinal directions which can be viewed regardless of which direction the user faces while

holding the device. *Id.* at [0049]. This functionality is reflected in the following image:



Id. at Fig. 11. A PHOSITA would have understood that because the display of the portable device disclosed by *Ikeda* is fixed, determining the orientation of the body of the device also determines the orientation of the display. *Kotzin Decl.* (Ex. 1003), ¶ 84.

A PHOSITA would have implemented the compass and gyroscope disclosed by *Hayashida* to get the orientation of the display of the portable terminal as taught by *Ikeda*. *Kotzin Decl.* (Ex. 1003), ¶¶ 84-85; *see also id.* at 65 (discussing *Hayashida*), 47 (discussing background of the technology). *Hayashida* includes a general teaching that the navigation device may be a portable navigation device used

by pedestrians, but does not elaborate on this teaching. *Id.* at ¶ 85. A PHOSITA therefore would have looked to other references such as *Ikeda* that expressly disclose a handheld device, in order to implement the teachings of *Hayashida*. *Id.* And given the similarity between the architecture of the two disclosures, a PHOSITA would have understood that the devices would have been able to perform the same functions. *Id.* Indeed, a PHOSITA would have had a reasonable expectation of success in making such a modification because *Hayashida* already teaches the necessary components for determining this orientation information obtained by *Ikeda*. *Id.*

ii. Claim 7

7. The portable terminal with said function of walking navigation according to claim 5, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Sections IV(A)(iii), Claim 5 and IV(B)(i), Claim 3, *supra*.

C. Ground 3: Hayashida and Abowd render claims 1, 3-5, 7-11, and 13 obvious

Overview of the Prior Art

Hayashida is described in detail in Section IV(A) above. *Abowd* was publicly available at least as of October 1997 and therefore qualifies as prior art to the '498 Patent under 35 U.S.C. § 102(b) (pre-AIA). *Abowd* (Ex. 1005); *see generally* *Munford Decl.* (Ex. 1009). *Abowd* was not cited or considered during prosecution of the '498 Patent. Although similar to Ground 1, which proposed a PHOSITA would

have understood that *Hayashida's* features in the context of a vehicle-based embodiment would have been applicable to its pedestrian embodiment, Ground 2 formally relies on *Abowd* as a component of the combination for its specific teachings that these features were in fact known in the pedestrian context.

As further evidence that *Abowd* is prior art to the '498 Patent, Petitioner provides as Exhibit 1009 a declaration from Jacob Munford, who obtained a copy of the MARC (Machine Readable Catalog) record and examined a physical copy of *Abowd* from the University of Pittsburgh and Carnegie Mellon. Mr. Munford explains that field code 008 of the respective MARC records identified the date *Abowd* was publicly available at each of these libraries occurred in October 1997. *Munford Decl.* (Ex. 1009), ¶ 10; *see also, Symantec Corp. v. Finjan, Inc.*, IPR2015-01892, 2017 WL 1041718, at *13 (Mar. 15, 2017) (finding librarian's declaration regarding MARC records as sufficient evidence of public availability). Accordingly, *Abowd* qualifies as a printed publication and is prior art with regard to the '317 Patent under at least 35 U.S.C. § § 102(b) (pre-AIA).

Abowd describes a contextually-aware, hand-held navigation device developed by a team at Georgia Tech called the Cyberguide (earlier versions called the CyBARguide). *Abowd* (Ex. 1005), 421, 428. *Abowd* teaches a modular system that includes a map module, providing a visual display of the surroundings, an information module, providing the user with information relating to the

surroundings, a positioning module, which determines the location of the user, and a communications module, which allows the user to communicate data to other users and to centralized servers. *Id.* at 423-24.

Because *Abowd* teaches a portable hand-held navigation device for pedestrian use, it is in the same field of endeavor and is reasonably pertinent to the claims of the '498 Patent. *Compare id.* at 422 (“One major application of mobile context-aware devices are personal guides...walking tours of cities or historical sites could be assisted by these electronic guidebooks.”) with '498 Patent (Ex. 1001) at 2:45-55; *see also Kotzin Decl.* (Ex. 1003), ¶¶ 86-88. Therefore, *Abowd* is also analogous to the claimed invention in the '498 Patent. *Kotzin Decl.* (Ex. 1003), ¶ 88.

Reason to Combine *Hayashida* and *Abowd*

Both *Hayashida* and *Abowd* describe portable navigation devices. While *Hayashida* generally describes the invention in the context of a vehicle embodiment, *Hayashida* also notes that the invention may be applied to a pedestrian embodiment. *Hayashida* (Ex. 1004), 76:13-20. A PHOSITA would have looked to other portable navigation devices at the time that used the same functions taught by *Hayashida* in a vehicle in a pedestrian context. *Kotzin Decl.* (Ex. 1003), ¶¶ 89-92. A PHOSITA would have been motivated to modify the system taught by *Hayashida* according to the teachings of *Abowd* because *Abowd* expressly describes these functions in a pedestrian context. *Id.* at ¶ 89. A PHOSITA would have been motivated to include

the modules taught by *Abowd*, including the map module, information module, positioning module, and communications module in the system of *Hayashida*. *Id.* at ¶ 91; *Abowd* (Ex. 1005), 423-24. Indeed, with respect to many desirable functions of the Cyberguide, *Abowd* notes that “[s]ome of these functions are currently being provided by automobile on-board navigation systems.” *Id.* at 422. Accordingly, it would have been obvious that the functions as performed by a vehicle navigation system would be provided in a pedestrian navigation system. *Kotzin Decl.* (Ex. 1003), ¶¶ 89-91.

Because of the similarity in the architecture of *Hayashida* and *Abowd*, a PHOSITA would have had a reasonable expectation of success in modifying the portable system of *Hayashida* to include the modules taught by *Abowd*. *Kotzin Decl.* (Ex. 1003), ¶ 92. For example, both *Hayashida* and *Abowd* teach the use of a GPS device and infrared ray sensor for positioning, both *Hayashida* and *Abowd* teach devices relating to the orientation of the device, and both references provide for display of this information in relation to a desired destination to assist users with traveling to that destination. *Compare Hayashida* (Ex. 1004), 7:66-8:8, 7:60-64, 8:22-31 *with Abowd* (Ex. 1005), 432, 422, 428; *Kotzin Decl.* (Ex. 1003), ¶¶ 91-92. And because *Abowd* describes a modular system, such modifications would not only have been straightforward, but would have been anticipated due to the modularity of the system. *Abowd* (Ex. 1005), 424; *Kotzin Decl.* (Ex. 1003), ¶ 92. Accordingly, such

modifications would not have required undue experimentation and would have yielded predictable results. *Id.*

i. Claim 1

1[P]. A portable terminal with the function of walking navigation, comprising:

See Section IV(A)(i), Claim 1 preamble, *supra*.

[1(a)] a device for getting location information denoting a present place of said portable terminal; and

As discussed, *Hayashida* teaches central processor 1, which includes CPU 2, and GPS receiver 25, and beacon receiver 26, which perform the claimed function of getting location information denoting a present place of said portable terminal. *See* Section IV(A)(i), claim [1(a)], *supra*.

Like *Hayashida*, *Abowd* also teaches a GPS for getting location information. *Abowd* (Ex. 1005), 422. *Abowd* notes that GPS signals may be weak in some areas, such as indoors. *Id.* at 425. *Abowd* proposes a solution, which is to use an infrared beacon system for these weak areas. *See id.* *Abowd* explains that ideally, the two systems would be integrated into the same system “to allow a tourist to wander in and out of buildings.” *Id.* at 432.

It would have been obvious, when implementing the carrying-type portable navigation device taught by *Hayashida*, to include an infrared beacon receiver along with a GPS to get location information of the portable terminal, as taught by *Abowd*. *Kotzin Decl.* (Ex. 1003), ¶¶ 93-97; 61-62; 41-45. A PHOSITA would also have

recognized that a CPU would process the data from the two devices. *Id.* at ¶ 96. A PHOSITA would have recognized that beacon receiver 26 taught by *Hayashida* could be replaced with the IR positioning system taught by *Abowd*. *Id.* Indeed, the infrared ray sensor taught by *Abowd* is very similar to the VICS system taught by *Hayashida* and the PICS system that was also available in Japan. *Id.*

A PHOSITA would have been motivated to make such a modification in order to determine a position in areas where GPS signals are weak, such as indoors, as noted by *Abowd*. *Id.* at ¶¶ 97; 61-62 (discussing *Hayashida*); 45 (discussing Background of the Technology); *Abowd* (Ex. 1005), 425, 432. Indeed, *Hayashida* also acknowledges this possibility. *Hayashida* (Ex. 1004), 13:45-47. A PHOSITA would have been further motivated to make this modification because *Abowd* expressly teaches implementation of an infrared ray sensor along with a GPS in a single pedestrian navigation device. *Abowd* (Ex. 1005), 432; *Kotzin Decl.* (Ex. 1003), ¶ 97. Such a modification is a simple substitution of a known method of infrared positioning (i.e., position correction) with another known method of infrared positioning (i.e., position determination) that would have been straightforward, and would not have required undue experimentation and would have yielded predictable results. *Id.*; *see also id.* at ¶¶ 61-62 (discussing *Hayashida*), 89-92 (discussing reasons to combine *Hayashida* and *Abowd*). Moreover, as discussed above, because *Abowd*'s system is modular, a PHOSITA would have had

a reasonable expectation of success in making this substitution. *Id.* at ¶ 97; *see also id.* at ¶¶ 61-62 (discussing *Hayashida*), 89-92 (discussing reasons to combine *Hayashida* and *Abowd*).

[1(b)] a device for getting direction information denoting an orientation of said portable terminal,

As discussed, *Hayashida* teaches a central processor 1, including CPU 2, and a compass, and a gyroscope, which perform the claimed function of getting direction information denoting an orientation of said portable terminal. *See* Section IV(A)(i), claim [1(b)], *supra*.

Abowd teaches that detection of orientation is useful in a portable, hand-held terminal. *Abowd* (Ex. 1005), 421 (“Initially, we are concerned with only a small part of the user’s context, specifically the location and orientation.”). *Abowd* explains that both position and orientation are important because the device is hand-held, such information reflects the location of the user. *See id.* *Abowd* suggests the use of an electronic compass or inertial navigation system to find user orientation. *Id.* at 422.

It would have been obvious, when implementing the carrying-type portable navigation device taught by *Hayashida*, to include a compass to determine the orientation of the portable terminal, as taught by *Abowd*. *Kotzin Decl.* (Ex. 1003), ¶¶ 98-102. *Hayashida* teaches the use of a terrestrial magnetism sensor for determining a direction information. *Hayashida* (Ex. 1004), 7:31-32. A PHOSITA would have been motivated to detect orientation, as taught by *Abowd* because a PHOSITA would

have recognized that because of the hand-held nature of the device, detection of orientation, as opposed to traveling direction, would produce more accurate results. *Kotzin Decl.* (Ex. 1003), ¶ 101. And the increased accuracy would increase the versatility of the navigation device, allowing it to answer questions with greater specificity, as taught by *Abowd*. *Abowd* (Ex. 1005), 423; *Kotzin Decl.* (Ex. 1003), ¶ 101. Accordingly, such a modification is a simple substitution of a known method with another known method that would have been straightforward, and would not have required undue experimentation and would have yielded predictable results. *Id.* at ¶¶ 102, 89-92 (discussing reasons to combine *Hayashida* and *Abowd*), 63-64 (discussing application to *Hayashida*), 41, 46 (discussing prior art implementing a device for getting direction information). Moreover, as discussed above, because *Abowd's* system is modular, a PHOSITA would have had a reasonable expectation of success in making this substitution. *Id.*; see also *id.* at ¶¶ 89-92 (discussing reasons to combine *Hayashida* and *Abowd*).

[1(c)(i)] wherein a direction and a distance of a destination from said present place are denoted with an orientation and a length of a line that is distinguished between starting and ending points

See Section IV(A)(i), claim [1(c)(i)], *supra*.

[1(c)(ii)] to supply route guidance information as said walking navigation information.

In light of *Abowd's* express teachings, it would have been obvious to implement each of *Hayashida's* display techniques, including denoting a direction

and a distance of a destination from said present place with an orientation and a length of a line that is distinguished between starting and ending points in a portable carrying type navigation device for pedestrians. *Kotzin Decl.* (Ex. 1003), ¶¶ 116-121.

Abowd teaches generally that “[t]he personal guide could also assist in route planning and providing directions” and notes that “[s]ome of these functions are currently being provided by automobile on-board navigation systems.” *Abowd* (Ex. 1005), 422. Accordingly, a PHOSITA would have displayed navigation information to pedestrians in the same way such information would be displayed to vehicle driver. *Kotzin Decl.* (Ex. 1003), ¶ 120. And because both *Hayashida* and *Abowd* teach display techniques involving similar displays, such a modification would require only minor modifications to software that would have been straightforward and yielded predictable results. *Id.* at ¶ 121.

A PHOSITA would have had a reasonable expectation of success in making this modification given the teachings of *Hayashida*. For example, *Hayashida* teaches that routes may include backlanes, which may be footpaths. *Hayashida* (Ex. 1004), 12:21-25; *see also id.* at 10:6-14 (discussing display of backlanes). A PHOSITA would have recognized that footpaths, while not useful in a vehicle embodiment, would serve as routes in a pedestrian embodiment. *Kotzin Decl.* (Ex. 1003), ¶ 121. Additionally, *Hayashida* teaches that various functions such as the guidance

beginning, searching the return route and identifying the route only operate at slow speeds. *Hayashida* (Ex. 1004), 50:10-14. Accordingly, a PHOSITA would have recognized that these functions would be well-suited to a pedestrian embodiment, as pedestrians move much more slowly than vehicles. *Kotzin Decl.* (Ex. 1003), ¶ 121.

In addition to the reasons discussed above (*see* Section IV(B), *Reasons to Combine Hayashida and Abowd, supra*), a PHOSITA would have been motivated to include each of *Hayashida*'s displays in a pedestrian embodiment because such information would further *Hayashida*'s goals of presenting information to a user to allow the user to grasp the surroundings. *Hayashida* (Ex. 1004), 58:37-43; *see also id.* at 50:64-51:2 (discussing display of position and direction of previous guide route); *compare with '498 Patent* (Ex. 1001), 6:12-13 (“[T]he information is thus displayed more easily for the walker to understand.”); *see also id.* at 10:17-22 (teaching a “user-friendly interface that enables the walker (user) to understand condition inputs intuitively); *Kotzin Decl.* (Ex. 1003), ¶ 121. Further, as described above, a PHOSITA would have recognized that portable devices at the time included each of these display techniques. *Kotzin Decl.* (Ex. 1003), ¶¶ 120, 50-55.

ii. Claim 3

3. A portable terminal with the function of walking navigation according to claim 1, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

Hayashida teaches said device for getting direction information. *See* Section IV(A)(ii), Claim 3, *supra*. *Abowd* expressly teaches determining the orientation of the Cyberguide unit, explaining that because the unit is hand-held, it also locates the user. *Abowd* (Ex. 1005), 421. It would have been obvious, in light of this disclosure by *Abowd*, that determining the orientation of a navigation device would similarly determine the orientation of a user. *Abowd* (Ex. 1005), 421. A PHOSITA would have recognized that determining the orientation of a display of said portable terminal would be a method for determining the orientation of the portable terminal and would have modified *Hayashida* accordingly. *Kotzin Decl.* (Ex. 1003), ¶ 103; *see also id.* at ¶¶ 65 (discussing *Hayashida*), 47 (discussing background of the technology).

A PHOSITA would have recognized that in a portable context, where the device may be moved about freely, some type of association between expected direction of travel and an indicated display orientation must be provided. *Id.* at ¶ 103. Indeed, it was well known that handheld devices were intended to be used (or even required to be used) in a particular orientation with respect to the user. *Id.* at ¶ 47. For example, when a user held the device in the recommended / mandatory

manner, the display on the device would be oriented in a specific manner and consistent with regard to an expected direction of travel. *Id.* at ¶ 103. A PHOSITA would have recognized that all users would hold the device in the same way when using the device in order to view the screen. *Id.* A PHOSITA would have understood, in light of *Abowd*'s teaching, that because users would hold the device in the same way, the orientation of the display of the device would be an accurate reference to determine the orientation of the user. *Id.* This is implemented by including a direction sensor in the device - said device also incorporating a fixedly mounted display. *Id.* The sensor is calibrated in such a manner that a direction indicated on the display properly associates with a defined forward movement of the device. *Id.* Accordingly, the orientation of a display would be consistent when held by user's in the recommended/mandatory manner. *Id.*; *see also id.* at ¶ 65 (discussing application to *Hayashida*). That the recommended/mandatory orientation of the device would be used as a reference point for purposes of orientation-focused tasks in a handheld navigation device would have been obvious to any PHOSITA familiar with human-machine interactions. *Id.* at ¶ 103; *see also id.* at ¶ 65 (discussing application to *Hayashida*). Additionally, a PHOSITA would have known that it was common for portable navigation devices at the time to measure orientation in this manner. *Id.* at ¶¶ 103, 47.

iii. Claim 4

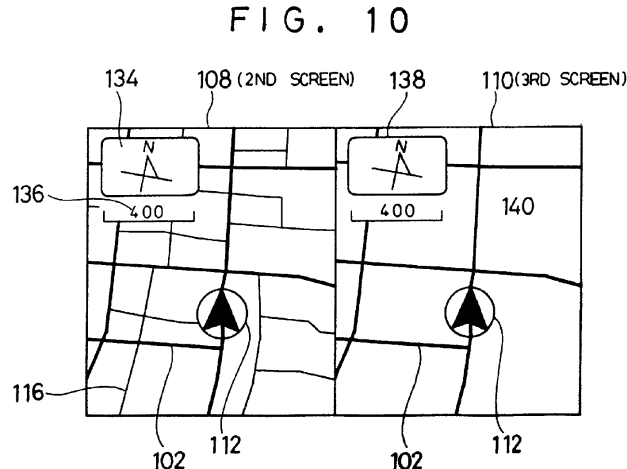
4. A portable terminal with the function of walking navigation according to claim 1, [4(a)] wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and

Hayashida in view of *Abowd* teaches that the location of a user of said portable terminal is determined according to said location information and said direction information.

Hayashida teaches that in the processing for detecting the present position (step SA2) geographical coordinates (latitude, longitude, altitude, etc.) of an overland moving body are detected using a GPS. *Hayashida* (Ex. 1004), 13:16-29. These geographical coordinates data of the vehicle are stored in the RAM 5 as present position data MP. *Id.* at 13:29-31. The present position data MP are often corrected by the data input through a beacon receiver 26 or the data transmitter/receiver 27. *Id.* at 13:31-33. Accordingly, *Hayashida* teaches determining the location of a user according to location information. *Kotzin Decl.* (Ex. 1003), ¶ 105.

Hayashida teaches that ZD data and relative direction angle data D θ (i.e., direction information) are operated to determine the position of the vehicle, enabling the position to be indicated correctly even when GPS signals are weak. *Hayashida* (Ex. 1004), 13:34-31, 31:45-47. This determined position of the vehicle is collated with map data stored in a data 38c of the information memory unit 37, and the present

position on the map screen is corrected and is indicated more correctly. *Id.* at 13:41-45. The resulting present position symbol is depicted below:



Id. at Fig. 10. The present position symbol represents a latitude and longitude on the map, as well as the direction of travel of the user. *See id.* at 19:58-59. Accordingly, a PHOSITA would understand *Hayashida* to determine the location of a user of said portable terminal according to said location information and said direction information. *Kotzin Decl.* (Ex. 1003), ¶ 105.

Abowd teaches the importance of both location and orientation in a portable navigation device. *Abowd* (Ex. 1005), 421. And like *Hayashida*, *Abowd* teaches that such information is obtained through a navigation component that includes a GPS and infrared ray sensor for obtaining location information and a compass or inertial navigation system for obtaining direction information. *Id.* at 422, 424. And like *Hayashida*, *Abowd* teaches indicating an orientation of a user with a position symbol. *Id.* at 429 (“The left shows the interactive map indicating the user’s location (the

triangle) and the location of establishments previously visited (the beer mugs).”); *see also id.* at 425 (“[W]e indicate an assumed orientation by pointing the position icon accordingly.”).

Accordingly, in light of this express teaching of *Abowd*, a PHOSITA would have been motivated, when implementing the carrying-type navigation device taught by *Hayashida*, to determine the location of a user of said portable terminal according to said location information and said direction information. *Kotzin Decl.* (Ex. 1003), ¶ 105.

[4(b)] wherein location of partner of the user is determined according to a location information from the partner's portable terminal.

Hayashida and *Abowd* teach that the location of a partner of the user is determined according to a location information from the partner’s portable terminal. As discussed, *Hayashida* and *Abowd* teach determining the location of a user according to location information. *See* Section IV(C)(iii), Claim [4(a)], *supra*.

Abowd teaches a Messenger (Communications Component) that sends and receives information via a set of wireless communication services. *Abowd* (Ex. 1005), 424. *Abowd* teaches that one use for these wireless communication services is to get location information of another portable terminal via connected network. *Abowd* notes the importance of communications between users. *Id.* at 421 (“As the prototypes of Cyberguide evolve, we have been able to handle more of the user's context, such as where she and others have been, and we have increased the amount

in which the tourist can interact and communicate with the place and people she is visiting.”). For example, *Abowd* teaches that “knowing where everyone else is located might suggest places of potential interest.” *Id.* at 431. *Abowd* explains that the data may be communicated in several different ways: mailing out from a mobile unit to the network, broadcasting from the network to all mobile unit, and updating positioning information. *Id.* at 427.

Abowd provides that “[i]n order to find out where other tourists are located, each tourist can communicate her current location to some central service that others can access.” *Id.* at 424. *Abowd* suggest that such a central service could be the Internet. *See id.* at 425 (discussing communication component); *see also id.* at 431 (suggesting leveraging the Internet).

A PHOSITA would have modified *Hayashida* to upload position information in the form of latitude and longitude coordinates (location information) of each user to a central service such as the Internet as suggested by *Abowd*. *Kotzin Decl.* (Ex. 1003), ¶¶ 106-108. *Hayashida* already exchanges this information with the VICS server for use in generation of display figures. *Id.* at ¶ 108. Because such information is already obtained and stored, such a modification would not have required undue experimentation and would have yielded predictable results. *Id.* And a PHOSITA would have recognized that many portable navigation devices at the time already performed such a function. *Id.* at ¶¶ 108, 48-49.

A PHOSITA would have been motivated to modify *Hayashida* according to the teachings of *Abowd* in order to increase the versatility of *Hayashida*. *Id.* at ¶ 106. As suggested by *Abowd*, such functionality may suggest places of potential interest to users. *Abowd* (Ex. 1005), 431; *Kotzin Decl.* (Ex. 1003), ¶ 106.

iv. Claim 5

5[P]. A portable terminal with the function of walking navigation, comprising:

See Section IV(C)(i), Claim 1 preamble, *supra*.

[5(a)] a device for getting location information denoting a present place of said portable terminal; and

See Section IV(C)(i), claim [1(a)], *supra*.

[5(b)] a device for getting direction information denoting an orientation of said portable terminal,

See Section IV(C)(i), claim [1(b)], *supra*.

[5(c)(i)] wherein a local route around said present place is shown with a bent line and a direction of movement is shown with an arrow on said bent line

See Section IV(A)(ii), claim [1(c)], *supra*.

[5(c)(ii)] to supply route guidance information as said walking navigation information.

See Section IV(C)(i), claim [1(c)(ii)], *supra*.

v. Claim 7

7. The portable terminal with said function of walking navigation according to claim 5, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Sections IV(C)(iv), Claim 5 and IV(C)(ii), Claim 3, *supra*.

vi. Claim 8

8. The portable terminal with said function of walking navigation according to claim 5, wherein neighborhood guidance information is retrieved in a direction from said present place so as to supply said neighborhood guidance information as said walking navigation information.

Hayashida teaches neighborhood guidance information is retrieved in a direction from said present place so as to supply said neighborhood guidance information as said walking navigation information. *See* Section IV(A)(v), Claim 8, *supra*.

Abowd teaches a map component. *Abowd* (Ex. 1005), 423. *Abowd* explains that the map may be provided in varying levels of detail and depicts various establishments in the area. *Id.* at 428. Each establishment has a database entry associated with it that reflects both objective and subjective information that can be used to plan an evening's excursion, querying of information, and routing facilities. *Id.*

In light of the express teachings of *Abowd* it would have been obvious to include this functionality in the portable carrying-type navigation device taught by *Hayashida*. *Kotzin Decl.* (Ex. 1003), ¶¶ 113-115; *see also id.* at ¶¶ 69-70 (discussing *Hayashida*), 52 (discussing background of the technology).

vii. Claim 9

9. The portable terminal with said function of walking navigation according to claim 5, [9(a)] wherein location of a user is of said portable terminal is determined according to said location information and said direction information, and

See Sections IV(C)(iv), Claim 5 and IV(C)(iii), Claim [4(a)], supra.

[9(b)] wherein location of partner of the user is determined according to a location from the partner's portable terminal.

See Section IV(C)(iv), Claim 5 and IV(C)(iii), Claim [4(b)], supra.

viii. Claim 10

10[P]. A portable terminal with the function of walking navigation, comprising:

See Section IV(A)(i), Claim 1 preamble, supra.

[10(a)] a device for getting location information denoting a present place of said portable terminal; and

See Section IV(C)(i), claim [1(a)], supra.

[10(b)] a device for getting direction information denoting an orientation of said portable terminal,

See Section IV(C)(i), claim [1(b)], supra.

[10(c)] wherein location of a user is of said portable terminal is determined according to said location information and said direction information,

See Sections IV(C)(iii), Claim [4(a)], supra.

[10(d)] wherein location of a partner of the user is determined according to a location information from the partner's portable terminal, and

See Section IV(C)(iii), Claim [4(b)], supra.

[10(e)(i)] wherein a full route from said starting point to said destination is shown with a bent line that is distinguished between starting and ending points and said present place is shown with a symbol on said line

Hayashida teaches the display of a full route from said starting point to said destination with a bent line, which may be in the form of an arrow, and both destination and present position symbols. *See* Section IV(A)(i), claim [1(c)(i)], *supra*. A PHOSITA would recognize that the display of the route as an arrow distinguishes between starting and ending points. *Kotzin Decl.* (Ex. 1003), ¶¶ 75-76. A PHOSITA would also recognize that the display of present position (starting point) and destination (ending point) symbols would further distinguish between the starting and ending points of the route. *Id.* *Abowd* also teaches a map component that depicts a present position and destinations, and suggests the use of route planning facilities. *See* Section IV(C)(i), claim [1(c)(i)], *supra*. For the reasons discussed in above, it would have been obvious to modify *Hayashida's* carrying type navigation device to include these functions, in light of the teachings of *Abowd*. *See id.*

[10(e)(ii)] to supply said route guidance information as said walking navigation information.

See Section IV(C)(i), claim [1(c)(ii)], *supra*.

ix. Claim 11

11. The portable terminal with said function of walking navigation according to claim 10, wherein said device for getting direction information gets information in a direction pointed by the tip of said portable terminal.

Abowd expressly teaches determining the orientation of the Cyberguide unit, explaining that because the unit is hand-held, it also locates the user. *Abowd* (Ex. 1005), 421. It would have been obvious, in light of this disclosure by *Abowd*, to get direction information in a direction pointed by the tip of said portable terminal. *Kotzin Decl.* (Ex. 1003), ¶ 104.

A PHOSITA would have been motivated to make such a modification because a PHOSITA would have understood that user's commonly hold navigation devices in a certain manner when using the device—a manner in which the user may view the screen. *Id.* Typically, this position also reflects the top or tip of the screen pointing in the leading direction that the user is traveling. *Id.* And when holding the device in such a way, the tip (or top) of the portable navigation device would always point in a direction the user is facing. *Id.* Therefore, the direction pointed by the tip of said portable terminal would be reflective of the direction in which a user is oriented. *Id.*

Such a modification is the simple substitution of one bearing reference (e.g., the orientation of a display) with another bearing reference (the tip of the portable terminal) and would therefore have required only minor modifications and yielded

predictable results. *Id.*; *see also id.* at ¶ 47 (discussing use of this technique in other portable navigation devices at the time).

x. Claim 13

13. The portable terminal with said function of walking navigation according to claim 10, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Sections IV(C)(viii), Claim 10 and IV(C)(ii), Claim 3, *supra*.

D. Ground 4: *Hayashida*, *Abowd*, and *Ikeda* render Claims 3, 7, 11, and 13 obvious

Overview of the Prior Art

Hayashida is described in detail in Section IV(A) above, *Ikeda* was described in detail in Section IV(B) above, and *Abowd* was described in detail in Section IV(C) above. And each are prior art to the '498 Patent.

i. Claim 3

3. A portable terminal with the function of walking navigation according to claim 1, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

Hayashida as modified by *Abowd* teaches Claim 1. *See* Section IV(C)(i), Claim 1, *supra*. Further, *Hayashida* as modified by *Abowd* teaches said device for getting direction information gets orientation information of a display of said portable terminal. *See* Section IV(C)(ii), Claim 3, *supra*. *Ikeda* expressly teaches getting orientation information of a display of said portable terminal. *See* Section IV(B)(i), Claim 3, *supra*.

It would have been further obvious to modify the *Hayashia-Abowd* device for getting direction information to get orientation information of a display of said portable terminal according to the express teaching of *Ikeda*. *Kotzin Decl.* (Ex. 1003), ¶¶ 122-124, 126; *see also id.* at ¶¶ 82-84 (discussing combination of *Hayashida* and *Ikeda*), 65 (discussing *Hayashida*), 47 (discussing background of the prior art); *see also* Section IV(B)(i), Claim 3, *supra*.

ii. Claim 7

7. The portable terminal with said function of walking navigation according to claim 5, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Sections IV(C)(iv), Claim 5 and IV(D)(i), Claim 3, *supra*.

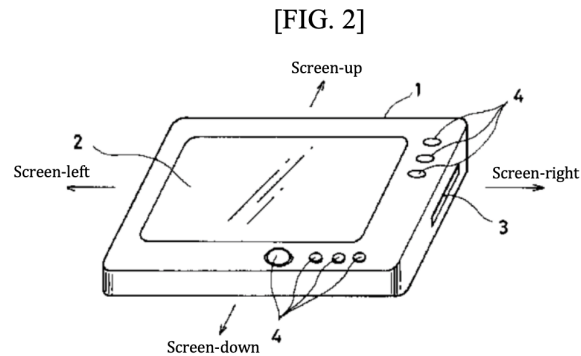
iii. Claim 11

11. The portable terminal with said function of walking navigation according to claim 10, wherein said device for getting direction information gets information in a direction pointed by the tip of said portable terminal.

Hayashida, *Abowd*, and *Ikeda* teach said device for getting direction information gets information in a direction pointed by the tip of said portable terminal. *Hayashida* and *Abowd* teach Claim 10. *See* Section IV(C)(viii), Claim 10, *supra*.

As discussed above, it would have been obvious to incorporate the teachings of *Ikeda* in the navigation device of *Hayashida* as modified by *Abowd*. *See* Section IV(D)(i), claim 3, *supra*. A PHOSITA would further recognize that the screen-up

portion of the device corresponds to the tip of the device, which is the leading direction of the device when held horizontally by a user as shown below:



Id. at Fig. 2. A PHOSITA would have recognized that Ikeda therefore teaches that information can be gotten in a direction pointed by the tip of the navigation device. *Kotzin Decl.* (Ex. 1003), ¶¶ 125-126.

It would have been obvious to modify *Hayashida* as modified by *Abowd* to incorporate the teachings of *Ikeda*. A PHOSITA would have been motivated to make such a modification in order to further *Hayashida*'s goals of presenting a display that can be easily grasped by the user—a benefit that *Ikeda* acknowledges from its display. *Id.* at ¶ 126. Given the similarity in the architecture of each reference, a PHOSITA would have had a reasonable expectation of success in implementing *Ikeda*'s teachings. *Id.* Further a PHOSITA would have recognized that portable navigation devices commonly get information in a direction pointed by the tip of said portable terminal. *Id.* at ¶ 47. Accordingly, such a modification would not have

required undue experimentation and would have yielded predictable results. *Id.* at ¶ 126.

iv. Claim 13

13. The portable terminal with said function of walking navigation according to claim 10, wherein said device for getting direction information gets orientation information of a display of said portable terminal.

See Sections IV(C)(viii), Claim 10 and IV(D)(i), Claim 3 *supra*.

V. CONCLUSION

For the forgoing reasons, Petitioner respectfully requests *inter partes* review of claims 1, 3-5, 7-11, and 13 of the '498 Patent.

Respectfully submitted,

BY: /s/ Adam P. Seitz

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COUNSEL FOR PETITIONER

VI. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(A)(1)

A. Real Party-In-Interest

The Petitioner is the real party-in-interest. 37 C.F.R. § 42.8(b)(1).

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner is aware of no pending patent infringement lawsuits involving the '498 Patent.

C. Lead and Back-Up Counsel

Petitioner provides the following designation and service information for lead and back-up counsel. 37 C.F.R. § 42.8(b)(3) and (b)(4).

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APPENDIX OF EXHIBITS

Exhibit 1001	U.S. Patent No. 6,430,498 to Maruyama et al. (“’498 Patent”)
Exhibit 1002	File History of U.S. Patent No. 6,430,498 (“’498 File History”)
Exhibit 1003	Declaration of Michael D. Kotzin (“Kotzin Decl.”)
Exhibit 1004	U.S. Patent No. 6,067,502 to Hayashida et al. (“Hayashida”)
Exhibit 1005	Cyberguide: A Mobile Context-Aware Tour Guide by Abowd et al. (“Abowd”)
Exhibit 1006	JPH09-311625 to Ikeda
Exhibit 1007	Certified English Translation of JPH09-311625 (“Ikeda”)
Exhibit 1008	CV of Michael D. Kotzin
Exhibit 1009	Munford Declaration
Exhibit 1010	<i>Maxell Ltd. v. Apple Inc.</i> , 5:19-cv-00036, No. 1 (E.D. Tex. Mar. 15, 2019) (“Maxell Complaint”)
Exhibit 1011	<i>Maxell Ltd. v. Apple Inc.</i> , 5:19-cv-00036, No. 99 (E.D. Tex. Oct. 16, 2019) (“Joint Claim Construction and Prehearing Statement”)
Exhibit 1012	<i>Maxell Ltd. v. Apple Inc.</i> , 5:19-cv-00036, No. 136 (E.D. Tex. Nov. 18, 2019) (“Opening Claim Construction Brief”)
Exhibit 1013	<i>ZTE Corporation et al. v. Maxell, Ltd.</i> , IPR2018-00235, Paper 9 (P.T.A.B. June 1, 2018) (“the ’317 IPR”)
Exhibit 1014	<i>ASUSTeK Computer Inc. et al. v. Maxell, Ltd.</i> , IPR2019-00071, Paper 7 (P.T.A.B. Mar. 14, 2019) (“the ’498 IPR”)
Exhibit 1015	<i>Maxell, Ltd. v. ASUSTeK Computer Inc.</i> , et al., 3:18-cv-01788, No. 113-0 (N.D. Cal. Aug. 27, 2018)
Exhibit 1016	Taubes, The Global Positioning System, The Role of Atomic Clocks, Beyond Discovery, National Academy of Science (1997) (“Taubes”)
Exhibit 1017	A Brief History of Satellite Navigation, Stanford University News Service (June 13, 1995) (“A Brief History of Satellite Navigation”)
Exhibit 1018	Georgiadou et al., The Issue of Selective Availability (“Georgiadou”)
Exhibit 1019	Thompson, Global Positioning System: The Mathematics of GPS Receivers, Mathematics Magazine (“Thompson”)
Exhibit 1020	U.S. Patent No. 5,589,835 to Gildea et al. (“Gildea”)
Exhibit 1021	USRE42,927 to Want et al. (“Want”)

Exhibit 1022	Tamura, Toward Realization of VICS – Vehicle Information and Communications System (1993) (“ <i>Tamura</i> ”)
Exhibit 1023	Intelligent Transportation Systems Benefits: 1999 Update, U.S. Department of Transportation (May 28, 1999) (“ <i>ITS Benefits</i> ”)
Exhibit 1024	Teruyuki et al, Pedestrian Information and Communication Systems for Visually Impaired Persons, 2001 Conference Proceedings (“ <i>Teruyuki</i> ”)
Exhibit 1025	JPH10-197277 to Maruyama et al.
Exhibit 1026	Certified English Translation of JPH10-197277 (“ <i>Maruyama</i> ”)
Exhibit 1027	NavTalk Owner’s Manual and Reference Guide (Rev. A) (January 1999) (“ <i>Garmin NavTalk</i> ”)
Exhibit 1028	JPH07-280583 to Suzuki et al.
Exhibit 1029	Certified English Translation of JPH07-280583 (“ <i>Suzuki</i> ”)
Exhibit 1030	U.S. Patent No. 6,525,768 to Obradovich (“ <i>Obradovich</i> ”)
Exhibit 1031	U.S. Patent No. 5,781,150 to Norris (“ <i>Norris</i> ”)
Exhibit 1032	Trimble unveils GPS for small mobile devices, Digital Photography Review, (June 22, 2000), available at https://www.dpreview.com/articles/7140605260/trimblegps (“ <i>Digital Photography Review</i> ”)
Exhibit 1033	Trimble GPS Technology Enables Seiko Epson Communication Device and Wireless Data Service, Trimble News Release (November 8, 1999) (“ <i>Trimble News Release</i> ”)
Exhibit 1034	JPH08-285613 to Akiyama et al.
Exhibit 1035	Certified English Translation of JPH08-285613 (“ <i>Akiyama</i> ”)
Exhibit 1036	JPH05-264711
Exhibit 1037	Certified English Translation of JPH05-264711 (“ <i>the ’711 Patent</i> ”)
Exhibit 1038	“A Collaborative Wearable System with Remote Sensing” by Bauer et al. (“ <i>Bauer</i> ”)
Exhibit 1039	<u>Intentionally Left Blank</u>
Exhibit 1040	U.S. Patent No. 6,748,317 to Maruyama et al. (“ <i>’317 Patent</i> ”)
Exhibit 1041	<i>Maxell v. Apple Docket Control Order</i>

CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. §42.24 that the foregoing Petition for *Inter Partes* Review, excluding any table of contents, mandatory notices under 37 C.F.R. §42.8, certificates of service or word count, or appendix of exhibits, contains 13,815 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: January 13, 2020

BY: /s/ Adam P. Seitz
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COUNSEL FOR PETITIONER

CERTIFICATE OF SERVICE ON PATENT OWNER
UNDER 37 C.F.R. § 42.105

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105, the undersigned certifies that on January 13, 2020, a complete and entire copy of this Petition for *Inter Partes* Review including exhibits was provided via Federal Express to the Patent Owner by serving the correspondence address of record for the '498 Patent as listed on PAIR:

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Further, a courtesy copy of this Petition for *Inter Partes* Review was sent via Federal Express to the assignee of record:

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