

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALLSTATE INSURANCE COMPANY,
Petitioner,

v.

ATOS, LLC,
Patent Owner.

IPR2021-01118
Patent 8,527,140 B2

Before AMANDA F. WIEKER, RICHARD H. MARSCHALL, and
RYAN H. FLAX, *Administrative Patent Judges*.

MARSCHALL, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining Challenged Claims 1–5, 7, 8, 10–16, and 18 Unpatentable
Determining Challenged Claims 6, 9, and 17 Not Unpatentable

Petitioner Allstate Insurance Company challenges claims 1–18 of U.S. Patent No. 8,527,140 B2 (“the ’140 patent” (Ex. 1001)), which is assigned to Patent Owner ATOS, LLC. We have jurisdiction under 35 U.S.C. § 6, and we issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 (2019). For the reasons set forth below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–5, 7, 8, 10–16, and 18 of the ’140 patent are unpatentable and that Petitioner has not shown by a preponderance of the evidence that claims 6, 9, and 17 are unpatentable.

BACKGROUND

A. Procedural History

Petitioner filed a Petition requesting *inter partes* review of the challenged claims. Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response (Paper 5), Petitioner filed a Preliminary Reply (Paper 6), and Patent Owner filed a Preliminary Sur-reply (Paper 7). Pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review of claims 1–18 of the ’140 patent on all presented challenges. Paper 8 (“Inst. Dec.”).

After institution, Patent Owner filed a Response (Paper 15, “PO Resp.”), Petitioner filed a Reply (Paper 17, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 21, “PO Sur-reply”). An oral hearing in this proceeding was held on October 13, 2021, and a transcript of the hearing is included in the record (Paper 30, “Tr.”).

B. Related Matters

The parties identify the following proceeding related to the ’140 patent: *ATOS, LLC v. Allstate Insurance Company, Esurance Insurance Services, Inc., and Arity, LLC*, No. 1:20-cv-06224 (N.D. Ill.).

Pet. 3; Paper 4, 2. Patent Owner also identifies the following *inter partes* reviews involving patents related to the '140 patent as related matters: IPR2021-01209 and IPR2021-01449. Paper 29, 2 (Patent Owner's Updated Mandatory Notices).

C. The '140 Patent

The '140 patent relates to a method that detects “the state of a vehicle by a portable device carried by a user and the various actions taken upon the detection of the state.” Ex. 1001, 1:10–12. In the background discussion of related art, the '140 patent describes problems the art attempts to address, such as using a portable device to remember a parking spot or disabling certain user actions on a portable device while a user moves or exceeds a speed limit. *Id.* at 1:14–19, 1:43–46. The '140 patent also describes disadvantages of using GPS alone to address these problems. *See id.* at 1:37–42, 1:46–56.

To address the drawbacks in the related art, the '140 patent employs “an accelerometer in a portable device” to detect “the stopping and starting of a car.” Ex. 1001, 2:11–12. According to the '140 patent, an accelerometer can detect engine vibrations to determine whether an engine remains running or has stopped running, and can also detect vibrations that indicate walking by the user. *Id.* at 2:13–20. In one embodiment, the '140 patent describes combining the state of the vehicle determined using accelerometer information (engine on/off) with GPS location information to determine the location of a stopped car. *Id.* at 2:21–28.

Figure 1 of the '140 patent is reproduced below.

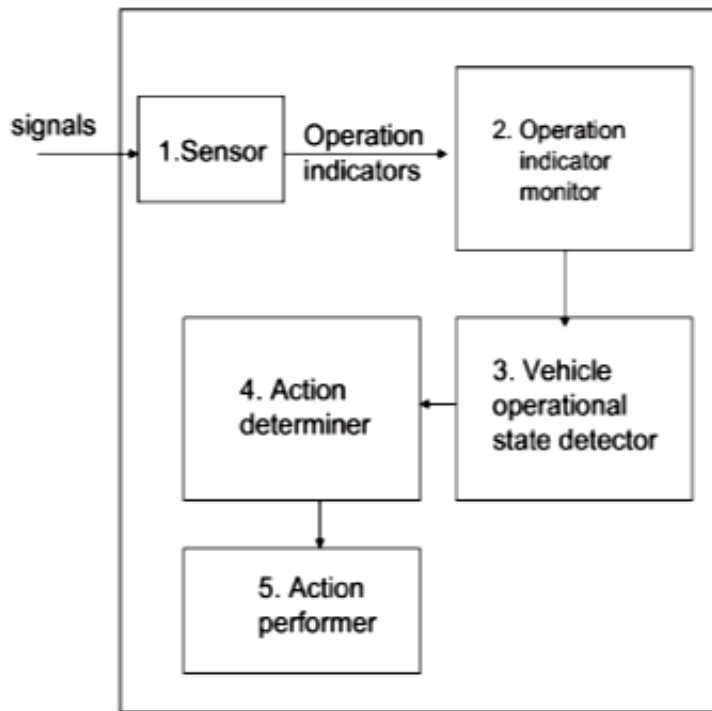


Figure 1: Portable device for taking action based on state of vehicle.

Figure 1 “illustrates the portable device apparatus carried by an individual to determine if certain actions should be performed.” Ex. 1001, 3:45–47. A portion of Figure 1 depicts a sensor receiving “signals” as an input and generating “[o]peration indicators” as an output. *Id.* The '140 patent describes basing a decision to perform an action on “determining the operational state of a vehicle surrounding the portable device,” which in turn involves monitoring “an onboard sensor on the device.” *Id.* at 3:47–50. According to the '140 patent, the sensor receives signals from the environment and converts them to “operation indicators.” *Id.* at 3:50–52. The '140 patent provides an example that employs a vibration sensor, such as an accelerometer, that measures “forces over time (i.e. the signals) and

convert[s] them into number of vibrations measured per second (operation indicators).” *Id.* at 3:52–57.

The operation indicators from the sensor “are forwarded to the operation indicator monitor unit (unit 2) which continuously monitors and collects the operation indicators over time.” *Id.* at 4:4–7. The monitor unit then forwards the operation indicators to an “operational state detector unit” that “uses pre-determined criteria which are a set of rules to help determine the operational state of the vehicle.” *Id.* at 4:7–11. The ’140 patent describes the next step as sending the operational state information to an “[a]ction determiner” to determine whether to take an action followed by an “[a]ction performer” that performs any action decided upon by the action determiner. *Id.* at 4:32–37, Fig. 1.

D. Challenged Claims

Petitioner challenges all of the claims (claims 1–18) of the ’140 patent. Pet. 3. Claims 1, 3–5, 10, 15, and 18 are independent. Ex. 1001, 10:64–14:34. Claim 1 is illustrative and reproduced below:

1. A method of performing one or more actions on a portable device carried by an individual, comprising:
 - monitoring at least one operation indicator continuously and transparently to the individual, wherein the at least one operation indicator is created by an on-board component of the portable device when the portable device is located inside a vehicle;
 - detecting when the at least one operation indicator meets one or more predetermined criteria;
 - determining one or more operational states of the vehicle based on the one or more predetermined criteria;
 - determining the one or more actions based on the one or more operational states of the vehicle;
 - performing the one or more actions on the portable device;

determining the one or more actions based on at least one change in the operational state of the vehicle occurs; and

wherein the at least one change in the operational state comprise at least one of the following: a change from a vehicle is moving state to a vehicle movement is lingering state; a change from a vehicle engine is on state to an engine is off state; a change from a vehicle is moving state to a vehicle is stationary state; a change from a vehicle speed is below a predetermined speed limit state to a vehicle speed is above the predetermined limit; a change from a vehicle is stationary state to a vehicle is moving state; a change from an engine is off state to an engine is on state; and a change from an engine is off state to a vehicle is moving state.

Ex. 1001, 10:64–11:21 (indentations added for readability).

E. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–18 would have been unpatentable on the following grounds (Pet. 3–4):

Claims Challenged	35 U.S.C. §	References
1, 5, 10, 13, 15	102 ¹	Kim ²
2, 7	103(a)	Kim
2, 11, 14	103(a)	Kim, Barbera ³
3, 6, 8, 9, 17	103(a)	Kim, Baker ⁴
4	103(a)	Kim, Browne, ⁵ Baker
12	103(a)	Kim, Rubin ⁶
16	103(a)	Kim, Barbera, Kohli ⁷
18	103(a)	Kim, Mitrovic ⁸

Petitioner also relies on the Declarations of Dr. William R. Michalson and Dr. Hsieh-Yee. *See* Exs. 1003 (Michalson Decl.), 1014 (Yee Decl.). Patent Owner relies on the Declaration of Dr. Jeremy Cooperstock. *See* Ex. 2001 (“Cooperstock Decl.”).

ANALYSIS

A. Legal Standards

To prevail in its challenges, Petitioner must prove unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e) (2012); 37 C.F.R.

¹ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the ’140 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103. Our decision would not differ based on applying either pre- or post-AIA law.

² KR 10-0775006, published June 4, 2007 (Ex. 1005, “Kim”).

³ US 7,505,784 B2, published March 29, 2007 (Ex. 1007, “Barbera”).

⁴ US 2006/0111835 A1, published May 25, 2006 (Ex. 1009, “Baker”).

⁵ US 7,834,778 B2, published November 16, 2010 (Ex. 1008, “Browne”).

⁶ US 8,065,508 B2, filed November 10, 2008 (Ex. 1006, “Rubin”).

⁷ US 6,236,937 B1, issued May 22, 2001 (Ex. 1016, “Kohli”).

⁸ Mitrovic, D., *Reliable Method for Driving Events Recognition*, IEEE Transactions on Intelligent Transportation Systems, Vol. 6, No. 2 (June 2005) (Ex. 1017, “Mitrovic”).

§ 42.1(d) (2018). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner.⁹ See *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burdens of proof in an *inter partes* review).

Petitioner relies on both anticipation and obviousness in its challenges to the claims of the ’140 patent. To anticipate a claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation.” *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). That “single reference must describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art.” *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002).

A claim is unpatentable as obvious under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406

⁹ Although we primarily address Patent Owner’s arguments below and identify many of them as unpersuasive, we do not shift the ultimate burden from Petitioner. We focus on such arguments because they identify issues in dispute and we address them as unpersuasive only in the context of the record and Petitioner’s assertions.

(2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, also known as objective indicia of non-obviousness. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). “The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art” at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that a person of ordinary skill in the art at the time of the invention “would have been someone with a bachelor’s or master’s degree in the field of mechanical engineering, electrical engineering, or physics, or with a bachelor’s or master’s degree in a related field, and at least three years of experience in designing or developing portable device systems.” Pet. 4 (citing Ex. 1003 ¶ 52). Patent Owner does not address Petitioner’s proposal, but offers a competing proposal. PO Resp. 6. Patent Owner contends that a person of ordinary skill in the art at the time of the

invention “would have been someone who had a bachelor’s degree in mechanical or electrical engineering and at least 2 years of experience in the field working with sensors and/or computer processing of sensor data.” *Id.* (citing Ex. 2001 ¶ 18).

The parties’ proposals do not differ in any respect that would suggest our determination on this issue would impact any of our ultimate findings in this case. We note that both parties’ proposals include a person having a degree in mechanical or electrical engineering with at least two years of relevant industry experience. Petitioner’s proposal allows for a broader range of technical degrees and requires an additional year of relevant experience in comparison to Patent Owner’s proposal. Based on the full record before us, because the asserted references describe the problems and solutions of developing a portable device incorporating sensors including accelerometers, and a person having a degree in physics may also have the pertinent training to work in the field, we apply Petitioner’s broader proposal to our analysis.

Accordingly, we adopt Petitioner’s asserted level of ordinary skill as set forth by its declarant Dr. Michalson because it is consistent with the problems identified and solutions provided in the ’140 patent and the prior art.

C. Claim Construction

In *inter partes* reviews, we interpret claims in the same manner used in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b) (2019); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) (setting forth claim construction approach in district court cases). Under that standard, we generally give claim terms their ordinary and customary

meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the Specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence is generally “less reliable” than the intrinsic record. *See id.* at 1318–19. Only terms that are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

The parties dispute the meaning of three claim terms: “operation indicator,” “on-board component,” and “transparently.” Pet. 7–14; PO Resp. 6–18; Pet. Reply 1–8; PO Sur-Reply 3–7. Here, as in our decision granting institution, we determine that we need not construe “on-board component” because no issue turns on our construction of that limitation. *See Nidec*, 868 F.3d at 1017; Inst. Dec. 9. We address the parties’ arguments as to “operation indicator” and “transparently” in turn below. To the extent the parties raise implicit claim construction disputes in connection with their arguments as to the content of the prior art, we address those arguments when discussing Petitioner’s challenges to the claims.

1. Operation Indicator

With the exception of claim 18, each independent claim requires the step of “monitoring at least one operation indicator.” *See, e.g.*, Ex. 1001, 10:65–66. Petitioner argues that we should construe “operation indicator” to mean “a sensor measurement determined from signals from the environment.” Pet. 7. Petitioner contends that although the ’140 patent does not provide an express definition of “operation indicator,” it defines the term

“through context” when it states that vibration sensors measure forces over time and “convert them into number of vibrations measured per second (operation indicators).” *Id.* (quoting Ex. 1001, 3:51–56).¹⁰ Petitioner also relies on the statement in the ’140 patent that the “sensor receives signals from the environment and converts them into operation indicators.” *Id.* (quoting Ex. 1001, 3:58–61). We note that after we considered the parties’ pre-institution arguments as to the proper construction of “operation indicator,” we adopted Petitioner’s construction in our Institution Decision. Inst. Dec. 9–13.

In its Response, Patent Owner argues that we should construe “operation indicator” to mean “information derived by converting sensing device output determined from signals from the environment.” PO Resp 6–7. Patent Owner argues that Petitioner’s construction improperly “equate[s] the measurements taken by a sensing device with ‘operation indicators,’” while under Patent Owner’s construction, “sensing device measurements are not, standing alone, ‘operation indicators.’” *Id.* at 7. According to Patent Owner, “the output from the sensing device must be *converted* into operation indicators.” *Id.* (emphasis added). Patent Owner argues that the Specification supports its construction because it emphasizes “that operation indicators result from a *conversion*.” *Id.* (citing Ex. 1001 3:49–52, 3:58–59, 4:1–3).

Patent Owner argues that we erred in our Institution Decision when we found that the Specification only discusses “converting” in the context of

¹⁰ The parties typically underline reference names, italicize claim language, and bold large portions of quoted text. *See, e.g.*, Pet. 7–8, 16. For consistency and readability, we remove such emphasis in our quotations of the parties’ papers.

converting signals from the environment. *Id.* Patent Owner argues that “when the Specification speaks of converting signals from the environment, it *is* speaking of converting the output of a sensing device” because the signals from the environment are signals measured by sensing devices. *Id.* at 7–8. Patent Owner relies on the Specification’s reference to a vibration sensor example for support, where the Specification states that “a vibration sensor may measure forces over time (i.e. the signals) and convert them into number of vibrations measured per second (operation indicators).” *Id.* at 8 (quoting Ex 1001, 3:52–55¹¹). Patent Owner argues that “forces over time” refers to “the raw output of the sensing device” that “is converted into an operation indicator in units of vibrations per second.” *Id.* With support from its declarant Dr. Cooperstock, Patent Owner further argues that a conversion to vibrations per second must take place because accelerometers output force measurements in m/s^2 . *Id.* at 8–9 (citing Ex. 2001 ¶¶ 19–21, 24, 41–46). Patent Owner further contends that Petitioner’s declarant, Dr. Michalson, agrees with Dr. Cooperstock that an accelerometer’s output is in units of gravitational force, and that to obtain “vibrations per second” a “POSITA would understand that computation would need to be performed on an accelerometer output.” *Id.* at 9–10 (citing Ex. 2010, 59:12–60:24, 62:20–63:14). As to the claim’s reference to an “on-board component” that creates the “operation indicator,” Patent Owner argues that “an on-board component, such as a sensor, could have multiple parts” including “a processor to execute software and perform computations on the measurements.” *Id.* at 10–11 (citing Ex. 2001 ¶¶ 36, 40–46). As to the

¹¹ Patent Owner incorrectly cites to this quotation in its brief as Ex. 1001 3:38–41. *See* PO Resp. 8.

difference between “converting” and “determined from,” which both appear in Patent Owner’s construction, Patent Owner argues that “converting” does not encompass the prior art and “determined from” tracks the Specification’s description of sensory signals that are “determined from the environment” rather than from a centralized source such as GPS. *Id.* at 11–13 (citing Ex. 1001 3:49–59, 3:61–66; Ex. 2001 ¶ 48).

Petitioner argues that Patent Owner’s construction improperly adds “an additional converting sensing device output” step into the claims. Pet. Reply 2–4. Petitioner argues that the claims never mention converting sensing device output and the portion of the Specification Patent Owner relies upon does not support any additional conversion step as Patent Owner contends. *Id.* at 2 (citing Ex. 1001, 3:50–55). According to Petitioner, the Specification merely describes sensors that “take in environmental signals and output ‘operation indicators’” “without any additional process acting on the sensor’s output.” *Id.* at 2–3 (citing Ex. 1001, Figs. 1–2). Petitioner argues that Patent Owner’s declarant testimony contradicts the intrinsic record by referring to conversion steps and components for accomplishing the conversion that the Specification never describes. *Id.* at 3. Petitioner also contends that the testimony assumes that a sensing device integrates with other circuitry capable of storing measurements, executing software, and performing computations on the measurement to perform the conversion step but, if so, the “sensor” would then include the additional components and would still output the operation indicators without further processing. *Id.* at 3–4 (citing Ex. 2001 ¶ 36). Petitioner further alleges that there is no meaningful distinction between “converted from” and “determined from” in view of the prior art, and both the ’140 patent Specification and the prior art

disclose standard accelerometers used in cell phones and any alleged “converting” takes place within these ordinary sensors. *Id.* at 4–5.

In its Sur-reply, Patent Owner repeats its argument that operation indicators require a conversion and that Petitioner’s proposed construction improperly covers an accelerometer that “outputs measurements determined from signals from the environment.” PO Sur-reply 3–4. Patent Owner argues that “an accelerometer *cannot* produce a measurement of vibrations per second” and that both parties’ declarants agree that accelerometer output data in gravitational force such as m/s^2 . *Id.* at 4–5. According to Patent Owner, the Specification describes “collecting an accelerometer output over time and then converting that output into an operation indicator,” such that Patent Owner’s construction does not add a converting step beyond the conversion the Specification discloses. *Id.* at 5–6. Patent Owner further argues the term “sensor” as used in the ’140 patent refers not to an accelerometer alone, but an accelerometer that feeds measurements “into a processing component of the sensor to convert those measurements into operation indicators.” *Id.* at 6–7 (citing Ex. 2001 ¶ 36).

Based on our review of the parties’ arguments and cited evidence, we once again agree with Petitioner’s proposed construction and disagree with Patent Owner’s contention that “operation indicators” mean something more than the output of a sensor measurement based on signals from the environment. First, the claim language strongly supports Petitioner’s position, and undermines Patent Owner’s argument that some specific “conversion” must take place to create an operation indicator. The limitation in question appears in a step requiring “monitoring at least one operation indicator . . . wherein the . . . operation indicator is created by an

on-board component.” *See* Ex. 1001, 3:49–52, 10:65–11:2. Nothing in the limitation suggests anything more than “monitoring” the operation indicator created by the on-board component—no extra converting of the on-board component’s output appears in the claim nor does the claim language suggest that mere monitoring of the indicator requires further conversion prior to the monitoring.

Second, the Specification supports Petitioner’s construction by equating “operation indicator” with a sensor’s output. Ex. 1001, 3:51–56 (“[A] vibration sensor may measure forces over time (i.e. the signals) and convert them into number of vibrations measured per second (operation indicators).”). In the context of operation indicators, “converting” involves converting signals from the environment, not converting the output of the sensor as Patent Owner argues. *Id.* Patent Owner repeatedly contends that the Specification contemplates an additional conversion beyond converting signals from the environment to a sensor output, and relies on the Specification’s description of sensor output in vibrations per second, an operation indicator, which allegedly requires converting the sensing component’s output. PO Resp. 7–10; PO Sur-reply 4–7. In a related argument, Patent Owner contends that the ’140 patent contemplates a multi-part sensor that includes other components such as a processor that performs the conversion of the sensing component’s output into operation parameters. *See, e.g.*, PO Sur-reply 6–7. But the Specification fails to describe the alleged conversion step that Patent Owner attempts to read into the claim, or a multi-part sensor with a processor that performs the conversion step. *See* Ex. 1001, 3:51–56, Fig. 1. Patent Owner’s heavy reliance on declarant testimony does not undermine our construction. *See* PO Resp. 8–13 (citing

Ex. 2001); PO Sur-reply 4–7 (same). We find such extrinsic evidence unpersuasive when it lacks support in the intrinsic evidence.

Here, as discussed above, the claim language and Specification both lack support for the conversion step Patent Owner seeks to read into the claim, or the hardware that allegedly performs the step. The claim refers to an “operation indicator created by an on-board component” and the related portion of the Specification describes an on-board sensor that converts signals from the environment into operation indicators. Ex. 1001, 3:49–52. As an “example,” the Specification goes on to describe a “vibration sensor” used to “measure forces over time (i.e. the signals) and convert them into the number of vibrations measured per second (operation indicators).” *Id.* at 3:52–55. The Specification also states that “[a]n example of a vibrational sensing device is an accelerometer.” *Id.* at 3:56–57. In short, the Specification states that an accelerometer may be used to convert signals from the environment and output operation indicators in the form of vibrations measured per second, undermining Patent Owner’s argument that accelerometers alone cannot produce operation parameters. *See* PO Resp. 8–13; PO Sur-reply 3–6.

Further, even if the ’140 patent describes a multi-part sensor wherein a component translates the output of the accelerometer, as Patent Owner contends, this does not undermine our construction. The claims do not require a vibration sensor or accelerometer—they refer to an onboard component generating operation indicators. Even if one “example” in the Specification describes an accelerometer or vibration sensor producing readings in vibrations per second, that does not require defining the claim term “operation indicator” to require the conversion step Patent Owner

proposes. *See* Ex. 1001, 3:49–57. As Petitioner correctly argues, such a multi-component sensor would still be a “sensor” within the ’140 patent and the translated output would still be an “operation indicator” from a sensor. Pet. Reply 2–4. This understanding is consistent with the Specification.

Based on the foregoing, we construe “operation indicator” to mean “a sensor measurement determined from signals from the environment.”

2. *Transparently*

With the exception of claim 18, each independent claim requires “monitoring at least one operation indicator continuously and *transparently* to the individual.” *See, e.g.*, Ex. 1001, 10:65–67 (emphasis added). Petitioner does not expressly construe “transparently” in the Petition, but alleges that the prior art (Kim) “monitors information in a way that is not visible to the user, (i.e., ‘transparently to the individual’).” Pet. 17 (citing Ex. 1003 ¶ 150; Ex. 1005 ¶ 43). Petitioner’s declarant Dr. Michalson testifies that Kim teaches the limitation because it “monitors information in a way that is not visible to the user” and “without user input or observation.” Ex. 1003 ¶ 150 (citing Ex. 1005 ¶ 74). Patent Owner argued against Petitioner’s application of the limitation in its Preliminary Response, but in our Institution Decision we found Petitioner’s arguments and evidence on that record sufficient to carry its burden, and invited the parties to expressly construe “transparently” during the trial. Inst. Dec. 16–18.

In the Patent Owner Response, Patent Owner argues that we should construe “transparently” to mean “without requiring user interaction.” PO Resp. 15. Patent Owner argues that a method that acts automatically fails to meet this construction if it “requires the user to perform an explicit action to effect the process” because the “user must be agnostic to the conditions

required for the action to be performed.” *Id.* (citing Ex. 2001 ¶ 71). Patent Owner asserts that this “notion of transparently in computing is well understood.” *Id.* at 15–16 (citing Ex. 2001 ¶ 57). Patent Owner also contends that the Specification supports this reading because it describes taking certain actions undertaken “automatically and transparently to the user,” which suggests that “transparently” means something more than “automatically.” *Id.* at 16 (citing Ex. 1001, 6:66–7:7). Patent Owner also argues that an example provided in the Specification, where the device detects the speed of the vehicle and adjusts the volume of music based on that speed, supports its construction because the user does not interact with the device to change the volume. *See id.* at 16–17 (citing Ex. 2001 ¶¶ 58–59).

Petitioner argues that we need not construe “transparently” because Patent Owner’s construction fails to distinguish over the prior art by failing to tie the “transparently” construction to the application of the prior art to the “monitoring” step in which the term appears. Pet. Reply 5–6. According to Petitioner, Patent Owner improperly relies on aspects of the Specification that refer to transparently performing some action, which later claim elements addressed after the “monitoring” step. *Id.* at 6–7 (citing PO Resp. 15–17, 21–24). Petitioner also argues that Patent Owner’s construction lacks support because it excludes embodiments in the Specification requiring a user to power on a mobile device or carry it into a vehicle to initiate some action by the device. *Id.* at 7–8 (citing Ex. 2001 ¶¶ 22–23). Petitioner contends that if we need to construe “transparently,” we should construe it to mean “not visible to the user.” *Id.* at 8 (quoting Ex. 1003 ¶ 150).

In its Sur-reply, Patent Owner argues that Petitioner’s proposed construction and related declarant testimony lack adequate analysis and support. PO Sur-reply 10 (citing Ex. 1003 ¶ 150). Patent Owner also argues that Dr. Michalson invokes conflicting interpretations of “transparently” in his declaration, including “not visible to the user” (advocated by Petitioner as the correct construction) and also “without user input,” which Patent Owner interprets as consistent with its construction (“without requiring user interaction”). *Id.* at 10–11. Patent Owner also contends that Dr. Michalson’s testimony conflicts with his testimony in a related *inter partes* review involving a related patent, where Dr. Michalson stated that the “transparently limitation is satisfied when a process ‘supports interaction with a user.’” *Id.* at 11 (citing IPR2021-01449, Ex. 1003 ¶ 248). As to Petitioner’s argument that the ’140 patent Specification contemplates some action by the user to initiate certain actions, Patent Owner argues that any device “must be provided with power and brought to the environment where it will be used” and “some processes that run on a device require user interaction and some do not—the latter are transparent.” *Id.* at 11–12.

As an initial matter, we generally agree with Petitioner that we need not formally construe “transparently” because even using Patent Owner’s construction, Petitioner establishes that Kim discloses the limitation, as we will discuss in more detail below. Patent Owner, however, asserts that if we adopt its construction for “transparently” that will lead to a finding that Kim fails to disclose the limitation in which it appears. *See* PO Resp. 15, 21–24; PO Sur-reply 12–14. To clarify how we will apply Patent Owner’s construction, and to make clear that we do not adopt all of Patent Owner’s

arguments and interpretations of its construction, we provide the following limited claim construction analysis.

First, we agree with Petitioner that the “transparently” limitation only appears in the “monitoring” limitation— i.e., “monitoring at least one operation indicator continuously and *transparently* to the individual”—and only limits the monitoring step in the claims. *See, e.g.*, Ex. 1001, 10:65–67 (emphasis added); Pet. Reply 6–8. We reject any assertion by Patent Owner that its construction may require transparently performing an action as well as transparently monitoring an operation indicator. *See* PO Resp. 15, 23 (suggesting that a user of Kim’s device must take an action “to determine the context and perform the appropriate action”). Second, and relatedly, applying Patent Owner’s proposed “without requiring user interaction” interpretation does not require a complete lack of user interaction with the device outside of the “monitoring” step. For example, the parties appear to agree that the user must power on the device and bring it inside a vehicle for the device to operate properly, but those “required” user interactions with the device do not fall outside the scope of the claims. *See* Pet. Reply 8; PO Sur-reply 11–12. Accordingly, we do not read the “without requiring user interaction” construction as precluding user interaction with the device to prepare it for transparent monitoring (e.g., powering the device on and bringing it inside the vehicle in a proper position to monitor).

With these clarifications in mind, we need not resolve the dispute as to which proposed construction more accurately conveys the meaning of “transparently,” as the prior art discloses the limitation using either construction.

D. Anticipation

Petitioner contends that Kim anticipates claims 1, 5, 10, 13, and 15. Pet. 3, 15–30. Petitioner relies on the Declaration of Dr. Michalson in support of its showing. *See id.* (citing Ex. 1003).

1. Overview of Kim

Kim “relates to a terminal device for providing a context aware-based mobile service.” Ex. 1005 code (57) (Abstract). More specifically, Kim discloses a terminal device that includes sensors that output data to a “context awareness unit” that estimates the environment surrounding the user of the terminal device. *Id.* The terminal device then outputs context-appropriate content to the user. *Id.* According to Kim, using its disclosed system, “it is possible to seamlessly provide a mobile service suitable for the user’s current location and context automatically without the user’s intentional selection inside of a vehicle, outdoors or indoors.” *Id.*

In one embodiment, Kim discloses terminal 100 having sensing unit 110 that includes a number of sensors, including camera 111, microphone 112, GPS 113, and acceleration sensor 114. Ex. 1005 ¶¶ 38–40. Acceleration sensor 114 detects “the motion state of an object by detecting dynamic forces such as acceleration, vibration, and impact” and can detect engine and vehicle vibrations. *Id.* ¶¶ 40–41. Kim discloses sending the data from sensing unit 110 to context recognition unit 120, which “estimates an external context or a user’s behavior by comparing the sensor data sensed through the sensor unit 110 with a pattern of reference signals stored therein.” *Id.* ¶ 42. According to Kim, “the context awareness unit 120 continuously detects a change in the user’s context and detects a change in a service environment, for example, an area such as inside, outdoors, or

indoors of the vehicle 200.” *Id.* ¶ 43. After examining the user’s context, user intention setting unit 130 examines the context and determines the user’s intention based on information previously input and stored by the user, and service creation unit 140 selects an appropriate service based on the context and user intention. *Id.* ¶¶ 44–45.

2. Discussion

Petitioner argues that Kim discloses every limitation of claim 1, and provides a limitation-by-limitation analysis of claims 1, 5, 10, 13, and 15 with specific citations to Kim and declaration support. Pet. 15–30 (citing various portions of Ex. 1003). We find Petitioner has accounted for each limitation and element of these claims as disclosed in Kim. *Id.* Patent Owner argues that Kim does not disclose “operation indicators” or “monitoring . . . continuously and *transparently* to the individual.” PO Resp. 19–24.¹² Patent Owner also raises additional arguments as to specific claims. *See id.* at 29–39. We are persuaded by Petitioner’s arguments and evidence as to anticipation, and we address the parties’ disputes and each of Patent Owner’s arguments in turn below.

a. Independent Claim 1

i. Operation Indicator

Petitioner relies on its proposed construction of “operation indicator” (which we have adopted) in arguing that Kim discloses “monitoring at least one operation indicator.” Pet. 16 (“The phrase ‘*operation indicator*’ should be construed to mean a sensor measurement determined from signals from

¹² We address whether Kim discloses these two limitations in the context of claim 1, and the same analysis applies to all of the claims containing these limitations.

the environment.”). According to Petitioner, Kim discloses a terminal having “‘sensor unit 110 [that] detects an external context or action using various sensors and outputs the corresponding sensor data’—(i.e., ‘*operation indicator*’)—for example by utilizing ‘an acceleration sensor 114 for instantaneous detection of the motion state of an object by detecting dynamic forces such as acceleration, vibration, and impact.’” *Id.* (citing Ex. 1003 ¶ 91; Ex. 1005 ¶¶ 39–40).

Patent Owner argues that “Petitioner’s argument . . . rests on its incorrect claim construction.” PO Resp. 19. According to Patent Owner, “[p]roperly construed, the ‘operation indicator’ limitation does not appear in Kim.” PO Resp. 19. Relying on its own proposed construction for “operation indicator” (which we have not adopted), Patent Owner argues that the “conversion” its claim construction requires “never happens in Kim.” *Id.* at 20–21; *see also* PO Sur-reply 7–8 (arguing that Kim fails to perform the conversion “operation indicator” requires).

We find that Petitioner establishes that Kim discloses the “monitoring at least one operation indicator” limitation. *See* Pet. 16. We agree with Petitioner and find Kim discloses monitoring a “sensor measurement determined from signals from the environment” (the claimed operation indicator) because it discloses sensor unit 110 that detects context or action using sensor outputs, such as output from acceleration sensor 114 that detects acceleration and vibration. *See id.*; Ex. 1003 ¶ 91; Ex. 1005 ¶¶ 39–40, 74. Monitoring and detecting acceleration or vibration in the environment using an accelerometer satisfies the “monitoring at least one operation indicator” limitation.

Patent Owner argues that Kim fails to disclose “monitoring at least one operation indicator,” but relies on its proposed construction for “operation indicator” that we reject above. *See* PO Resp. 19–21; PO Sur-reply 7–8. Patent Owner does not argue that Kim fails to disclose the limitation if we adopt Petitioner’s construction. *See* Pet. Reply 9 (“Patent Owner does not dispute that Kim discloses this aspect of the ‘monitoring’ step under Petitioner’s construction of ‘operation indicator.’”); PO Resp. 19–21; PO Sur-reply 7–8.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that Kim discloses the “monitoring at least one operation indicator” limitation.

ii. Transparently

Claim 1 requires “monitoring at least one operation indicator *continuously and transparently to the individual*.” Petitioner contends that Kim discloses context recognition unit 120 that acquires signals from sensor unit 110 and estimates the context, or operational state of a vehicle, through *continuous* detection of changes in the user’s context. Pet. 16–17 (quoting Ex. 1005 ¶¶ 43, 74). Petitioner also argues that “the ‘terminal’ in Kim monitors information in a way that is not visible to the user, (i.e., ‘transparently to the individual’).” *Id.* at 17 (citing Ex. 1003 ¶ 150; Ex. 1005 ¶ 43). Dr. Michalson, in his supporting testimony, states that Kim’s terminal “monitors information in a way that is not visible to the user, ‘the context recognition unit 120 of the terminal 100 acquires these . . . signals through the sensor unit 110, and estimates the context by comparing them with the pattern of the self-stored reference signals’ and can be performed

entirely . . . without user input or observation, (‘transparently to the individual’).” Ex. 1003 ¶ 150 (quoting Ex. 1005 ¶ 74).

Relying on its proposed construction for “transparently,” Patent Owner argues that Kim fails to disclose the “transparently” aspect of the limitation because it does not monitor “without requiring user interaction.” *See* PO Resp. 21–24. Patent Owner argues that neither the cited portions of Kim nor Dr. Michalson’s testimony support Petitioner’s position that Kim monitors operation indicators transparently to the user. *Id.* at 22–23 (citing Ex. 1003 ¶ 150; Ex. 1005 ¶¶ 43, 74). Patent Owner concedes that Kim’s “method appears to work automatically,” but argues that it does not work transparently because it requires the user to mount Kim’s terminal in a cradle or on the dashboard in order “to receive accelerometer data indicating that the user is a driver of the vehicle.” *Id.* at 23 (citing Ex. 1005 ¶¶ 71, 73; Ex. 2001 ¶¶ 69–70). According to Patent Owner, if the user “does not take explicit action to mount the terminal, it will not be able to determine the context and perform the appropriate action on the device.” *Id.*

In its Reply, Petitioner argues that “[u]nder the plain and ordinary meaning of ‘transparently,’ Kim discloses this limitation because it discloses a process of monitoring signals that is automatic and not visible to the user.” Pet. Reply 11. Petitioner also argues that Kim discloses monitoring without requiring user interaction as Patent Owner’s construction requires, and does not require “that its device be mounted on a dashboard” to monitor, as Patent Owner argues. *Id.* (citing PO Resp. 23). According to Petitioner, “Kim discloses that its device also monitors when ‘the user is directly carrying the terminal 200 on their body or in a bag,’” the “same scenario that Patent

Owner points to in the '140 Patent as monitoring '*transparently*.'” *Id.* (citing Ex. 1005 ¶ 79; PO Resp. 24).

In its Sur-reply, Patent Owner repeats its argument that Kim requires the user to interact with its terminal “to correctly monitor accelerometer data according to whether the user is a driver or passenger.” PO Sur-reply 12. Patent Owner asserts that “when a driver is using the terminal, Kim’s terminal does not even work unless the terminal is mounted.” *Id.* at 13. As to Petitioner’s argument that Kim discloses monitoring operation indicators even when a user carries the terminal on their body or in a bag, Patent Owner argues that in order to “correctly monitor” data, Kim’s user must “cradle or mount the terminal” (if the user is a driver) or “keep the terminal on their body or in a bag” (if the user is a passenger), and such actions take it outside the scope of “transparently” monitoring. *Id.* at 13–14.

We find that Petitioner establishes that Kim discloses “monitoring at least one operation indicator *continuously and transparently to the individual*” and that the act of a user mounting a mobile device in a cradle does not negate this. Kim discloses continuous detection of changes in a user’s context by context recognition unit 120, which assesses the output of sensor unit 110. Ex. 1005 ¶ 43; Pet. 17. Petitioner also relies on credible declarant testimony that Kim’s terminal “monitors information in a way that is not visible to the user” and that context recognition unit 120 can monitor signals from sensor unit 110 “without user input or observation.” Ex. 1003 ¶ 150 (citing Ex. 1005 ¶ 74). Kim supports these statements by describing data monitoring without requiring any action by the user. *See* Ex. 1005 ¶ 74 (describing context recognition unit 120 acquiring physical signals, such as engine vibration and noise, through sensor unit 110), ¶ 79 (describing

detection of vibrations by acceleration sensor 114 and noise when user directly carries terminal 200 “on their body or in a bag”).

Patent Owner argues that Kim requires user interaction that takes it outside the scope of monitoring “transparently” because the user must mount the device (if the user is a driver) or must keep the device on their person or in a bag (if the user is a passenger) for the device to work correctly. We disagree. First, as noted in our discussion of the parties’ claim construction positions, we do not read Patent Owner’s “without requiring user interaction” construction as forbidding placement of the device by a user in the correct position to monitor operation indicators. For example, Patent Owner concedes that a user must interact with the device to power it on and place it in a vehicle, yet Patent Owner does not view those required user interactions with the device as the kind of user interactions that negate transparent monitoring. *See* PO Sur-reply 11–12 (“Indeed, in order for any electronic device or computer to function, it must be provided with power and brought to the environment where it will be used.”). Similarly, even if Kim requires a user to mount a device to monitor the correct data, merely putting the device in the correct position does not amount to the sort of user interaction that renders all subsequent monitoring of the data non-transparent.

Second, Patent Owner’s argument ignores the fact that Kim’s device appears to always monitor the output of its sensors once turned on (similar to mounting, we find turning on the device does not negate transparent operation), and therefore always monitors operation indicators when in a vehicle. *See, e.g.,* Ex. 1005 ¶¶ 74, 79. Patent Owner does not directly dispute Petitioner’s assertion that if a user does nothing but simply leave the

device on their person (e.g., in a pocket) or in a bag, Kim's device will function normally and treat the person as a passenger in the vehicle. *See* Pet. Reply 11; PO Sur-reply 14 ("If the user is a passenger, the user is required to keep the terminal on their body or in a bag."). Patent Owner appears to assume that doing nothing—i.e., leaving a phone in a user's pocket—may not be enough if a driver wants the device to activate certain applications that are applicable to driving, but that does not negate the fact that Kim's device works as intended in certain situations without any user interaction with the device while it is monitoring.

Third, Patent Owner's arguments assume that Kim's device must obtain certain data to "correctly monitor accelerometer data," such as obtaining certain vibration data to indicate that a driver controls the device. *See* PO Sur-reply 12 (citing Ex. 1005 ¶¶73; Ex. 2001 ¶¶ 69–70). The claim limitation, however, merely requires "monitoring at least one operation indicator continuously and transparently" and does not specify the type of information monitored, or require that the information enable the device to discern between drivers and passengers that use the device by paying close attention to the type of vehicle vibrations picked up by a sensor. The limitation remains agnostic on these issues, and Patent Owner fails to identify any aspect of this limitation, its construction, or any other limitation in the claims that Kim fails to disclose merely because, in some embodiments, Kim enables discerning between drivers and passengers.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that Kim discloses the limitation requiring "monitoring at least one operation indicator *continuously and transparently to the individual.*"

iii. Determining . . . Based On At Least One Change in the Operational State of the Vehicle

Claim 1 also requires “determining the one or more actions based on at least one change in the operational state of the vehicle occurs.” Petitioner argues that Kim discloses this limitation. First, Petitioner argues that Kim “explains that the ‘the user intention setting unit 130 defines the user’s intention based on the context information recognized by the context recognition unit’ which, as Dr. Michalson explains, means “the type of service to be provided to the user is defined,” Ex. 1005 ¶ 65, (i.e., “*determining the one or more actions*”).” Pet. 22. Next, Petitioner argues that Kim “further discloses that the ‘terminal’ may ‘automatically provide a corresponding service according to changes in the service environment,’ (i.e., determining the action based on ‘*one change in the operational state of the vehicle.*’).” *Id.* (quoting Ex. 1005 ¶26) (citing Ex. 1003 ¶ 180). As an example, Petitioner points to Kim’s terminal detecting ““when the driving is stopped and the user comes out of the vehicle,” (i.e., ‘*at least one change in the operational state*’), and then in response the terminal determines to change modes, ‘the user intention setting unit 130 enters the outdoor service mode’ (i.e., ‘*determining the one or more actions*’).” *Id.* at 22–23 (quoting Ex. 1005 ¶ 82). As another example of a change in operation state, Petitioner points to the ability of Kim’s terminal to detect when a vehicle transitions from an engine on to an engine off state. *Id.* at 24 (citing Ex. 1003 ¶ 186; Ex. 1005 ¶¶ 41, 78).

Patent Owner argues that Kim does not disclose this limitation because it does not determine an action “based on at least one change in the operation state” of a vehicle, which differs from “simply looking at the vehicle’s current state.” PO Resp. 30 (citing Ex. 2001 ¶¶ 73, 80–81).

According to Patent Owner, detecting “a transition from engine on to off may trigger the device to record the location of the vehicle,” and the ’140 patent stresses the importance of detecting such transitions, or changes in state. *Id.* at 30–31 (citing Ex. 1001, 7:50, 8:34–41; Ex. 2001 ¶¶ 80–81). Patent Owner asserts that merely performing an action “based on a current state that happens to be different than a prior state” does not satisfy the limitation and that “the device must have the capability of being aware of the vehicle’s past state, comparing that state to the present, and if a specific transition took place, taking action based on that change.” *Id.* at 31 (citing Ex. 1001, 4:32–35). Patent Owner contends that Kim cannot perform an action based on a change because it cannot detect changes given that Kim does not disclose a device having “any memory of any prior status of the vehicle.” *Id.* at 32. Patent Owner views Kim’s disclosure of detecting when a vehicle is on versus off as merely determining the current state of the vehicle rather than a specific change in state. *Id.* (citing Ex. 1005 ¶¶ 74, 78). Even when Kim states that it will take actions based on “changes” in its device’s environment, Patent Owner contends that Kim merely detects a current status and changes to current status, rather than a change in state, because Kim has “no capability of remembering the vehicle’s *previous* state and comparing it to the current state.” *Id.* at 32–33 (citing Ex. 1005 ¶¶ 42–43). As to Kim’s disclosure of stored pattern data, Patent Owner argues that Kim merely compares current data to pattern data in order to determine current vehicle state. *Id.* at 34 (citing Ex. 2001 ¶¶ 76, 84). Patent Owner also contends that Kim provides more limited functionality than the method claimed in the ’140 patent. *Id.* at 34–35 (citing Ex. 2001 ¶¶ 74–78, 80, 83).

Petitioner argues that Kim expressly discloses providing a “corresponding service according to changes in the service environment” and providing a service “according to changes,” which means that Kim detects changes as the claim requires. Pet. Reply 12 (citing Ex. 1005 ¶ 26). Petitioner also argues that claim 1 specifies several “changes” that fall within the scope of the claim, including a change from a vehicle on to off state, and Kim discloses detecting when “the engine is *turned* off—*i.e.*, a change from on to off”—rather than merely “that an engine is off.” *Id.* (citing Ex. 1005 ¶ 78). Petitioner rejects Patent Owner’s argument that Kim’s device must be aware of a vehicle’s past state and able to compare that state to the present as unclaimed requirements Patent Owner improperly injects into the limitation. *Id.* at 13 (citing PO Resp. 31).

In its Sur-reply, Patent Owner argues that “Petitioner’s argument would render meaningless the prior claim limitation which recites determining an action based on the vehicle’s operational state, as opposed to the further limitation requiring determining the action based on at least one change in operational state.” PO Sur-reply 15–16. Patent Owner asserts that it “is not adding any words to the claim,” and agrees “that the claims do not require ‘any particular manner’ of determining actions based on ‘at least one change,’” but the claim still requires an action based on a change in state, not the current state. *Id.* at 16 (citing Ex. 2001 ¶¶ 72–81).

Based on our review of the arguments and evidence, Petitioner establishes that Kim discloses “determining the one or more actions based on at least one change in the operational state of the vehicle occurs.” As Petitioner correctly notes, Kim expressly discloses automatically providing a “corresponding service according to *changes* in the service environment.”

Ex. 1005 ¶ 26 (emphasis added); Pet. Reply 12. Providing a service “according to changes” strongly supports Petitioner’s argument that Kim discloses determining an action based on changes in operational state, and Dr. Michalson’s related declarant testimony. *See* Pet. Reply 12 (citing Ex. 1005 ¶ 26); Ex. 1003 ¶ 180 (citing Ex. 1005 ¶¶ 26, 65).

Kim’s specific examples of determining actions based on changes also support Petitioner’s position. Kim discloses a terminal that detects “when the driving is stopped and the user comes out of the vehicle” (with detecting the stopping of the vehicle amounting to a change in operational state) and then entering “the outdoor service mode,” meaning that Kim’s device determines an action based on the change in state. *See* Ex. 1005 ¶ 82; Pet. 22–23. In addition, claim 1 identifies “a change from a vehicle engine is on state to an engine is off state” as one of the changes in operational states that fall within the scope of claim limitation. *See* Ex. 1001, 11:9–15. Kim discloses detecting this same change in operational state when it discloses detecting when a vehicle transitions from an engine on to an engine off state. *See* Ex. 1005 ¶ 41 (describing detection of engine vibrations and noise when engine is on), ¶ 78 (describing ending navigation service provided on Kim’s device “when the vehicle 200 reaches the destination and it is detected that the engine is turned off” and the noise has disappeared through sensor unit 110); Pet. 24; Ex. 1003 ¶ 186. This example shows determining an action (supplying and then not providing a navigation application) based on a change in the operational state of the vehicle (turning an engine that is on to off).

Patent Owner argues that “change” in this limitation requires a device that has “the capability of being aware of the vehicle’s past state, comparing

that state to the present, and if a specific transition took place, taking action based on that change.” PO Resp. 31 (citing Ex. 1001, 4:32–35). Relatedly, Patent Owner contends that Kim’s lack of “any memory of any prior status of the vehicle” renders it incapable of performing an action based on a change. *Id.* at 32. We disagree with Patent Owner’s characterizations of the “change” aspect of the limitation. First, Patent Owner does not support its interpretation of the limitation with any formal claim construction position that would suggest we must construe the limitation as narrowly as Patent Owner proposes.

Second, nothing in the claim language suggests that any specific type of process must be used to detect the change in operational state, much less a change detected using some comparison to past states or use of memory in the device. The limitation merely requires determining an action “based on at least one change in the operational state of the vehicle” without specifying how to detect the change.

Third, Patent Owner’s reliance on the Specification does not suggest a narrower reading of “change” in the limitation. Patent Owner cites to one sentence from the Specification that states: “The operational state determined by unit 3 are sent to unit 4 which decides what actions should be taken based on current and past operational states.” PO Resp. 31 (quoting Ex. 1001, 4:32–34). The reference to “current and past operational” states does not reference the claimed “change,” and even if it did so the passage could refer to turning an engine from on to off, as in Kim (i.e., after turning an engine off, the past state is on and current state is off). Patent Owner cites another section of the ’140 patent referencing “Using Change In State Detection To Find A Parked Car,” but that section describes analyzing

vibration measurements to determine whether an engine is on or off, and taking certain actions based on those readings. *See* PO Resp. 30–31 (citing Ex. 1001, 7:50, 8:34–41; Ex. 2001 ¶¶ 80–81); Ex. 1001, 7:50–8:41. The portions cited by Patent Owner do not support Patent Owner’s arguments that the claim requires “the capability of being aware of the vehicle’s past state, comparing that state to the present, and if a specific transition took place, taking action based on that change.” PO Resp. 31. Instead, these portions of the ’140 patent Specification appear similar to Kim, where the device analyzes vibration sensor output to help determine when a vehicle’s engine transitions from an on to an off state, or vice versa.

Based on the foregoing, we find that Petitioner establishes by a preponderance of the evidence that Kim discloses the limitation requiring “determining the one or more actions based on at least one change in the operational state of the vehicle occurs.”

iv. Conclusion

We address all of the arguments Patent Owner raises with respect to claim 1 above, and find that Petitioner establishes sufficiently that Kim discloses those limitations. We have also reviewed Petitioner’s arguments and evidence as to the undisputed limitations of claim 1 and find that Petitioner establishes sufficiently that Kim discloses these limitations for the reasons provided by Petitioner. We need not set forth formal findings as to the undisputed assertions by Petitioner.¹³ We adopt Petitioner’s arguments and evidence as to these limitations as our own. *See* Pet. 15–25.

¹³ *See In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (“Although the Board did not make findings as to whether any of the other claim limitations (such as fusion apertures or anti-migration teeth) are disclosed in the prior art, it did not have to: NuVasive did not present arguments about

b. Independent Claim 5

Independent claim 5 includes many of the same elements as claim 1, including the “operational indicators” and “transparently” limitations. *Compare* Ex. 1001 10:64–11:21 (claim 1) *with* 11:60–12:9 (claim 5). In addition to their arguments in regards to claim 1, the parties raise new arguments with regards to the limitations of claim 5 that differ from claim 1, which include “wherein the determining the one or more actions further comprises: determining a location of the individual; and determining the one or more actions based on the one or more operational states of the vehicle and the location of the individual.” *Id.* at 12:5–9. Petitioner argues that Kim discloses each of the limitations of independent claim 5. Pet. 25–26; Pet. Reply. 14–15. Petitioner relies on its analysis of claim 1 for limitations that are the same in claims 1 and 5 and cites to portions of Kim and declarant testimony for its argument as to additional limitations added by claim 5. *See id.*

As to claim 5’s “wherein” clause quoted above, Petitioner argues that Kim’s terminal “makes determinations based on an individual’s location after exiting a vehicle.” Pet. 26. Petitioner argues that Kim “discloses that when ‘driving is stopped,’ (i.e., ‘*one or more operational states of the vehicle*’), and ‘the user comes out of the vehicle,’ the ‘terminal’ recognizes that the user has exited the vehicle and is thus in a location outside the vehicle, (i.e., ‘*determining a location of the individual*’).” *Id.* (citing 1005 ¶ 82). Petitioner also argues that the terminal then “selects an appropriate

those limitations to the Board. . . . The Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters.”); Paper 9, 8 (emphasizing that “any arguments not raised in the response may be deemed waived”).

service’ (i.e., ‘*determining the one or more actions*’) and that selection is ‘based on the context information recognized,’ (i.e., ‘*based on the one or more operational states of the vehicle and the location of the individual.*’).” *Id.* (citing Ex. 1003 ¶ 232; Ex. 1005 ¶ 45). Petitioner further contends that Kim’s “‘terminal’ determines the user’s location while walking after exiting the stopped vehicle and uses that information to select an appropriate action to take.” *Id.* (citing Ex. 1003 ¶ 233; Ex. 1005 ¶ 84).

Patent Owner argues that Kim does not disclose “determining the one or more actions based on the one or more operational states of the vehicle and the location of the individual.” PO Resp. 35. Patent Owner contends that the limitation requires “two separate pieces of information: the fact that the car is lingering, and the geographic location of the individual.” *Id.* Patent Owner argues Kim does not disclose both criteria because when Kim states “when the driving is stopped and the user comes out of the vehicle 200, the context recognition unit 120 of the terminal 100 detects this,” the “when the driving is stopped” language “is simply part of the narrative description of what someone does before exiting a vehicle.” *Id.* at 36 (citing Ex. 1005 ¶ 82). According to Patent Owner, Kim’s device takes action based on a single piece of information, that the user has left the car, and does not take action based on the vehicle’s state as required by claim 5. *Id.* (citing Ex. 1005 ¶ 34; Ex. 2001 ¶¶ 87–90).

In its Reply, Petitioner argues that Kim discloses a mobile device that takes action based on two separate pieces of information “for at least three reasons.” Pet. Reply 14. First, Petitioner argues Kim detects “when the vehicle 200 reaches the destination *and* it is detected that the engine is turned off.” *Id.* (citing Ex. 1005 ¶ 78) (emphasis added). Second, Petitioner

argues that Kim detects these two criteria using sensors disclosed in Kim’s claim 3 which recites “wherein the plurality of sensors comprise [components] for recognizing a location through an artificial satellite, and an acceleration sensor that instantly detects the motion state of an object.” *Id.* (citing Ex. 1005, claim 3) (emphasis omitted). Finally, Petitioner argues that Kim “uses these two criteria (location and operational state) to determine an action,” and points to Kim’s description of its terminal recognizing the GPS location of the user and information from the acceleration sensor, and then delivering the information to the user. *Id.* at 14–15 (citing Ex. 1005 ¶ 87).

In its Sur-reply, Patent Owner argues that the additional disclosures cited by Petitioner similarly fail to disclose an action taken based off both the location of the individual and the operational state of the vehicle. PO Sur-Reply 16–17. Patent Owner argues that paragraph 78 of Kim describes “a situation in which an action is taken” only when “the engine is turned off.” *Id.* (citing Ex. 1005 ¶ 78). Patent Owner also argues paragraph 87 of Kim discloses “a different set of circumstances” from the ’140 Patent, i.e., when a user is “at a certain position for a certain amount of time in the middle of *walking*.” *Id.* (citing 1005 ¶ 87) (emphasis added). Finally, Patent Owner argues that the citation relied on by Petitioner to Kim’s claim 3 “recites a terminal containing certain sensors, but says nothing about determining actions.” *Id.*

We find that Petitioner establishes that Kim discloses “determining the one or more actions based on the one or more operational states of the vehicle and the location of the individual.” Petitioner relies in part on Kim’s paragraph 82, which states that “when the driving is stopped and the user comes out of the vehicle 200” the recognition unit “detects this based on

signals from the microphone 112, the GPS 113 and the acceleration sensor 114 of the sensor unit 110, and the user intention setting unit 130 enters the outdoor service mode.” Ex. 1005 ¶ 82; Pet. 26. We agree with Petitioner that this paragraph describes determining an action based on both the operational state of the vehicle and the user’s location. *See* Pet. 26 (citing Ex. 1003 ¶ 232).

Patent Owner argues that the paragraph’s reference to “when the driving is stopped” does not deserve weight because the determination of the action (here, entering “outdoor service mode”) does not use that information, but we disagree. *See* PO Resp. 36. Paragraph 82 describes both that the “driving is stopped *and* the user comes out of the vehicle” and that the context recognition unit “detects *this*” based on sensor inputs, with “this” referring back to both detecting both the stopping of driving (an operational state) and the user coming out of the vehicle (the location of the individual). Ex. 1005 ¶ 82 (emphasis added). Patent Owner does not dispute that the sensors mentioned in paragraph 82 (microphone, GPS, and acceleration sensors) would not only generate information about the user’s location but also that driving stopped, and that information indicating driving stopped would tend to support the conclusion that the device should enter the “outdoor service mode.” *See id.* While Patent Owner may be on firmer ground arguing that the device *could* determine that the user was outside the car and enter the “outdoor service mode,” without also knowing that the driving stopped, Kim’s paragraph 82 indicates that both pieces of information are detected as required by the claim.

Petitioner also provides an independent basis to conclude that Kim discloses the limitation because Kim’s paragraph 78 states that while using a

navigation service, “when the vehicle 200 reaches the destination and it is detected that the engine is turned off and the noise has disappeared through the sensor unit 110,” the navigation service “either ends automatically, or ends when the user intentionally stops it.” Ex. 1005 ¶ 78; Pet. Reply 14 (citing Ex. 1005 ¶ 78). We find this disclosure persuasive as it identifies the device undertaking an action, automatically ending the navigation service, based on a user’s location, “the vehicle 200 [and therefore the user] reaches the destination,” and the state of the vehicle, “the engine is turned off.” Ex. 1005 ¶ 78. Patent Owner argues that paragraph 78 merely “describes a situation in which an action is taken when ‘the engine is turned off,’” but the claim does not require determination of an action only when the engine remains on, and Patent Owner makes no argument that the claim should be read so narrowly. *See* PO Sur-reply 16.

Accordingly, we are persuaded by Petitioner’s arguments and evidence, and find that Petitioner establishes sufficiently that Kim discloses “determining the one or more actions based on the one or more operational states of the vehicle and the location of the individual.” With the exception of the “operation indicator” and “transparently” arguments we find unpersuasive for the reasons provided in our analysis of those limitations in the context of claim 1, and claim 5’s “wherein” clause addressed immediately above, Patent Owner does not raise any additional arguments against the limitations of claim 5. We have reviewed Petitioner’s arguments and evidence as to the remaining, undisputed limitations of claim 5 and find that Petitioner establishes sufficiently that Kim discloses these limitations for the reasons provided by Petitioner. We adopt Petitioner’s arguments and evidence as to these limitations as our own. *See* Pet. 25–26. Because Kim

discloses all of the limitations of claim 5, we find that Petitioner establishes by a preponderance of the evidence that Kim anticipates claim 5.

c. Independent Claim 10

Independent claim 10 includes many of the same elements as claim 1, including the “operational indicators” and “transparently” limitations.

Compare Ex. 1001 10:64–11:21 (claim 1) *with* 12:44–61 (claim 10). In addition to their arguments in regards to claim 1, Petitioner addresses the limitations of claim 10 that differ from claim 1, which include “wherein the determining the one or more actions further comprises: detecting when one or more predetermined applications are invoked via the portable device; and determining the one or more actions based on the one or more operational states of the vehicle and the one or more predetermined applications.” *Id.* at 12:56–61. Petitioner argues that Kim discloses each of the limitations of independent claim 10. Pet. 27–28. Petitioner relies on its analysis of claim 1 for limitations that are the same in claims 1 and 10 and cites to portions of Kim and declarant testimony for its argument as to additional limitations added by claim 10. *See id.*

As to claim 10’s “wherein” clause, Petitioner argues that Kim discloses a “terminal” that contains pre-determined applications including “music listening, video viewing, DMB service or information viewing services.” Pet. 27 (citing Ex. 1005 ¶ 88). Petitioner further argues that Kim discloses taking actions based on a user’s selection of a pre-determined application. *Id.* Petitioner points to Kim’s disclosure of a user selecting a music service in support of this argument, which states: “when a service such as listening to music is selected while the user is sitting in the passenger seat or the rear seat inside the car 200, an adapted music listening

service is provided to the user in consideration of the user's preferences, the internal context of the car 200, and context information such being in the middle of travel.” Ex. 1005 ¶ 46; *see also* Pet. 27 (citing Ex. 1003 ¶ 251; Ex. 1005 ¶ 46). Petitioner argues this disclosure includes one or more predetermined applications, “an adapted music service,” and the operational state of the vehicle, providing the application based on the detected context of the vehicle. Pet. 28 (citing Ex. 1003 ¶ 253; Ex. 1005 ¶ 46). Patent Owner does not address Petitioner's arguments and evidence as to claim 10's “wherein” clause.

We find Petitioner's arguments as to claim 10's “wherein” clause persuasive. The additional limitations of claim 10 require detecting the invocation of a predetermined application on the device, and taking an action based on the operational state of the vehicle and the application selected. *See* Ex. 1001 12:56–61. Kim discloses an action undertaken by the device providing “an adapted music listening service” (a predetermined application) based at least in part on the operational state of the vehicle, e.g., “context information such [as] being in the middle of travel.” Ex. 1005 ¶ 46; Pet. 27–28 (citing ¶¶ 251, 253; Ex. 1005 ¶ 46).

With the exception of the “operation indicator” and “transparently” arguments we find unpersuasive for the reasons provided in our analysis of those limitations in the context of claim 1, Patent Owner does not raise any arguments against the additional limitations of claim 10. *See* PO Resp. 19–24. We have reviewed Petitioner's arguments and evidence as to the undisputed limitations of claim 10 and find that Petitioner establishes that Kim discloses these limitations for the reasons provided by Petitioner. We adopt Petitioner's arguments and evidence as to these limitations as our own.

See Pet. 27–28. We find that Petitioner establishes by a preponderance of the evidence that Kim anticipates claim 10.

d. Dependent Claim 13

Claim 13 depends from claim 10 and recites, “[t]he method of claim 10 further comprises: associating a profile of the individual with the one or more predetermined applications and the one or more actions that should be performed for the one or more predetermined applications.” Ex. 1001, 13:9–12. Petitioner argues that Kim discloses each of the limitations of dependent claim 13. Pet. 28–29.

Petitioner argues Kim discloses “user profiles and preferences” that are stored in the terminal disclosed in Kim. Pet. 28. Specifically, Petitioner relies on Kim’s statement that “[t]he service adaptation unit 160 adjusts the content of the service selected by the service creation unit 140 according to . . . a user’s profile, or preferences.” Ex. 1005 ¶ 46; Pet. 28 (citing Ex. 1005 ¶ 46). Petitioner further argues that Kim discloses an adapted music listening service provided to the user “in consideration of the user’s preferences” and that Kim’s terminal “determines and takes an action based on a user profile.” Pet. 28–29 (citing Ex. 1003 ¶¶ 275–277; Ex. 1005 ¶ 46). Patent Owner does not address Petitioner’s arguments and evidence as to claim 13.

We find Petitioner’s arguments as to claim 13 persuasive. Claim 13 requires associating a user profile with the predetermined application and the action performed by the application. *See* Ex. 1001 13:9–12. Kim discloses adjusting the action the terminal performs based on a user’s profile or preferences associated with the application, such as adapting a music listening service based on the user’s preferences associated with that service.

Ex. 1005 ¶ 46; *see also* Pet. 28–29; Ex. 1003 ¶¶ 275–277. Accordingly, we are persuaded by Petitioner’s arguments and evidence, and find that Petitioner has established by a preponderance of the evidence that Kim anticipates claim 13.

e. Independent Claim 15

Independent claim 15 includes many of the same elements as claim 1, including the “operational indicators” and “transparently” limitations. *Compare* Ex. 1001 10:64–11:21 (claim 1), *with* 13:27–14:8 (claim 15). In addition to their arguments in regards to claim 1, the parties raise new arguments with regards to the limitations of claim 15 that differ from claim 1, which include “wherein the determining the one or more operational states of the vehicle further comprises: determining a position of the portable device; determining the one or more operational states of the vehicle based on the one or more predetermined criteria and the position of the portable device.” *Id.* 14:4–8. Petitioner argues that Kim discloses each of the limitations of independent claim 15. Pet. 29–30; Pet. Reply. 15. Petitioner relies on its analysis of claim 1 for limitations that are the same in claims 1 and 15, and cites to portions of Kim and declarant testimony for its argument as to the additional limitations added by claim 15. *See id.*

As to claim 15’s “wherein” clause quoted above, Petitioner argues that Kim discloses determining the position of the terminal by using the terminal’s acceleration sensor and microphone. Pet. 29–30 (citing Ex. 1003 ¶ 290; Ex. 1005 ¶¶ 73, 77). Specifically, Petitioner relies on Kim’s statement that “the acceleration sensor 114 and the microphone 112 . . . detect a unique pattern of vibration and noise generated in the vehicle 200 . . . and infer that the user is inside the vehicle 200 and is sitting in the

driver's seat.” Ex. 1005 ¶ 73; Pet. 29–30. Petitioner further argues that Kim's terminal detects sounds including vibrations of the vehicle and engine, air transmission noises, wind sounds, tire noise, intake and exhaust sounds and uses these signals to determine the operational state of the vehicle. Pet. 30 (citing Ex. 1003 ¶¶ 291–292; Ex. 1005 ¶¶ 41, 74).

Patent Owner argues that claim 15 requires determining an operational state based on two inputs, one or more predetermined criteria and the position of the portable device. PO Resp. 36–37. Patent Owner argues that Petitioner merely addresses the limitation requiring determining a position of the device and fails to demonstrate Kim discloses two inputs in determining the operational state. *Id.* at 37–38 (citing Pet. 29–30). Patent Owner also argues that Kim discloses using the position of the device to determine the position of the driver, but not the operational state of the vehicle. *Id.* Patent Owner further argues that “[a]t most” Kim discloses determining the operational state of the vehicle “based on predetermined criteria (i.e., ‘self-stored reference signals’),” but this disclosure does not also disclose determining the location of the portable device. *Id.* at 38 (citing Pet. 30 (citing Ex. 1005 ¶¶ 41, 74)). Patent Owner alleges that Petitioner fails to adequately link the two disclosures Petitioner cites, such that Kim's disclosure does not operate in the way claim 15 requires, i.e. using both predetermined criteria and location to determine operational state. *Id.* at 38–39.

In its Reply, Petitioner argues that Kim “determines the terminal is on the dashboard by detecting vibrations from the engine, which requires detecting the engine is on.” Pet. Reply 15 (citing Ex. 1005 ¶ 73). Petitioner further argues that the terminal takes an action based on this identification

by providing an appropriate service. *Id.* (quoting Ex. 1005 ¶ 77) (“[W]hen the user is in the driver’s seat inside the vehicle 200 and the terminal 100 is mounted on the vehicle 200, such a context may be recognized and a corresponding service may be provided.”). Petitioner contends that these disclosures show that Kim discloses using “both the position (attached to the dashboard) and the determination that the engine is on” to determine the user’s position in the driver’s seat. *Id.*

In its Sur-reply, Patent Owner argues that Kim “only discloses a system in which the terminal infers whether it is cradled or mounted by comparing acceleration data to predetermined criteria” and not “to determine the operational state of the vehicle.” PO Sur-reply 17.

We agree with Petitioner, and Patent Owner appears to concede, that Kim discloses “determining a position of the portable device” and “determining the one or more operational states of the vehicle based on the one or more predetermined criteria.” *See* Pet. 29–30; PO Resp. 37–38. The only dispute is whether Kim uses the position of the device, in addition to the predetermined criteria, to aid in determining the operational state of the vehicle.

We first address our understanding of the claim requirements. The parties do not direct us to any disclosure in the ’140 patent that would provide an understanding of exactly how the position of the device aids in determining the operational state of a vehicle. *See* PO Resp. 36–39. Based on our review of the ’140 patent, the position of the device provides one input in determining certain operational states of the vehicle. For example, a device located outside the vehicle indicates a stationary and/or “engine off” state, while a device located inside the vehicle indicates an “engine is on” or

“engine is off” state. *See* Ex. 1001, 4:17–24, 5:33–49. The position of the device may also aid in assigning vibration frequencies to particular states using pattern recognition techniques by, for example, ensuring that frequencies picked up when the device is outside the vehicle (e.g., from walking) are assigned to a “vehicle is stationary” and “engine is off” state. *Id.* at 5:33–49. The ’140 patent also describes determining the location of the device within the vehicle to determine whether it belongs to the driver, which in turn suggests actions to enable or block from the driver. *See id.* at 9:29–63. In that disclosure, however, the ’140 patent does not necessarily determine the vehicle’s operational state after identifying the device location within the vehicle, and instead appears to use the information to take or avoid certain actions. *See id.* Based on these disclosures, the reference to determining an operating state based in part on the position of the device in claim 15 appears to include merely knowing whether the device is located inside or outside of the car, which helps determine whether the vehicle is in a stationary/“engine is off” state or an “engine is on” state. *See* Ex. 1001, 4:17–24, 5:33–49.

With this background in mind, we turn to Kim’s disclosures. Kim discloses that “[w]hen the user is sitting in the driver’s seat, the terminal 100 is generally fixed to a cradle or mounted on a dashboard” and when so mounted the sensors “detect a unique pattern of vibration and noise generated in the vehicle 200 (vibration pattern 1, refer to Fig. 6(a)), and infer that the user is inside the vehicle 200 and is sitting in the driver’s seat.” Ex. 1005 ¶ 73. Kim also discloses that its context recognition unit acquires vibration and noise signals and compares “them with the pattern of the self-stored reference signals” to determine a context. *Id.* ¶ 74. Further “when

the user is in the driver's seat inside the vehicle 200 and the terminal 100 is mounted on the vehicle 200, such a context may be recognized and a corresponding service may be provided.” *Id.* ¶ 77; *see also* Pet. 29–30 (citing Ex. 1003 ¶¶ 290–292; Ex. 1005 ¶¶ 41, 73, 74, 77). The “pattern data” Kim refers to that helps determine the context includes data that corresponds to when the device is located inside or outside the car, such as when walking. *See* Ex. 1005 ¶ 42. Reading these passages together, we are persuaded that Kim teaches using the location of the device, e.g., mounted in a cradle, to help interpret sensor data that indicates the operational state of the vehicle, such as whether the engine is on or the car is moving. *See, e.g.*, Ex. 1005 ¶¶ 73–74; *see also* Ex. 1003 ¶¶ 292–293. Kim’s teachings are analogous to the description in the ’140 patent that uses the location of the device (inside or outside the vehicle) to help interpret sensor data. *See* Ex. 1001, 4:17–24, 5:33–49. Kim also teaches determining the location of the device within the car (driver, passenger, etc.) and using that information to perform an action, analogous to the similar disclosure in the ’140 patent. *See id.* at 9:29–63; Ex. 1005 ¶ 77.

Based on the foregoing, we are persuaded by Petitioner’s arguments and evidence, and find that Petitioner establishes sufficiently that Kim discloses claim 15’s “wherein” clause. With the exception of the “operation indicator” and “transparently” arguments we find unpersuasive for the reasons provided in our analysis of those limitations in the context of claim 1, Patent Owner does not raise any arguments against the additional limitations of claim 15. *See* PO Resp. 19–24. We have reviewed Petitioner’s arguments and evidence as to the undisputed limitations of claim 15 and find that Petitioner establishes sufficiently that Kim discloses

these limitations for the reasons provided by Petitioner. We adopt Petitioner's arguments and evidence as to these limitations as our own. *See* Pet. 29–30. We find that Petitioner establishes by a preponderance of the evidence that Kim anticipates claim 15.

3. Conclusion as to Claims 1, 5, 10, 13, and 15

Based on the foregoing, we determine that Petitioner establishes that Kim discloses every limitation in these challenged claims. *See* Pet. 15–30; Ex. 1003 ¶¶ 142–191. Accordingly, Petitioner has proven by a preponderance of the evidence that Kim anticipates claims 1, 5, 10, 13, and 15.

E. Obviousness

Petitioner challenges claims 2–4, 6–9, 11, 12, 14, and 16–18 as obvious under 35 U.S.C. § 103(a) based on Kim alone or Kim in combination with other art. *See* Pet. 3–4, 31–68. For these challenges, Petitioner cites to the asserted references the Michalson Declaration and the Yee Declaration. *Id.* We provided an overview of Kim above. We next provide an overview of the other asserted prior art and then discuss the parties' positions.

*1. Overview of the Prior Art*¹⁴

a. Baker

Baker discloses “[a] location system for locating a parked vehicle, a method for providing a location of a parked vehicle and a personal wireless device including the location system or method.” Ex. 1009, code (57).

¹⁴ Petitioner asserts, and Patent Owner does not contest, that all of the references Petitioner relies upon are prior art to the '140 patent. *See* Pet. 10, 34, 42, 52, 56, 61, 64.

Baker's system includes a "sensor" that a "parking determiner employs to ascertain a parking event based on audio," with the parking determiner configurable to determine when "an engine [is] turned off." *Id.* ¶ 25. Baker further discloses that "[a]nother sensor may be employed to detect for the absence of vibration that is associated with a running engine of the vehicle." *Id.* ¶ 39. An accelerometer may be used to detect that a personal wireless device "is no longer moving in the vehicle and indicate that vehicle may have been parked." *Id.* Baker discloses that its invention "provides a location system for locating a parked vehicle, a method for providing a location of a parked vehicle." *Id.* ¶ 6.

b. Barbera

Barbera discloses a "safety feature" that detects a user's speed and takes an action when the user is traveling beyond a certain speed threshold. Ex. 1007, code (57). Barbera discloses that in certain embodiments "a cell phone is provided that is configured to prevent use of the cell phone when the user and cell phone are traveling beyond a certain speed," and that "a variety of techniques for detecting speed may be used" including "GPS." *Id.* at 7:55–8:21.

c. Browne

Browne discloses a method for identifying available parking spaces. Ex. 1008, code (57). Browne discloses that "GPS locations may be received as part of a driver notification" and "the vehicle 102 may automatically send a notification to the locator component 108 when the vehicle 102 has been stopped in a valid parking space for a specified amount of time and is now being started or is moving." *Id.* at 5:21–31. Brown further discloses an embodiment where "the navigation system is utilized by the vehicle 102" to

transmit “the geographic location to mapping software 206.” *Id.* at 8:45–49. The mapping software “determines the parking rule(s) associated with the parking space.” *Id.* at 8:47–49.

d. Kohli

Kohli discloses a code GPS receiver system that tracks position information with as few as two satellites. Ex. 1016, code (57). Kohli discloses “an improved terrestrial navigation system using a GPS receiver” where “[t]he GPS data is augmented with data from another source” including “data from external sensors, data bases including map data bases, and/or knowledge of the physical environment within which the vehicle is to be navigated.” *Id.* at 2:14–26. Kohli further states that “[t]urn detection may be accomplished by monitoring changes in the vehicle vector velocity derived from changes in the GPS derived position information.” *Id.* at 3:5–9. Kohli discloses “the use of turn information for updating the last known position information.” *Id.* at 10:8–9.

e. Mitrovic

Mitrovic discloses a “simple and reliable method for the recognition of driving events using hidden Markov models.” Ex. 1010, 198. Mitrovic discloses creating Markov models to recognize specific driving events through the analysis of driving data. *Id.* at 203. Mitrovic states that the driving data was acquired through “accelerometers, gyroscopes, and a GPS receiver.” *Id.* at 205. Mitrovic discloses that its models were trained by observing sequences for each type of driving event and that its models were able to correctly recognize 98.3% of driving events. *Id.* at 203–04.

f. Rubin

Rubin discloses a method for receiving and analyzing accelerometer data from a mobile device. Ex. 1006, code (57). Rubin discloses that “acceleration profiles can be recorded by and stored in the mobile device” and that the device can “compare the real-time acceleration data with acceleration profiles stored in the mobile device.” *Id.* at 3:37–44. Rubin also states that if the real-time data matches a stored acceleration profile, the mobile device can activate a pre-set application associated with the matching acceleration profile. *Id.* at 3:44–59. Rubin discloses several example acceleration profiles, including a user who is jogging, a user on a train, and a user in various states of traffic. *Id.* at 4:38–6:13.

2. Discussion

We begin our analysis by addressing Patent Owner’s asserted objective indicia of non-obviousness, and then turn to the merits of Petitioner’s specific obviousness challenges before us.

a. Objective Indicia of Non-obviousness

i. The Parties’ Positions

Patent Owner argues that objective indicia of non-obviousness in the form of long-felt but unmet need illustrate the nonobviousness of the challenged claims. PO Resp. 27–29. Patent Owner argues that there was a “long-felt but unmet need for a way to monitor changes in the operational state of a vehicle without relying on GPS or a tightly-coupled device that existed at the time of the ‘140 patent.” *Id.* at 27. Patent Owner cites several articles for the assertion that “there was a long-felt need for a method of utilizing a smartphone’s accelerometer to detect a vehicle’s operational state without relying on GPS” within the usage-based insurance (“UBI”) industry.

Id. at 27–29 (citing Exs. 2006–2009). Patent Owner further asserts that “there was a long-felt need for a method of utilizing a smartphone’s accelerometer to detect a vehicle’s operational state, without relying on GPS.” *Id.* at 28. Patent Owner contends that “[t]he ‘140 patent was able to meet this long-felt need known by the UBI industry by providing a method for utilizing the data obtained by the on-board sensors, e.g., the accelerometer, of a portable device, such as a smartphone, to determine the operational state of a vehicle.” *Id.* at 29 (citing Ex. 1001, claims 1–5, 10, 15, 18).

Petitioner argues that Patent Owner “has failed to establish a nexus between” the alleged need and “the claims of the ’140 Patent.” Pet. Reply 15–16. Petitioner argues that a patent owner is only entitled to a presumption of nexus when citing a specific product that embodies the claimed features, and that there is no such product cited here. *Id.* at 16. Petitioner further argues that the claimed use of an accelerometer was present in the prior art and that Patent Owner cannot point to prior art features to establish a nexus. *Id.* Finally, Petitioner argues that Patent Owner fails to tie specific claim limitations to the alleged long-felt need and “instead only cites generally to multiple claims.” *Id.*

In its Sur-reply, Patent Owner argues that Petitioner “does not substantively address the evidence cited by Patent Owner to show that there was an unmet need for the invention of the ’140 patent.” PO Sur-reply 14. Patent Owner argues that despite Kim’s publication in 2007, “a need still existed in the field of usage-based insurance as late as 2012 for a method of utilizing a smartphone’s accelerometer to detect a vehicle’s operational state without relying on GPS.” *Id.* at 15 (citing Ex. 2007).

ii. Analysis of Long Felt Need

We first address the issue of nexus between the claimed invention and Patent Owner’s objective indicia of nonobviousness and then the strength of Patent Owner’s objective indicia evidence.

Patent Owner bears the burden of establishing a nexus. *See Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). “[A] patentee is entitled to a rebuttable presumption of nexus between the asserted evidence of secondary considerations and a patent claim if the patentee shows that the asserted evidence is tied to a specific product and that the product ‘*is the invention disclosed and claimed.*’” *Id.* (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)).

We agree with Petitioner that Patent Owner fails to meet its burden of establishing a nexus. Patent Owner never even mentions “nexus” in the Patent Owner Response, forfeiting its right to submit evidence and argument on the issue for the first time in its Sur-reply. *See* PO Resp. 27–29; Paper 9, 8 (emphasizing that “any arguments not raised in the response may be deemed waived”). Even after Petitioner pointed out the failure to establish a nexus in its Reply, Patent Owner does not make an attempt to remedy the issue by setting forth a substantive nexus argument in its Sur-reply. *See* PO Sur-reply 14–15.

The substance of Patent Owner’s arguments also fails to establish a nexus. First, Patent Owner never addresses whether a nexus to a claim, rather than a commercial product, can establish an adequate nexus. Second, Patent Owner never ties the alleged evidence of long-felt need to any specific claim, and only broadly cites to a number of claims without

providing any analysis of those claims. *See* PO Resp. 29 (citing Ex. 1001, claims 1–5, 10, 15, 18). In several places Patent Owner refers broadly to using an accelerometer on a smartphone to detect an operational state, but the fact that such language may track one or two of the many limitations in each independent claim does not establish a nexus to any of the challenged claims. *See id.* at 28–29; PO Sur-reply 15. Although a limitation-by-limitation analysis may not be required to establish a nexus to a claim, Patent Owner must do more than merely paraphrase a limitation or two from the challenged claims. Moreover, the fact that Kim already discloses the use of accelerometers in smartphones to detect a vehicle’s operational state only underscores the need for more argument and evidence from Patent Owner to make a colorable nexus showing here. *See* Pet. Reply 16.

Based on the foregoing, we find that Patent Owner fails to establish a nexus and therefore fails to establish that any alleged evidence of objective indicia supports a finding of non-obviousness. Accordingly, we give Patent Owner’s reliance on objective indicia of non-obviousness no weight in our obviousness analysis.

b. Kim – Dependent Claims 2 and 7

Petitioner asserts that Kim alone or in combination with the knowledge of a POSITA satisfies all of the limitations of claims 2 and 7. Pet. 31–33. Petitioner provides analysis of each limitation in claims 2 and 7, with citations to the references that correspond to each of the claim limitations. *Id.* Petitioner also cites to the relevant declarant testimony. *Id.* (citing various portions of Ex. 1003).

i. Claim 2

Claim 2 depends from claim 1 and further states: “wherein the speed limit value is determined based on the vehicle location or based on a preconfigured fixed value.” Ex. 1001, 11:22–24. The parties agree that the “speed limit value” of claim 2 refers back to the limitation in claim 1 referring to “a change from a vehicle speed is below a *predetermined speed limit state* to a vehicle speed is above the predetermined limit.” See Pet. 31; PO Resp. 39.¹⁵ In other words, claim 2 specifies how to determine the speed limit state of claim 1—by basing it on the vehicle location or a preconfigured fixed value.

Petitioner argues that Kim does not expressly disclose the limitations in claim 2 but that “it would have been obvious to include that functionality in Kim” because such a modification “would have been motivated by Kim’s own disclosure of detecting vehicle speed to determine the vehicle’s state.” Pet. 31 (citing Ex. 1003 ¶ 194; Ex. 1005 ¶ 76). Petitioner also argues that a POSITA would have been motivated to modify Kim to include the limitation “because modifying mobile device functions in response to vehicle speed changes was an obvious need in the art.” *Id.* (citing Ex. 1007, 1:10–19). Petitioner further contends that “it was also well-known in the art that such a need arose both with respect to the vehicle’s location and/or with respect to certain threshold speeds.” *Id.* at 32 (citing Ex. 1003 ¶ 194; Ex. 1011 ¶ 7).

¹⁵ Notably, this limitation in claim 1 refers to one of a list of possible changes in operational state that claim 1 covers, and Petitioner does not argue that Kim discloses this aspect of claim 1 as part of its anticipation challenge to claim 1. See Pet. 23–25. Accordingly, to show that claim 2 has been met, Petitioner must also show that Kim discloses or renders obvious the related limitation in claim 1.

Finally, Petitioner argues that it also would have been obvious to modify Kim “because speed detection for comparison to speed limit values on a mobile device were contemporaneously being developed and presented as an obvious need in the art.” *Id.* (citing Ex. 1003 ¶ 194; Ex. 1007, 9:30–33; Ex. 1011, ¶ 7).

Patent Owner argues that: (1) claim 1 requires determining speed using an operation indicator; (2) the parties agree that “operation indicators exclude information received from GPS;” (3) Kim “relies on the use of GPS to determine a vehicle’s speed;” and (4) Kim, therefore, “fails to disclose the use of operation indicators to determine a vehicle’s speed.” PO Resp. 39–40 (citing Ex. 1001, 11:3–6; Ex. 1005 ¶ 76; Ex. 2001 ¶ 92; Pet. 9). Patent Owner also argues that nothing in Kim supplies a motivation to modify its system to determine the exact speed “necessary to determine whether the speed has reached a ‘predetermined speed limit state’” as required by claim 1. *Id.* at 40 (citing Ex. 1005 ¶¶ 76–77). Next, Patent Owner contends that nothing in Kim would motivate a modification of Kim to determine a speed limit value given that Kim focuses on user convenience rather than complying with speed limits. *Id.* at 40–41. According to Patent Owner, even assuming a motivation to modify Kim, Petitioner fails to show a reasonable expectation of success given the precision necessary to compare car’s speed to a predetermined speed limit. *Id.* at 41 (citing Ex. 2001 ¶ 92). Finally, Patent Owner argues that Petitioner’s declarant improperly invokes “common sense” to fill the gaps in Kim. *Id.* (citing Ex. 1003 ¶ 194).

Petitioner argues that using sensors other than GPS to detect speed must have been within the knowledge of a POSITA given that the ’140 patent claims but does not describe how to use sensors for speed detection.

Pet. Reply 17 (citing Ex. 1001 generally). Petitioner also argues that the '140 patent does not teach any method that demands the precision and specificity Patent Owner seeks to impose on Kim's disclosure. *Id.* As to the motivation to modify Kim, Petitioner argues that "speeding was a salient issue related to the use of mobile devices while operating vehicles" and that speed limits based on location were common and would have provided motivation and an expectation of success "in comparing a detected speed limit." *Id.* (citing Ex. 1003 ¶ 194; Ex. 1007, 1:10–19; Ex. 1011 ¶ 7). Petitioner further contends that the claim requires basing the speed on a predetermined value and Kim "discloses the use of pre-configured values through 'pattern data previously input and stored,'" such that modifying Kim "would be well within the skill of a POSITA." *Id.* at 18 (citing Ex. 1003 ¶¶ 194–195; Ex. 1005 ¶ 19).

Patent Owner replies that Petitioner fails explain why a POSITA would have been motivated to modify Kim to use sensors to detect speed rather than using GPS. PO Sur-reply 17–18. Patent Owner also argues that Petitioner's arguments as to the level of detail in the '140 patent miss the point that "a POSITA would not have been motivated to make the change claimed in the '140 patent." *Id.* at 18.

We agree with Patent Owner that Petitioner fails to establish adequately that it would have been obvious to modify Kim to meet the limitations of claim 2. First, Petitioner acknowledges that Kim does not expressly teach the limitations—Kim does not appear to say anything about speed limits, much less setting a speed limit value based the specific criteria claimed. *See* Pet. 31. Second, Petitioner argues that it would have been obvious to modify Kim based on Kim's own disclosure of detecting speed,

but merely detecting speed says nothing about determining speed limits or detecting a change based on detecting a speed above or below that limit. *See id.*; Ex. 1005 ¶ 76 (disclosing detecting speed using GPS). Third, Petitioner points to other references as support for the modifications to Kim, but those citations provide an insufficient basis to modify Kim in the manner claimed. *See* Pet. 31–32 (citing Ex. 1007, 1:10–19, 9:30–33; Ex. 1011 ¶ 7). Two of the citations merely note the danger of using mobile phones while driving, or at high speeds. *See* Ex. 1007, 1:10–19 (noting “safety concerns” with using cellular phones while driving); Ex. 1011 ¶ 7 (noting “potentially hazardous exercise such as driving a car at high speeds” while talking on a cellular phone). These passages do not support modifying Kim to add the specific limitations in claim 2. Another passage relied upon by Petitioner from Barbera comes closer by referring to a speed threshold: “[s]uch intra-vehicle positioning may be used to prevent the disablement of cell phone features despite a non-driving user’s traveling speed being beyond the threshold.” Ex. 1007, 9:30–33; Pet. 32. This single sentence cited by Petitioner, however, also fails to render obvious the addition to Kim of the specific limitations of claim 2, including determining an action based on a change from a speed below to above a predetermined speed limit (the relevant portion of claim 1), and determining the speed limit value “based on the vehicle location or based on a preconfigured fixed value” (required by claim 2). The single sentence Petitioner cites in Barbera mentions a “threshold,” but does not define it or describe how to determine the threshold. *See* Ex. 1007, 9:30–33.¹⁶

¹⁶ Petitioner also relies on declarant testimony in support of its challenge, which includes an argument that it “would have been common sense to

Petitioner provides further argument and evidence as to Barbera's teachings in its separate obviousness challenge to claim 2 based on Kim and Barbera, which we find persuasive. *See* Pet. 34–37. But the isolated citations here, in this obviousness challenge based on Kim alone, provide an insufficient basis to support the proposed modifications to Kim.

“Once all relevant facts are found, the ultimate legal determination [of obviousness] involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1361 (Fed. Cir. 2017). Above, based on the full record before us, we provide our factual findings regarding (1) the level of ordinary skill in the art, (2) the scope and content of the prior art, (3) any differences between the claimed subject matter and the prior art; and (4) objective indicia of nonobviousness.¹⁷

In particular, we find that (1) Petitioner's proposed level of ordinary skill in the art is consistent with the art of record; (2) Petitioner fails to

modify” Kim in the manner proposed. *See* Ex. 1003 ¶ 194. Petitioner does not raise this “common sense” argument in the briefs, and the single-sentence argument in the declaration lacks adequate explanation and evidence to support a finding that it would have been obvious to add the limitations of claim 2 to Kim based on common sense alone. *See id.*

¹⁷ We apply these same four factors throughout our obviousness analysis. Because our findings that Petitioner's proposed level of ordinary skill in the art is consistent with the art of record and Patent Owner fails to establish any objective indicia of nonobviousness apply to each obviousness challenge, we do not repeat these findings. Accordingly, our obviousness determinations turn on whether the prior art discloses the limitations of the claims in question and whether Petitioner establishes a sufficient motivation to modify or combine the references, and we focus on those issues in our remaining analysis below.

establish sufficiently that Kim discloses or renders obvious all the limitations of claim 2; and (3) Patent Owner presents insufficient evidence to establish any objective indicia of nonobviousness. Weighing these underlying factual determinations, Petitioner has not shown, by a preponderance of the evidence, that Kim alone renders claim 2 obvious.

ii. Claim 7

Claim 7 depends from independent claim 5 (which we found anticipated by Kim above) and states “wherein the determining the location of the individual comprises: setting the location of the individual to the individual is in an outside of the vehicle location when a position of the portable device shows off a road location.” Ex. 1001, 12:21–25. Petitioner argues that Kim does not expressly disclose this limitation, but that it would have been obvious to include this functionality in Kim based on the knowledge of a POSITA. Pet. 32 (citing Ex. 1003 ¶ 243). Petitioner argues that Kim “is capable of tracking the location of the user after the vehicle is stopped, and comparing that location to real-world geographic information.” *Id.* at 33 (citing Ex. 1005 ¶¶ 82, 87). Petitioner points to Kim’s description of recognizing a user that enters a building, indoors, and argues that it meets the portion of claim 7 requiring “setting the location of the individual to the individual is in an outside of the vehicle location.” *Id.* (citing Ex. 1005 ¶ 35). Petitioner then argues that because “being located inside of a building and setting the location to ‘in an outside the vehicle location’ requires setting the location to an ‘off a road location,’ it would have been obvious to modify the disclosure in Kim to include an ‘off a road location’ setting.” *Id.* (citing Ex. 1003 ¶ 243). Petitioner also contends that “comparing GPS positioning information to the presence or absence of nearby roadways is an obvious and

ordinary application of GPS.” *Id.* (citing Ex. 1003 ¶ 245; Ex. 1011 ¶ 23; Ex. 1012 ¶ 24).

Patent Owner argues that “determining when a user is indoors” does not equate “to determining that the user is on an off-road location.” PO Resp. 42. Patent Owner contends that “there is a difference between ‘indoor service mode’ and an ‘off a road location’” because “[i]t is possible to be off a road but not indoors—for instance, in a parking lot.” *Id.* (citing Ex. 2001 ¶¶ 96–97). Patent Owner also contends that Kim fails to distinguish between “on a road” and “off a road.” *Id.* Finally, Patent Owner argues that even if Kim’s “indoor service mode” discloses an “off a road location” as required by the claim, Petitioner fails to supply an adequate motivation to modify Kim’s “such that the input to the method is that a person is indoors and the output is that the device is on an ‘off a road location.’” *Id.* at 42–43 (citing Pet. 33).

Petitioner replies that “a device that functions indoors would meet the ‘off a road’ element” and modifying Kim “to include an express ‘off a road’ setting would thus be obvious and within the skill of a POSITA.” Pet. Reply 18. Petitioner also argues that Kim’s recognition of the indoor context shows that it detects the “off a road” location and Kim’s switching to an indoor service mode show that it meets the “setting the location of the individual” limitation. *Id.* (citing Ex. 1005 ¶ 35).

Patent Owner argues that “there is a difference between detecting when a device is “off a road” and “indoors.” PO Sur-reply 18. According to Patent Owner, a “device can be off a road and outdoors (in a parking lot) or on a road and indoors (in a parking garage).” *Id.* Patent Owner also argues

that a “device that merely detects that it is indoors would not meet the claim’s requirement that the device determines that it is off a road.” *Id.*

Based on our review of the arguments and evidence, Petitioner establishes that Kim discloses or renders obvious the limitations of claim 7. Kim discloses “determining the location of the individual” and “setting the location of the individual to the individual is in an outside of the vehicle location” because it tracks the location of the user inside and outside the vehicle, including inside a building. *See* Ex. 1005 ¶ 35 (“[W]hen the user has the terminal 100 and enters the building 500 and is located indoors, this context is recognized by the terminal 100 and it switches to the indoor service mode to provide indoor service to the user.”), ¶ 82 (“[W]hen the driving is stopped and the user comes out of the vehicle 200, the context recognition unit 120 of the terminal 100 detects this.”), ¶ 87 (tracking user location while walking outside a vehicle); Pet. 33 (citing Ex. 1005 ¶¶ 35, 82, 87); Ex. 1003 ¶ 244. We also agree with Petitioner that locating a user indoors equates to locating a user “off a road” as required by claim 7. Pet. 33; Ex. 1003 ¶ 244. Based on these disclosures, we agree with Petitioner that it would have been obvious to modify Kim to include an “off a road location” setting given that Kim already discloses identifying a user location inside a building and outside of a vehicle. *See* Pet. 33; Ex. 1003 ¶¶ 243–244.

Patent Owner argues that a device “can be on a road and indoors (in a parking garage),” which, if true, would undermine Petitioner’s argument that identifying an individual indoors necessarily identifies an individual off a road. *See* PO Sur-reply 18. Patent Owner does not cite any support for this argument, however, and it generally conflicts with the notion in Kim that

“indoors” refers to a location inside a building, not inside a parking garage. *See* Ex. 1005 ¶ 35 (“[W]hen the user has the terminal 100 and *enters the building 500 and is located indoors*, this context is recognized by the terminal 100 and it switches to the indoor service mode to provide indoor service to the user.”) (emphasis added), Ex. 1003 ¶ 244 (“Being located ‘indoors’ is necessarily being located in an “off a road location.”). Patent Owner makes other statements, such as a “device can be off a road and outdoors (in a parking lot),” but this statement goes beyond claim 7’s requirements. *See id.* Claim 7 refers to “a position of the portable device shows off a road location” and if an indoor location shows an off a road location, that satisfies this claim language; whether a device can be off a road and outdoors is not dispositive.

Based on the foregoing, we find that Petitioner has shown by a preponderance of the evidence that Kim alone renders claim 7 obvious.

c. Kim and Barbera – Dependent Claims 2, 11, and 14

Petitioner asserts that Kim in combination with Barbera discloses all of the limitations of claims 2, 11, and 14. Pet. 34–41. Petitioner provides analysis of each limitation in claims 2, 11, and 14, with citations to the references that correspond to each of the claim limitations. *Id.* Petitioner also cites to the relevant declarant testimony. *Id.* (citing various portions of Ex. 1003). We address each claim in turn, with an emphasis on the arguments raised by Patent Owner.

i. Claim 2

Petitioner’s challenge to claim 2 based on Kim and Barbera relies on Barbera as disclosing the claimed “speed limit value.” Pet. 34 (citing Ex. 1003 ¶ 195). Petitioner argues that Barbera discloses a portable device

that includes a safety feature that prevents some uses of the device “when the user is traveling beyond a speed threshold.” *Id.* (citing Ex. 1007, 2:16–19). Petitioner further argues that Kim discloses a “speed detector” that determines the speed of the device using, in some embodiments, “land-based signal triangulation techniques.” *Id.* (citing Ex. 1003 ¶ 197; Ex. 1007, 2:33–49). Petitioner contends that Barbera discloses comparing the detected speed to a threshold value (the claimed pre-configured fixed value) and determines “[w]hen the indicated speed exceeds the threshold value,” (i.e., *‘a change from a vehicle speed is below a predetermined speed limit state to a vehicle speed is above the predetermined limit’*).” *Id.* at 34–35 (citing Ex. 1003 ¶ 198; Ex. 1007, 3:50–55). Per Petitioner, Barbera also “discloses that ‘the applicable [speed] threshold may depend on a variety of conditions (e.g. location, the type of device, etc.),’ (i.e., *“wherein the speed limit value is determined based on the vehicle location or based on a pre configured fixed value”*).” *Id.* at 35 (citing Ex. 1003 ¶ 198; Ex. 1007, 5:34–36).

Petitioner also provides a number of reasons in support of the combination of Kim and Barbera. Pet. 35–37 (citing Ex. 1003 ¶¶ 203–206). For example, Petitioner argues that: (1) Kim and Barbera are analogous art because each discloses portable electronic devices that detect motion of a vehicle and take actions based on that information; (2) applying the speed detection methods of Barbera “would have been well within the level of ordinary skill in the art” and “would not have resulted in any unpredictable results;” (3) both references use speed detection to take actions; (4) a POSITA would have had a reason to combine the references given Kim’s disclosed need for context-aware services that automatically select services “based on whether the user is driving a vehicle” and Barbera’s ability to

address safety concerns when using a mobile device while driving a vehicle; (5) other inventors patented similar safety devices before the '140 patent was filed, which provides additional motivation to add Barbera's safety feature to Kim; and (6) before the '140 patent, "providing a wide variety of location and context-aware services on portable electronic devices had become increasingly popular," such that adding features similar to Barbera's using software and existing hardware on portable devices like Kim's terminal would have been possible and further motivated the proposed combination. *Id.* (citing Ex. 1001, 1:43–46; Ex. 1003 ¶¶ 203–206; Ex. 1005 ¶¶ 11, 75–76; Ex. 1006, 1:15–19; Ex. 1007, Abstract, 1:14–16; Ex. 1011 ¶¶ 6–7; Ex. 1013 ¶ 3).

Patent Owner argues that Petitioner's arguments fail because both Kim and Barbera use GPS to determine a vehicle's speed, and claim 1 (from which claim 2 depends) requires determining speed using operation indicators that exclude information received from a centralized source such as GPS. PO Resp. 43 (citing Ex. 1005 ¶ 76; Ex. 1007, 2:37–49; Pet. 9). Patent Owner also argues that neither reference discloses determining an action based on a change in an operational state, wherein the change comprises "a change from a vehicle speed is below a predetermined speed limit state to a vehicle speed is above the predetermined limit." *Id.* at 44. As to Kim, Patent Owner's argument tracks its argument in connection with claim 1 to the effect that "the method must be able to remember a prior operational state and take an action based on its determination that the current state differs from the prior state." *Id.* As to Barbera, Patent Owner argues that Barbera's statement that it determines when a vehicle exceeds a threshold speed merely detects a current speed rather than a change in speed.

Id. at 44–45 (citing Ex. 1007, 2:28–32). According to Patent Owner, “Barbera does not disclose that the system ever remembers prior speeds and compares them to the current speed to assess whether there was a change in speed.” *Id.* at 45. As to the motivation to combine, Patent Owner argues that a POSITA would not have been motivated to combine Kim and Barbera because they “are directed to different ideas.” *Id.* at 47–48. Patent Owner argues that “Kim is directed towards providing enhanced functionality to the user of a terminal based on the user’s intent, inferred from context,” while “Barbera is directed towards preventing a user of a device from using voice or text services while driving—in other words, limiting the functionality of a device contrary to the intent of the user.” *Id.* at 48; *see also* PO Sur-reply 21 (arguing a failure to show motivation where Kim enhances functionality while Barbera limits the functionality of a portable device).¹⁸

Petitioner replies that Barbera does not rely only on GPS to determine speed, and also relies on “‘land based signal triangulation’ techniques that ‘comprise a transmitter/receiver as a local portion (34) of a speed detector (30); with a remote portion (32) of the speed detector (30) comprising a plurality of fixed base stations.’” Pet. Reply 20 (citing Ex. 1003 ¶ 197; Ex. 1007, 2:48–53). As to detecting a change, Petitioner argues that Barbera discloses “‘detecting that the speed has exceeded a speed threshold’ before disabling the phone or applications” and that detecting when a vehicle exceeds a threshold detects “a change from below to above that threshold, and a pre-set threshold is a ‘pre[-]configured fixed value’ as claim 2

¹⁸ Patent Owner’s arguments as to motivation combine go to the combination of Kim and Barbera generally, and our resolution of this dispute here applies to the analysis of claims 2, 11, and 14. *See* PO Resp. 47–48.

requires.” *Id.* (citing Ex. 1003 ¶¶ 198–199; Ex. 1007, 8:32–34). As to motivation to combine, Petitioner argues that Patent Owner ignores that both Kim and Barbera disclose mobile devices used in vehicles and vehicle-specific applications. *Id.* at 22 (citing Ex. 1003 ¶¶ 202–207; Ex. 1005 ¶ 76; Ex. 1007, Abstract).

In its Sur-reply, Patent Owner argues that Barbera’s speed detection method still relies on fixed base stations, which require information from a centralized source. PO Sur-reply 19. As to the “change” issue, Patent Owner argues that Barbera merely detects the current speed and does not disclose detecting a change in speed. *Id.*

We find that Petitioner’s proposed combination of Kim and Barbera satisfies all of the limitations of claim 2. Kim discloses a device that detects speed using a speed detector that employs triangulation techniques, and then uses that speed to determine when a user’s speed exceeds a pre-determined threshold. *See* Pet. 34–35; Ex. 1007, 2:16–19, 2:33–49, 3:50–55; Ex. 1003 ¶¶ 196–198). These aspects of Barbera disclose claim 2’s “speed limit value . . . determined based on . . . a pre-configured fixed value” (i.e., Barbera’s speed threshold) and claim 1’s “a change from a vehicle speed is below a predetermined speed limit state to a vehicle speed is above the predetermined limit” (i.e., Barbera’s detection of a change from a speed below a threshold value to above a threshold value). Although claim 2, and the related limitation from claim 1, require nothing further because the speed limit value may be determined from *either* a vehicle location *or* a pre-configured fixed value, Barbera also discloses that its speed threshold may be based on a vehicle location. *See* Ex. 1007, 5:34–36; Pet. 35; Ex. 1003 ¶ 198.

Petitioner's showing outweighs Patent Owner's arguments. Patent Owner's argument that both Kim and Barbera obtain vehicle speed using GPS ignores Petitioner's express reliance on Barbera's triangulation techniques for obtaining speed in the Petition. *See* Pet. 34; PO Resp. 43. Barbera's triangulation techniques employ a plurality of fixed based stations that send a signal to a portable device with a speed detector and measure the time it takes for that signal to arrive at the mobile device. Ex. 1007, 2:48–58. Those measurements, when combined with triangulation algorithms, allow Barbera's system to determine the speed of the mobile device. *See id.* When forced to confront this alternative manner of determining speed that Barbera discloses, Patent Owner argues that Barbera's speed detection method still relies on fixed base stations, which require information from a centralized source. PO Sur-reply 19. This single-sentence argument made for the first time in Patent Owner's Sur-reply lacks any citation for support and does not adequately explain how Barbera's system relies on a centralized source that falls outside the scope of the claims. *See id.* We find Petitioner's argument and evidence persuasive on this point. Pet. 34 (citing Ex. 1003 ¶ 197; Ex. 1007, 2:28–49); Pet Reply 20 (citing Ex. 1003 ¶ 197; Ex. 1007, 2:48–53).

Patent Owner's argument that Barbera fails to detect a change also lacks merit. Patent Owner appears to base this argument on the same interpretation of the “change” requirement in claim 1 that we address and reject above in the context of our analysis of claim 1. *See* PO Resp. 44 (referring back to previous argument as to “change” in claim 1). For example, Patent Owner argues that “the method must be able to remember a prior operational state” and that Barbera “does not disclose that the system

ever remembers prior speeds and compares them to the current speed to assess whether there was a change in speed,” but nothing in the claim supports such a requirement. *See id.* Petitioner persuasively establishes that Barbera detects a change in speed from below its speed limit threshold to above the speed limit threshold, and sends a signal when this change occurs. *See* Ex. 1007, 3:50–55 (describing step of comparing detected speed to speed limit threshold and sending a signal “[w]hen the indicated speed exceeds the threshold value”), 8:32–34 (“detecting that the speed has exceeded a speed threshold”); Ex. 1003 ¶¶ 197–198, 200; Pet. 34–35; Pet. Reply 20 (“Detecting when a vehicle ‘exceed[s] a speed threshold’ requires detecting a change from below to above that threshold.”).

We also find that Petitioner establishes adequately that a POSITA would have been motivated to combine Kim and Barbera for the reasons provided by Petitioner, which rationale which we adopt as our own. *See* Pet. 35–37 (citing Ex. 1001, 1:43–46; Ex. 1003 ¶¶ 203–206; Ex. 1005 ¶¶ 11, 75–76; Ex. 1006, 1:15–19; Ex. 1007, Abstract, 1:14–16; Ex. 1011 ¶¶ 6–7; Ex. 1013 ¶ 3); Pet. Reply 22. Patent Owner does not directly attack these many stated reasons in support of the prior art combination, and instead asserts that “Kim is directed towards providing enhanced functionality to the user of a terminal based on the user’s intent, inferred from context,” while “Barbera is directed towards preventing a user of a device from using voice or text services while driving—in other words, limiting the functionality of a device contrary to the intent of the user.” PO Resp. 48; PO Sur-reply 21. These brief remarks as to motivation to combine, not supported by any testimony from the perspective of a POSITA, do not undermine Petitioner’s extensive rationale for the proposed motivation to combine, which Patent Owner

leaves un rebutted. PO Resp. 48. In addition, Patent Owner’s argument narrowly characterizes both references in a manner that overlooks their similarities—indeed, both references disclose mobile devices that selectively enable or disable applications while operating a vehicle.

Based on the foregoing, we find that Petitioner has shown by a preponderance of the evidence that (1) the combination of Kim and Barbera satisfies all of the limitations of claim 2 and (2) a POSITA would have been motivated to combine the references in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim and Barbera renders claim 2 obvious.

ii. Claim 11

Claim 11 depends from independent claim 10 (which we found, above, to be anticipated by Kim) and provides that the “one or more predetermined applications” must “comprise at least one” of a list of applications, including “at least one text entering application; at least one application for making voice calls; . . . and at least one application for making data connections.” Ex. 1001, 12:62–13:3. Claim 11 refers back to the “predetermined applications” referred to in claim 10, which includes the following limitation: “detecting when one or more predetermined applications are invoked via the portable device; and determining the one or more actions based on . . . the one or more predetermined applications.” *Id.* at 12:57–61.

Petitioner argues that Kim discloses a terminal that “accesses applications that make data connections: it ‘accesses the Internet 400 to provide various services,’” including entertainment and digital multimedia

broadcasting (“DMB”) services. Pet. 38 (citing Ex. 1003 ¶¶ 256–257; Ex. 1005 ¶¶ 33, 80, 88–89). Petitioner further contends that “because downloading content or streaming requires making a data connection, Kim discloses that ‘the one or more predetermined applications’ include ‘at least one application for making data connections.’” *Id.* (citing Ex. 1003 ¶¶ 256–257). Petitioner also argues that Barbera discloses disabling certain applications when a vehicle speed exceeds a speed threshold, including voice communication and text message applications. *Id.* at 38–39 (citing Ex. 1003 ¶ 258; Ex. 1007, 4:10–17, 6:6–11). As to the related limitation in claim 10, Petitioner argues that Kim discloses the limitation because it discloses invoking predetermined applications when it refers to taking action “when a service such as listening to music is selected.” *Id.* at 27 (citing Ex. 1003 ¶ 251; Ex. 1005 ¶¶ 46, 88).

Patent Owner argues that Petitioner concedes that Kim fails to disclose “detecting when one or more predetermined applications are invoked via the portable device” and that Barbera also fails to disclose the limitation. PO Resp. 46. Patent Owner acknowledges that Barbera discloses the ability to disable voice and text functionality on its device “when a speed threshold has been exceeded,” but argues that does not disclose detection of “whether a ‘predetermined application’ was ‘invoked.’” *Id.* According to Patent Owner, Barbera “merely disables certain functionality as soon as a speed threshold is crossed, regardless of whether the user invoked any particular application.” *Id.* (citing Ex. 1007, 5:61–64).

Petitioner replies that it does not concede that Kim fails to disclose detecting when a predetermined application is invoked, and points to the portion of the Petition containing this assertion. Pet. Reply 20–21 (citing

Pet. 38). Petitioner contends that “[i]t would have been obvious to combine Barbera’s disclosure of disabling ‘voice communication and text messaging’ applications when a speed exceeds a threshold with Kim’s disclosures of detecting when an application is invoked.” *Id.* at 21 (citing Pet. 38–39; Ex. 1007, 6:6–11).

In its Sur-reply, Patent Owner argues that “Kim discloses the detection of changes to the user’s context (e.g., indoors, outdoors, or in a vehicle), but says nothing about detecting when the user invokes an application. PO Sur-reply 19 (citing Ex. 1005 ¶¶ 80, 88).

We agree with Petitioner that it did not concede that Kim fails to disclose the limitation in claim 10 requiring “detecting when one or more predetermined applications are invoked via the portable device.” PO Resp. 45. Patent Owner misreads the Petition. First, the limitation at issue appears in claim 10, not claim 11, and Patent Owner complains that Petitioner fails to make the argument based on Kim as part of its analysis of claim 11. *See id.* Second, Petitioner properly addresses the limitation in the context of claim 10, arguing that Kim discloses the limitation because it invokes several predetermined applications, and Patent Owner fails to acknowledge or address those arguments in its Response. *See* Pet. 27 (citing Ex. 1003 ¶ 251; Ex. 1005 ¶¶ 46, 88); PO Resp. 45. Third, Patent Owner never argues, in the context of claim 10, that Kim fails to disclose the limitation. *See* PO Resp. 19–24 (arguing that Kim fails to disclose the “operating indicator” and “transparently” limitations in claim 10). Fourth, Petitioner also addresses the “predetermined applications” aspect of the limitation in its analysis of claim 11, which Patent Owner also ignores in its Response. *See* Pet. 38–39. Based on the foregoing, Petitioner not only does

not concede that Kim fails to disclose “detecting when one or more predetermined applications are invoked via the portable device,” Patent Owner’s failure to address Petitioner’s showing as to that limitation amounts to a waiver of the arguments made for the first time in Patent Owner’s Sur-reply, which Petitioner never had the chance to address. *See* PO Sur-reply 19.

Turning to the merits of Petitioner’s challenge, we find that Petitioner establishes that Kim discloses the limitation requiring “detecting when one or more predetermined applications are invoked via the portable device.” *See* Pet. 27 (citing Ex. 1003 ¶ 251; Ex. 1005 ¶¶ 46, 88). Kim discloses several applications that are either selected by the user or automatically by the device, which amounts to detecting when predetermined applications are invoked via the device as the limitation requires. *See* Ex. 1005 ¶ 46 (referring to “the service selected”), ¶ 88 (referring to a “reading service . . . automatically derived . . . and performed” and “[w]hen the user selects one entertainment service such as music listening, video viewing, DMB service”); Ex. 1003 ¶ 251. For similar reasons, and relying on the same predetermined services, Petitioner establishes adequately that Kim discloses the “predetermined applications” that include an “application for making data connections” as required by claim 11. *See* Pet. 38 (citing Ex. 1005 ¶¶ 33, 80, 88–89). Although Kim discloses one of the applications listed in claim 11 (“application for making data connections”), Barbera discloses other applications listed in the claim, including an “application for making voice calls” and a “text entering application.” *See* Pet. 38–39; Ex. 1007, 4:10–17, 6:6–11; Ex. 1003 ¶ 258. Based on the foregoing, we agree with Petitioner that it would have been obvious to combine Barbera’s disclosure

as to disabling voice and texting applications when a speed exceeds a threshold with Kim’s disclosure of detecting when an application is invoked, with a reasonable expectation of success. *See* Pet. 39; Pet. Reply 21; Ex. 1003 ¶¶ 261–262.

Based on the foregoing, we find that Petitioner has shown by a preponderance of the evidence that (1) the combination of Kim and Barbera satisfies all of the limitations of claim 11 and (2) a POSITA would have been motivated to combine the references in the manner Petitioner proposes. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim and Barbera renders claim 11 obvious.

iii. Claim 14

Claim 14 also depends from independent claim 10 and further requires “wherein the one or more actions comprise at least one of the following” and lists a series of actions, including

not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving state; informing a third party via a network that the one or more predetermined applications are invoked and asking for confirmation to allow to perform the one or more predetermined applications; *not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving and the individual is a driver*; not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is stopped at the light; and controlling the one or more predetermined applications.

Ex. 1001, 13:13–26 (emphasis added to limitations in dispute). The “actions” in claim 14 refers back to “actions” in claim 10, including in the following limitation in claim 10: “determining the one or more actions [to

be performed on the device] based on . . . the one or more predetermined applications.” *Id.* at 12:59–61.

Petitioner refers back to its argument that Barbera discloses disabling voice and text messaging (in the context of claims 2 and 11) and further argues that Barbera discloses a device that prevents use of some forms of the device, including voice and text, when traveling beyond a speed threshold. Pet. 40 (citing Ex. 1003 ¶¶ 257, 280; Ex. 1007, Abstract, 6:6–11). Petitioner further argues that Barbera discloses preventing use of blocking functions when “the user is a passenger and not the driver,” such that Barbera discloses preventing use of the applications when the user is the driver. *Id.* at 40–41 (quoting Ex. 1007, 9:32–38 (emphasis omitted)) (citing Ex. 1003 ¶¶ 282–283). According to Petitioner, in its proposed combination, Barbera’s disabling functionality “would have been implemented in the terminal” of Kim’s portable device, and Petitioner refers back to its previous arguments in support of the combination. *Id.* at 41 (citing Ex. 1003 ¶¶ 284–285, 288).

Patent Owner argues that “Petitioner concedes that Kim does not disclose claim 14’s additional limitation,” and Barbera fails to do so because its “system does not take action in response to detecting that an application has been invoked” and instead “disables certain functionality regardless of whether any particular application was invoked.” PO Resp. 47 (referring back to its argument with respect to claim 11). Patent Owner also argues that Barbera fails to disclose disabling an application “when the one or more operational states of the vehicle is moving and the individual is a driver” because disabling a device based on going over a speed threshold does not disable a device “simply because the vehicle is moving.” *Id.* (citing Pet. 40).

According to Patent Owner, Barbera's failure to distinguish between stopped and moving cars means that it cannot disclose this limitation in claim 14. *Id.*

Petitioner replies that claim 14 does not require detecting "when an application is 'invoked'" because it "does not require this element for all of the listed 'actions' in the claim. Pet. Reply 21. Petitioner argues that only one of the listed actions in claim 14 "requires detecting when an application is invoked," but Petitioner does not discuss that limitation in the Petition. *Id.* n.3. Petitioner also contends that Patent Owner incorrectly argues that Barbera fails to disclose "not allowing to perform" an action when the user is a driver, because Barbera discloses preventing a blocking function based on whether the user is a driver or passenger. *Id.* (citing Ex. 1007, 9:32–38). As to whether Barbera can distinguish between stopped and moving cars, Petitioner argues that Barbera can distinguish when cars move above "a specific speed threshold," and setting the threshold to 1 mph would render the concepts "indistinguishable." *Id.* at 21–22 (citing PO Resp. 47).

In its Sur-reply, Patent Owner argues that Petitioner must show detecting an invoked action because claim 14 depends from claim 10, which requires detection of an invoked action. PO Sur-reply 19–20. Patent Owner also argues that "Barbera does not disclose disabling applications 'when the vehicle is moving'" because Barbera fails to "distinguish between stopped cars and moving cars." *Id.* at 20. As to disabling functionality when an individual is a driver, Patent Owner contends that allowing certain actions for passengers does not disclose "disallowing features for a driver." *Id.*

As an initial matter, we agree with Petitioner that Patent Owner's argument that the prior art fails to disclose taking "any action in response to detecting that an application has been invoked" misses the mark. *See* PO

Resp. 47; Pet. Reply 21. Claim 14 contains a list of actions, where “at least one” of the actions must be performed—i.e., Petitioner need only show that one of the actions are performed. Ex. 1001, 13:13–14. In the Petition, Petitioner argues that Barbera disclose two of the listed actions: (1) “not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving” state; and (2) “not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving and the individual is a driver.” Pet. 40–41; Ex. 1003 ¶¶ 280–283. Petitioner does not argue that Barbera also teaches the action in claim 14 directed to informing a third party that the predetermined applications “are invoked,” and any argument by Patent Owner that Barbara fails to teach that limitation of claim 14 fails to address Petitioner’s arguments as to claim 14. *See* Pet. Reply 21.

In its Sur-reply Patent Owner clarifies that it asserts that the prior art fails to disclose the claim 10 limitation related to detecting when an application has been invoked, which essentially mirrors Patent Owner’s claim 10 argument in the context of claim 11, which we discuss above. *See* PO Sur-reply 19–20. We reject the same argument here over claim 14 for the same reasons we provide above regarding claims 10 and 11: (1) Patent Owner wrongly asserts that Petitioner concedes that Kim does not disclose the “detecting when . . . applications are invoked” limitation in claim 10 because Petitioner expressly argues that Kim anticipates claim 10; (2) Patent Owner raises its specific argument that Kim does not disclose this limitation from claim 10 too late for consideration, in the Sur-reply; and (3) we find that Kim discloses the limitation in claim 10.

Turning to the merits of the remaining issues concerning claim 14, we find Petitioner's arguments and evidence that Barbera teaches the claim's limitations persuasive. Barbera discloses a portable device "configured to prevent at least some forms of use of the device when the user is traveling beyond a speed threshold" and blocking voice and texting applications as part of a "function disabling response." Ex. 1007, Abstract, 6:6–11; *see also* Ex. 1003 ¶¶ 258, 280 (discussing such teachings of the Kim-Barbera combination). We agree with Petitioner that such a teaching alone satisfies claim 14's limitation requiring "not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving state." Barbera further discloses "not allowing to perform the one or more predetermined applications when the one or more operational states of the vehicle is a vehicle is moving *and the individual is a driver*" because Barbera discloses that "one or more blocking functions may be prevented based on the determination that the user is a passenger and not the driver." Ex. 1007, 9:32–38. Petitioner reads this portion of Barbera as preventing blocking only when the user is a passenger, which necessarily means that blocking occurs when the user is a driver, and we agree. Pet. 40–41. Petitioner supports its assertions with credible declarant testimony consistent with Barbera. *See* Ex. 1003 ¶¶ 258, 280, 282–283. As noted above, we also find Petitioner's proposed reasons for combining the references persuasive, and that it would have been obvious to combine Kim's terminal with the speed detection and comparison techniques of Barbera as Petitioner proposes, with a reasonable expectation of success. *See* Pet. 41 (citing Ex. 1003 ¶ 288).

Patent Owner's arguments as to claim 14 are unavailing in view of the record. Patent Owner's argument that Barbera does not prevent usage of applications when the user is a driver conflicts with Barbera's statement that it blocks applications such as voice and texting applications when the car reaches a certain speed limit, and only prevents blocking in certain situations where the system can determine that the user is a passenger. *See* Ex. 1007, 9:32–38. We view Patent Owner's interpretation of Barbera as strained, and not supported by any testimony from the perspective of a POSITA that might lend it more credibility. *See* PO Resp. 47. Patent Owner also argues that Barbera fails to disclose disabling an application “simply because the vehicle is moving” because Barbera fails to distinguish between stopped cars and moving cars, but Patent Owner's argument lacks adequate explanation and support. *Id.* (citing Pet. 40). Claim 14 merely requires not allowing applications to perform “*when* the one or more operational states of the vehicle is a vehicle is moving,” i.e., *during* movement of the vehicle, and does not require detecting the transition from a stopped to a moving state, and Patent Owner fails to establish that the claim language supports such a narrow reading. *See id.*

Based on the foregoing, we find that Petitioner has shown by a preponderance of the evidence that (1) the combination of Kim and Barbera satisfies all of the limitations of claim 14 and (2) a POSITA would have been motivated to combine the references in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim and Barbera renders claim 14 obvious.

d. Kim and Baker – Independent Claim 3 and Dependent Claims 6, 8, 9, and 17

Petitioner asserts that Kim in combination with Baker discloses all of the limitations of independent claim 3 and dependent claims 6, 8, 9, and 17. Pet. 41–52. Petitioner provides analysis of each limitation in claims 3, 6, 8, 9, and 17, with citations to the references’ disclosures that correspond to each of the claim limitations. *Id.* Petitioner also cites to the relevant declarant testimony as support. *Id.* (citing various portions of Ex. 1003). We address each claim in turn, with an emphasis on the arguments raised by Patent Owner.

i. Claim 3

Independent claim 3 contains many limitations similar to those of independent claim 1, and also recites

wherein the performing the one or more actions further comprises: recording at least one geographic position of the vehicle when the operational state of the vehicle is changed at least to an engine is off state; and directing the individual upon his request using the portable device to the at least one geographic position.

Ex. 1001, 11:25–42.

Petitioner relies on its analysis of and assertions regarding claim 1 for limitations that are the same in claims 1 and 3 (taught by Kim) and argues that the additional limitations in claim 3 would have been obvious over Kim and Baker. *See* Pet. 41–45. Petitioner argues that “Baker discloses a portable electronic device that includes a ‘parking determiner’ which detects when a car’s engine is turned off, records the parking location, and can direct the user back to the parking location. *Id.* at 42. Petitioner contends that Baker’s device records “parking events” using sensors such as accelerometers and microphones to determine when driving stops. *Id.*

(citing Ex. 1003 ¶ 211; Ex. 1009 ¶¶ 24–25). Petitioner further contends that these teachings satisfy the portion of claim 3 requiring “recording at least one geographic position of the vehicle when the operational state of the vehicle is changed at least to an engine is off state.” *Id.* Petitioner also argues that Baker “includes a ‘parking event retriever’ in the portable device which can present a ‘vehicle location’ as a ‘location on a map,’ in order ‘to assist the user in reaching the parked vehicle,’” which satisfies the limitation requiring “directing the individual . . . to the at least one geographic position.” *Id.* (citing Ex. 1003 ¶ 212; Ex. 1009 ¶¶ 25, 34). Petitioner also provides several reasons why the ordinarily skilled artisan would have combined Kim and Baker. Pet. 42–44 (citing Ex. 1001, 5:33–36; Ex. 1003 ¶¶ 216–219; Ex. 1005 ¶¶ 82, 84–85; Ex. 1006, 1:15–19; Ex. 1007, Abstract; Ex. 1009 ¶¶ 24, 39, 65).

Patent Owner focuses on the limitation of claim 3 quoted above and argues that Petitioner concedes that Kim does not disclose the limitation, and that Baker does not disclose the limitation either. PO Resp. 48–49. Patent Owner contends that Petitioner’s relied-upon portions of Baker fail to meet the “directing the individual” requirement because “[d]irecting an individual’ means giving directions” based on the ’140 patent Specification’s reference to providing directions to a user. *Id.* at 49 (citing Ex. 1001, 8:25–29). According to Patent Owner, Baker fails to give directions because “it simply displays the user’s present location and destination, and leaves the user to fend for himself” and that “[s]howing a present location and a destination does not qualify as giving directions.” *Id.*; *see also* PO Sur-reply 21 (arguing that “showing a location on a map” does not satisfy the claim limitation).

Petitioner replies that Patent Owner improperly assumes that “directing the individual” requires “giving directions.” Pet. Reply 22. Petitioner contends that the ’140 patent Specification merely discloses an example method that refers to giving directions that should not be read into the claims. *Id.* at 22–23 (citing Ex. 1001, 7:51–8:28).

Although neither party addresses the “directing the individual” limitation in claim 3 as part of their claim construction arguments, the issue here turns on the meaning of *directing* here. More specifically, we must decide whether “directing the individual” means “giving directions” as Patent Owner argues. We decline to limit the claim in the manner Patent Owner suggests. First, the claim language at issue does not require express construction, as “directing the individual . . . to the at least one geographic position,” while broad, does not present any ambiguous terminology. Second, the ’140 patent Specification does not require that we adopt a narrower construction. The Specification provides the following description of one example of how to direct a user to a parked car:

The user walks to the mall, shops and is ready to return to the car, but has forgotten its location. The user asks the portable device to *give directions* to the car. The portable device recalls the last measured location (4a in FIG. 7) and *gives the user directions to the car location using GPS*. The direction can be given in many ways including on a lcd screen or by voice prompts.

Ex. 1001, 8:23–29 (emphasis added). We do not view this description as requiring us to construe “directing the individual” to mean “giving directions.” The example appears as part of an “example method” and does not use any language that would suggest it defines any terms. *See id.* at 7:51. This portion of the Specification also fails to use the claim language “directing the individual,” further suggesting that this portion of the

Specification was not an attempt to define the claim language, or mandate a certain, narrow meaning for “directing the individual.” Based on the foregoing, we decline to construe “directing the individual” in claim 3 to mean “giving directions” as Patent Owner proposes. Patent Owner does not argue that Baker fails to disclose the limitation of claim 3 if we decline to read the claim as narrowly as Patent Owner proposes. Using the ordinary meaning of the term “directing the individual,” we agree with Petitioner that Baker discloses the limitation because Baker’s device includes a “parking event retriever” that presents a “vehicle location” as a “location on a map” to “to assist the user in reaching the parked vehicle.” Ex. 1009 ¶¶ 25, 34; Ex. 1003 ¶ 212; Pet. 42.

With the exception of its arguments concerning the claim terms “operation indicator” and “transparently” that we find unpersuasive for the reasons provided in our analysis of those limitations in the context of claim 1, and its arguments over claim 3’s “directing the individual” limitation we address immediately above, Patent Owner does not raise any additional arguments against the limitations of claim 3. *See generally* PO Resp. We have reviewed Petitioner’s arguments and evidence as to the remaining, undisputed limitations of claim 3 and find that Petitioner establishes that the combination of Kim and Baker suggests these limitations for the reasons provided by Petitioner. We adopt Petitioner’s arguments and evidence as to these limitations as our own. *See* Pet. 40–42. We also find that Petitioner establishes adequately that a POSITA would have been motivated to combine Kim and Baker, with a reasonable expectation of success, for the reasons provided by Petitioner, which we adopt as our own.

See id. at 42–45.¹⁹ Based on the foregoing, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim and Baker renders independent claim 3 obvious.

ii. Claim 6

Claim 6 depends from independent claim 5, and recites wherein the determining the location of the individual further comprises: recording a first geographic location when the operational state of the vehicle is changed to at least an engine is off state; recording at least one current geographic location sampled at the predetermined time period; comparing the at least one current geographic location to the first geographic location; setting the location of the individual to the individual is in an outside of the vehicle location, when a distance between the at least one current and the first geographic locations exceeds a predetermined threshold.

Ex. 1001, 12:10–20.

Petitioner asserts that “[i]t would have been obvious to include such a ‘*geographic position*’ limitation in the terminal of Kim in view of Baker.” Pet. 45. Petitioner asserts that Baker uses a “parking determiner” that detects “parking events” by using a microphone to detect “an engine being turned off” and storing the location of the device at that time as a “parking event.” *Id.* (citing Ex. 1003 ¶ 236; Ex. 1009 ¶ 25). Petitioner alleges that this aspect of Baker discloses the portion of claim 6 requiring “recording a first geographic location when the operational state of the vehicle is changed to at least an engine is off state.” *Id.* (citing Ex. 1003 ¶ 237). Petitioner also

¹⁹ Patent Owner does not address or contest Petitioner’s basis for the combination. *See* PO Resp. 48–58 (addressing Ground 4 challenging claims 3, 6, 8, 9, and 17 based on Kim and Baker, but only raising a motivation to combine issue as to particular aspects of claim 17). This finding as to the combination of Kim and Baker applies to that analysis of claims 6, 8, and 9 as well. We address Patent Owner’s arguments as to claim 17 below.

asserts that Baker discloses storing additional locations using its device when it states that “additional entries” the parking determiner may conclude that the device “is no longer moving and notes the location” of the device, and “obtains additional entries to determine if the PWD 100 is moving at a velocity of a person walking.” *Id.* at 45–46 (citing Ex. 1009 ¶¶ 15, 23). Petitioner alleges that these aspects of Baker disclose the portion of claim 6 requiring “recording at least one current geographic location sampled at the predetermined time period; comparing the at least one current geographic location to the first geographic location.” *Id.* at 46 (citing Ex. 1009 ¶ 23). Petitioner then contends that Baker teaches that the parking determiner “obtains additional entries” from the positioning system and may then “conclude that the user left the vehicle and is now walking with the” device, with the parking determiner “stor[ing] the noted location of the” device as a parking event. *Id.* (citing Ex. 1009 ¶ 23). Petitioner alleges that these disclosures satisfy the limitation requiring “setting the location of the individual to the individual is in an outside of the vehicle location, when a distance between the at least one current and the first geographic locations exceeds a predetermined threshold.” *Id.* (citing Ex. 1003 ¶ 238; Ex. 1009 ¶ 23). Petitioner also asserts that Kim discloses tracking the user outside a vehicle and recording positions of the device at predetermined intervals, which satisfies the limitation requiring “setting the location of the individual to the individual is in an outside of the vehicle location.” *Id.* at 46–47 (citing Ex. 1003 ¶ 239; Ex. 1005 ¶ 82).

Finally, Petitioner argues that “to the extent that Kim and Baker are found not to explicitly disclose the distance comparison limitations of this claim, that comparison is obvious in view of Kim and Baker and the

knowledge of one of skill in the art, because both references contemplate using positioning system information to track a user's device both at the time the user and device exit the vehicle, and at a later time when the user has walked away from the stopped vehicle, as noted above.” *Id.* at 47 (citing Ex. 1003 ¶ 240). Petitioner contends that “[u]sing a first and second GPS reading, and comparing their separation to a threshold value, in order to determine whether the user and device have departed the original location is an obvious and ordinary application of GPS.” *Id.*

Patent Owner argues that neither Kim nor Baker disclose the limitation requiring “setting the location of the individual to the individual is in an outside of the vehicle location, when a *distance* between the at least one current and the first geographic locations *exceeds a pre-determined threshold*.” PO Resp. 50–52 (emphasis added). As to Baker, Patent Owner argues that it uses velocity rather than distances to determine if a user left a vehicle and “contains no measurement of distance between two locations and contains no ‘predetermined threshold.’” *Id.* at 50–51 (citing Ex. 1009 ¶ 23). As to Kim, Patent Owner argues that fails to disclose “recording positions” of the device and “predetermined intervals of time.” *Id.* at 51–52 (citing Ex. 1005 ¶¶ 82, 87). Patent Owner also argues that Petitioner's declarant testimony fails to fill the gaps in the art with adequate evidentiary support. *Id.* at 52 (citing Ex. 1003 ¶ 240; Pet. 47).

Petitioner replies that Baker utilizes a positioning system employing GPS to record locations and does not rely solely upon velocity as Patent Owner contends. Pet. Reply 23 (citing Ex. 1009 ¶ 9; PO Resp. 50–51). According to Petitioner, this remedies the alleged shortcomings in Baker tied to the “setting the location” and “outside the vehicle” limitations. *See id.*

Patent Owner responds by arguing that “Baker plainly relies on an individual’s velocity to determine when the user is outside the vehicle, not their position.” PO Sur-reply 21–22. Patent Owner relies on Baker’s statement that its “parking determiner 142 obtains additional entries to determine if the PWD 100 is moving at a velocity of a person walking” and “[i]f so, the parking determiner 142 may conclude that the user left the vehicle.” *Id.* at 22 (quoting Ex. 1009 ¶ 23).

We focus on our analysis on the last portion of claim 6 directed to “comparing the at least one current geographic location to the first geographic location; setting the location of the individual to the individual is in an outside of the vehicle location, when a distance between the at least one current and the first geographic locations exceeds a predetermined threshold.”

The “first geographic location” refers to a location “when the operational state of the vehicle is changed to at least an engine is off state” and the “current geographic location” refers to a location “sampled at the predetermined time period.” We assume for purposes of our analysis that Baker discloses using GPS positions to record locations, including a user outside a vehicle, as Petitioner contends. *See* Pet. 45–46. Even with that assumption in mind, however, Petitioner fails to establish that Baker discloses “comparing” the two locations and setting the location to a location outside the vehicle “when a distance between the at least one current and the first geographic locations exceeds a predetermined threshold.” Petitioner argues that Baker’s description of obtaining “additional entries” to determine its device “is no longer moving” or “moving at a velocity of a person walking” and noting the associated locations, but nothing in the relied-upon

text describes directly *comparing* those locations. *See* Pet. 45–46 (citing Ex. 1003 ¶ 238; Ex. 1009 ¶ 23). Petitioner also argues that Baker obtains “additional entries” to determine that “the user left the vehicle and is now walking” with the device, and stores the noted location as a parking event, but that disclosure does not describe setting a location to an outside the vehicle location “when a distance between” the locations “exceeds a predetermined threshold.” *See id.* At best, Baker obtains enough location information that perhaps it *could* compare the two locations and then compare the distance between them to some threshold to help assign the location to an “outside the vehicle” location, but it never describes doing so. *See* Ex. 1009 ¶ 23.

We are also unpersuaded by Petitioner’s alternative argument that even if the Kim/Baker combination does not disclose these “distance comparison” limitations, the “comparison is obvious in view of Kim and Baker and the knowledge of one of skill in the art, because both references contemplate using positioning system information to track a user’s device both at the time the user and device exit the vehicle, and at a later time when the user has walked away from the stopped vehicle, as noted above.” Pet. 47 (citing Ex. 1003 ¶ 240). We disagree because, again, these facts, even if true, merely establish that Baker obtains the two locations necessary to perform the comparison steps in the claim but does not bridge the gap to explain how or why a person of ordinary skill in the art would have performed such a comparison. Similarly, Petitioner’s argument that “[u]sing a first and second GPS reading, and comparing their separation to a threshold value, in order to determine whether the user and device have departed the original location is an obvious and ordinary application of

GPS” does little more than establish that the claimed steps could have been performed. *See id.* Tellingly, neither sentence in this brief argument refers to the final aspect of claim 6 requiring not only a comparison between two locations, but a comparison to a “predetermined threshold” and taking an action (setting the location to an outside the vehicle location) when the distance exceeds that threshold. Patent Owner pointed out some of these gaps in Petitioner’s argument in the Response, and Petitioner did not attempt to remedy or explain those deficiencies in its Reply. *See* PO Resp. 52; Pet. Reply 23.

Based the foregoing, we find that Petitioner has not established that the combination of Kim and Baker discloses “*comparing the at least one current geographic location to the first geographic location; setting the location of the individual to the individual is in an outside of the vehicle location, when a distance between the at least one current and the first geographic locations exceeds a predetermined threshold.*” Accordingly, we determine that Petitioner has not established by a preponderance of the evidence that claim 6 would have been obvious based on Kim and Baker.

iii. Claim 8

Claim 8 depends from independent claim 5, and recites wherein the performing the one or more actions comprises: storing a geographic position of the portable device when the one or more operational states of the vehicle have changed to engine is off state and the location of the individual has changed to an individual is outside of the vehicle; directing the individual upon his request using the portable device to the geographic position.

Ex. 1001, 12:26–32.

Petitioner asserts that claim 8 “is substantively identical to claim 3” and relies on its arguments as to independent claim 3 for the similar

limitations in claim 8. Pet. 48 (citing Ex. 1003 ¶ 247; discussion of claim 3). Petitioner notes that claim 8 adds that the recorded geographic position “is stored when ‘the location of the individual has changed to an individual is outside of the vehicle,’” and asserts that “in both Kim itself and in Baker, the systems determine and record when the individual is outside of the vehicle.” *Id.*

Patent Owner argues that Petitioner’s arguments as to the “directing the individual” requirement fail for the same reasons that they fail with respect to the same limitation in claim 3. PO Resp. 53. Patent Owner also argues that “Petitioner errs in asserting that claim 3 is ‘substantively identical’ to claim 8” because claim 8, unlike claim 3, refers to “and the location of the individual has changed to an individual is outside of the vehicle.” *Id.* Patent Owner contends that Petitioner fails to establish that Kim and Baker “determine and record when the individual is outside of the vehicle” because Baker uses a microphone to detect when an engine is turned off and records a location at that time, and Kim does not store a position “of the vehicle when the ‘individual is outside the vehicle.’” *Id.* (citing Pet. 48).

Petitioner replies that it addresses the additional limitations in claim 8 in the Petition and that both Kim and Baker disclose the limitation. Pet. Reply 23. Petitioner argues that Kim “determines when the user is indoors and thus outside the vehicle” and “Baker detects that a user is ‘walking’ or outside the vehicle.” *Id.* at 23–24 (citing Ex. 1005 ¶ 35; Ex. 1009 ¶ 23).

In its Sur-reply, Patent Owner argues that Kim does not disclose the limitation because “Kim’s disclosure of ‘indoors’ is not equivalent to ‘outside a vehicle’” and “a user could be indoors in a parking garage while

also inside a vehicle.” PO Sur-reply 22. As to Baker’s detection of walking, Patent Owner argues that “Baker does not consider the operational state of the vehicle.” *Id.* (citing Pet. Reply 22).

We have addressed and rejected Patent Owner’s argument that the combination of Kim and Baker fails to disclose “directing the individual . . . to the geographic position” in the context of claim 3, and that same analysis applies here—Petitioner establishes adequately that Baker discloses “directing the individual . . . to the geographic position” in claim 8. For similar reasons, we find that Petitioner establishes that Baker discloses “storing a geographic position of the portable device when the one or more operational states of the vehicle have changed to engine is off state” based on Petitioner’s showing as to the similar limitation in claim 3. *See* Pet. 41–42, 48.

We also find that Petitioner establishes that the combination of Kim and Baker discloses that additional limitation in claim 8 directed to storing a position of the device “when the one or more operational states of the vehicle have changed to engine is off state *and the location of the individual has changed to an individual is outside of the vehicle.*” Petitioner correctly notes that both Kim and Baker disclose identifying when the individual’s location changes to outside the vehicle. *See* Pet. 48; Pet. Reply 23–24. Kim determines when a user is indoors and therefore outside a vehicle. Ex. 1005 ¶ 35. Patent Owner argues that “indoors” may not necessarily mean “outside the vehicle” because a parking garage falls within the category of “indoors,” but we disagree. Kim does not suggest that it labels parking garages as “indoors” and Patent Owner cites no evidence in support of its reading. We view Petitioner’s reading of Kim as more credible because Kim

suggests that “indoors” means in a building, which would not encompass a parking garage. *See* Ex. 1005 ¶ 35 (referring to “when the user . . . enters the building 500 and is located indoors”); Ex. 1003 ¶ 247.

We also find that Baker discloses the added limitation of claim 8 because it detects when a user is walking outside a vehicle. *See* Ex. 1009 ¶ 23. Patent Owner does not argue that detecting walking fails to detect a user outside the vehicle, but instead argues that “Baker does not consider the operational state of the vehicle.” PO Sur-reply 22 (citing Pet. Reply 24). That argument misses the mark because the additional limitation in claim 8 does not refer to the “operational state” of the vehicle or require consideration of that state to determine the location outside of the vehicle. In addition, Baker does take into account the operational state of the vehicle (whether the engine is turned off) when recording the location of the vehicle. *See* Ex. 1009 ¶ 25; Pet. 42.

Based on the foregoing, we find that Petitioner has established by a preponderance of the evidence that the combination of Kim and Baker discloses the additional limitation of claim 8 not present in claim 3. Accordingly, we determine that Petitioner has established by a preponderance of the evidence that claim 8 would have been obvious based on Kim and Baker.

iv. Claim 9

Claim 9 depends from independent claim 5, and recites wherein the performing the one or more actions comprises: recording a first geographic positions of the vehicle *when the one or more operational states of the vehicle have changed to a vehicle movement is lingering state*; recording at least one subsequent geographic position of the portable device at predetermined sampling periods until the location of the

individual is changed to the individual is in an outside of the vehicle location; directing the individual upon his request using the portable device *through the at least one subsequent geographic position to the first geographic position.*

Ex. 1001, 12:33–43 (emphasis added to limitations in dispute).

Petitioner asserts that the limitations in claim 9 overlap with those in claims 6 and 8, and relies on the previous arguments for those common limitations. Pet. 48–49 (citing previous arguments and Ex. 1003 ¶ 249). Petitioner also asserts that Baker “addresses the concept of a ‘lingering state’ in which the vehicle is no longer moving: ‘[f]rom additional entries, the parking determiner 142 may conclude that the PWD 100 is no longer moving and notes the location of the PWD 100 when the PWD 100 stopped.’” *Id.* at 49 (citing Ex. 1003 ¶ 249; Ex. 1009 ¶ 23).

Patent Owner focuses on the “lingering state” aspect of claim 9 and argues that the Specification describes “a method of tracking the location of a vehicle that ‘linger[s] slowly before stopping completely’ making it ‘difficult to determine early on when the vehicle stopped.’” PO Resp. 54 (citing Ex. 1001, 6:21–34). Patent Owner argues that Baker fails to disclose a lingering state because such a state requires identifying when a vehicle moves slowly before stopping, and Petitioner only points to Baker’s disclosure of detecting a stopped vehicle. *Id.* at 54–55 (citing Ex. 1001, 6:22–28). Patent Owner also argues that Baker fails to disclose directing the individual “through the at least one subsequent geographic position to the first geographic position” because the limitation requires directing a user to multiple recorded positions, even assuming the references meet the “directing the individual” aspect of the limitation for one location. *Id.* at 55 (citing Ex. 1009 ¶ 23).

Petitioner replies that Patent Owner improperly reads the “purpose” of the “lingering” limitation from the Specification into the claim. Pet.

Reply 24. According to Petitioner, “Baker discloses that its device detects multiple entries of the vehicle’s position and may determine that the vehicle is no longer moving,” which encompasses a “lingering” state. *Id.* (citing Ex. 1003 ¶ 249).

We agree with Patent Owner that Petitioner fails to establish adequately that Baker discloses the claimed “lingering state” or directing the individual “through the at least one subsequent geographic position to the first geographic position.” The portion of Baker that Petitioner and its declarant rely upon for these limitations merely states that Baker’s parking determiner, based on “additional entries,” “may conclude that the PWD 100 is no longer moving and notes the location of the PWD 100 when the PWD 100 stopped.” Ex. 1009 ¶ 23. Concluding that a device “is no longer moving,” i.e., stopped, does not identify a “lingering state.” As Patent Owner correctly points out, and Petitioner does not contest, a “lingering state” is not the same as a “stopped” or “moving” state. The claims reinforce this distinction by referring to “stopped” and “moving” in other contexts, and the Specification makes the distinction clear when describing a lingering state. *See* Ex. 1001, 6:22–28 (describing situation where a vehicle may “linger slowly before stopping completely” distinguishing between “location as the car lingers” and “exact location the car changed to a stationary state”), 11:59 (referring to vehicle in a “moving state”); 13:25 (referring to vehicle “stopped at a light”).

As to the further requirement that the device direct the individual to multiple locations, Petitioner only argues that Baker’s “device detects

multiple entries”—even if true, that does not establish that Baker directs an individual to multiple locations. *See* Pet. Reply 24; Ex. 1003 ¶ 249 (addressing the “lingering” issue but not the limitation referring to multiple locations); Pet. 48–49 (failing to address the “directing the individual upon his request using the portable device *through the at least one subsequent geographic position to the first geographic position*” limitation with argument or evidence).

Based the foregoing, we find that Petitioner has not established that the combination of Kim and Baker discloses a “lingering state” or directing the individual upon his request using the portable device “*through the at least one subsequent geographic position to the first geographic position*” limitations. Accordingly, we determine that Petitioner has not established by a preponderance of the evidence that claim 9 would have been obvious based on Kim and Baker.

v. *Claim 17*

Claim 17 depends from independent claim 15, and further comprises:

detecting locations of all reference devices that exist in the vehicle; obtaining a measurement of a location of the individual in reference to a particular reference device; determining the one or more operational states of the vehicle when the vehicle is moving and the individual is a driver based on the location of the individual in reference to the particular reference device and the one or more predetermined criteria.

Ex. 1001, 14:15–22 (emphasis added to limitations in dispute).

Petitioner asserts that it would have been obvious to include the “reference devices” that Baker discloses in the terminal of Kim. Pet. 50. Petitioner contends that Baker’s parking determiner that detects parking events includes the use of multiple RFID tags (the claimed “reference devices”) placed in the vehicle. *Id.* (citing Ex. 1009 ¶ 27). Petitioner further

contends that “[w]hen the user leaves the vehicle, the PWD 100 can detect that the vehicle RFID tag is no longer present” and therefore Baker discloses “obtaining a measurement of a location of the individual in reference to a particular reference device.” *Id.* (citing Ex. 1003 ¶ 308; Ex. 1009 ¶ 27). Petitioner relies on Kim’s disclosure of “detecting that a user is in a moving vehicle” to satisfy the limitation requiring “determining . . . the operational states . . . when the vehicle is moving.” *Id.* (citing Ex. 1003 ¶ 306; Ex. 1005 ¶ 33). Petitioner also argues that Kim’s detection of vibration and noise when in a cradle, and the related determination that the user “is sitting in the driver’s seat” satisfies the limitations requiring “predetermined criteria” and “determining . . . the individual is a driver.” *Id.* at 51 (citing Ex. 1003 ¶ 307; Ex. 1005 ¶ 73). Finally, Petitioner argues that it would have been obvious to combine Baker’s RFID reference devices with Kim’s “driver determination functionality” for a number of reasons. *Id.* at 51–52 (citing Ex. 1003 ¶ 312; Ex. 1005 ¶¶ 75, 80, 82; Ex. 1009 ¶¶ 25, 27, 30, 39).

Patent Owner argues that Baker’s use of RFID tags to determine when a parking event occurs differs from the method of claim 17 because Baker does not disclose “detecting locations of all reference devices that exist in the vehicle” as claim 17 requires. PO Resp. 56 (citing Pet. 50). Patent Owner asserts that Baker’s method does not detect the locations of the RFID tags, which Petitioner relies on as the claimed “reference devices,” and instead Baker’s “method merely determines whether the portable device is near the RFID tags.” *Id.* Patent Owner also argues that Baker fails to disclose determining an operational state of the vehicle “when the vehicle is moving” because “Baker’s method is used when the vehicle is parked, not when the vehicle is moving,” and “Kim merely detects when a vehicle is

moving” without disclosing locations of reference devices or determining an operational state “based on the location of the individual in reference to the particular reference device.” *Id.* at 56–57. Finally, Patent Owner argues that Petitioner fails to establish a motivation for combining Baker’s RFID system, which detects a device outside a car, with Kim’s system mounted inside a car and used to determine whether a car is moving. *Id.* at 57.

Petitioner replies that, contrary Patent Owner’s argument, “Baker’s disclosure of reference devices requires ‘detecting’ the location of all such devices in a vehicle.” Pet. Reply 24. Petitioner points to Baker’s statement that its device “can detect that the vehicle RFID tag is no longer present,” and further argues that “[t]o detect if the reference devices are near or far is to detect their ‘location.’” *Id.* (citing Ex. 1009 ¶ 27). Petitioner also argues that “Patent Owner misrepresents the asserted combination by arguing that Baker does not disclose determining a vehicle’s operational state” because “Kim discloses detecting if a user is a driver of a vehicle and determining an operational state, and it would have been obvious to combine the devices from Baker with Kim to determine if the user is driving a vehicle.” *Id.* at 24–25 (citing Pet. 51–52).

Patent Owner counters that “Baker does not detect the ‘locations’ of RFID tags within the vehicle or measure the location of an individual in reference to a particular tag.” PO Sur-reply 23. According to Patent Owner “detecting whether a device is ‘near or far’ is not the same as detecting that device’s location” and “the system of Baker does not detect whether RFID tag is ‘near or far’ at all—only whether a signal is present at all, irrespective of distance or direction.” *Id.*

We focus our analysis on the limitation that recites: “determining the one or more operational states of the vehicle when the vehicle is moving and the individual is a driver *based on the location of the individual in reference to the particular reference device.*” *See* PO Resp. 56–57. For purposes of our analysis, we assume that Baker’s system uses RFID tags in a manner that meets the limitations requiring “detecting locations of all reference devices” and “obtaining a measurement of a location of the individual in reference to a particular reference device,” as Petitioner argues. *See* Pet. 50. We also assume that Kim discloses “determining the one or more operational states of the vehicle when the vehicle is moving” and determining that the user is a driver, and that there would have been a motivation to combine the references. *See id.* at 50–52.

Even with those assumptions in place, we find that the proposed combination fails to determine an operational state “based on the location of the individual in reference to the particular reference device.” This limitation refers back to the location in the previous limitations, which Petitioner argues Baker discloses using its RFID tags. *See* Pet. 50. Petitioner does not argue or establish that Baker’s RFID tag system discloses determining an operational state “based on the location of the individual in reference to the particular reference device.” *See id.* at 50–51. Instead, Petitioner relies on Kim as disclosing “determining one or more operational states of the vehicle when the vehicle is moving,” “determining . . . the individual is a driver,” and “predetermined criteria.” *Id.* Tellingly, however, Petitioner never directly addresses the requirement that the determination of the operational state be “based on” the location of the individual as well as the predetermined criteria, nor does Petitioner’s

declarant. *See id.*; Ex. 1003 ¶¶ 306–308. Petitioner alleges that Kim discloses all of the limitations surrounding the limitation in question without directly addressing it. Pet. 50–51.

Review of Petitioner’s proposed combination does not remedy this deficiency. Petitioner alleges that there are reasons to “combine the RFID reference devices of Baker with the driver determination functionality described in Kim,” but does not suggest a combination that would alter how the systems work. *See* Pet. 51–52. In other words, the combined system includes Baker’s RFID tags that detect locations of reference devices and obtain “a measurement of a location of the individual in reference to a particular reference device,” and Kim’s sensors and method of determining the operational state of the car and that the user is the driver of the car when Kim’s device is mounted, but combining this functionality without further modification does not address how or why a POSITA would have found it obvious to determine an operational state based on the location of the individual obtained by Baker’s RFID tags. *See id.* Petitioner’s arguments in support of its proposed combination, like its arguments as to the references individually, fail to directly address the step of determining an operational state “when the vehicle is moving and the individual is a driver *based on the location of the individual in reference to the particular reference device.*” Because Petitioner’s analysis elides a claim requirement, it fails to establish that its proposed combination discloses it.

Based on our review of the arguments and evidence, we agree with Patent Owner that Petitioner fails to establish adequately that either Baker or Kim, or the combination of the two, disclose “determining the one or more operational states of the vehicle when the vehicle is moving and the

individual is a driver *based on the location of the individual in reference to the particular reference device.*” Accordingly, we determine that Petitioner has not established by a preponderance of the evidence that claim 17 would have been obvious based on Kim and Baker.

e. Kim, Browne, and Baker – Independent Claim 4

Independent claim 4 contains many limitations similar to those in claim 1 and also recites

wherein the performing the one or more actions further comprises: notifying members of a group that the individual belongs to that the vehicle is leaving a parking spot and a new parking spot is available when the operational state of the vehicle is changed to at least vehicle is moving state.

Ex. 1001, 11:43–59.

Petitioner asserts that the combination of Kim, Browne, and Baker discloses all of the limitations of claim 4. Pet. 52–55. Petitioner provides analysis of each limitation in claim 4, with citations to the references that correspond to each of the claim limitations. *Id.* Petitioner also cites to the relevant declarant testimony as support. *Id.* (citing various portions of Ex. 1003). Petitioner relies on its analysis of claim 1 for the limitations the claims have in common and relies on Browne as disclosing the “notifying” limitation quoted above. *Id.* at 52–53 (citing Ex. 1003 ¶¶ 113, 222; Ex. 1008, 5:12–37, 8:21–25, Abstract). Petitioner relies on aspects of Browne related to its method of locating available parking spaces using a mobile device. *See id.* Petitioner contends that “[i]t would have been obvious to combine Browne’s parking spot notification method with Baker’s parking detector and the terminal of Kim.” *Id.* at 53 (citing Ex. 1003 ¶ 225). Petitioner points to Kim’s disclosure of a terminal that detects when a vehicle stops, Baker’s disclosure of a portable device that detects parking

events using sensors, and the disclosure of all three references that use portable devices to detect the motion of a vehicle. *Id.* Petitioner also points to a number of reasons to combine the references. *See id.* at 53–55 (citing Ex. 1001, 8:35–37; Ex. 1003 ¶¶ 227–230; Ex. 1005 ¶ 82; Ex. 1006, 1:15–19; Ex. 1007, Abstract; Ex. 1008, 1:21–24, 6:10–12; Ex. 1009 ¶ 39).

Patent Owner argues that “Petitioner does not contend that Kim can be directly combined with Browne, and rightly so,” because “Kim does not even mention parking, while Browne is a method of finding parking spots.” PO Resp. 58. According to Patent Owner, the fact that the references “both refer generally to mobile devices” does not adequately support their combination. *Id.* Patent Owner also argues that Baker does not remedy the problem because “Baker is a secondary reference that does not render obvious any claim of the ’140 patent” and “[c]ombining two very different references based on the tangentially relevant teachings of a third reference” relies on improper hindsight bias.

Petitioner replies that Patent Owner ignores that all three of Kim, Browne, and Baker disclose mobile devices and address parked cars. Pet. Reply 25 (citing Ex. 1005 ¶ 82; Ex. 1008, 11:55–59; Ex. 1009 ¶ 39). Petitioner also argues that “parking spot availability was an important issue and a POSITA would have been motivated to combine the references.” *Id.* (citing Ex. 1008, 1:21–24; Pet. 54). As to combining Kim and Browne directly, Petitioner argues that “Browne includes ‘a method for identifying available parking spaces,’ by using ‘a cellular telephone’ which could readily be implemented on the Kim’s device.” *Id.* (citing Ex. 1008, Abstract, 8:21–25).

In its Sur-reply, Patent Owner argues that a POSITA would not have been motivated to combine the three references based on their disparate teachings. PO Sur-reply 24. Patent Owner further argues that “Petitioner is silent on how or why a POSITA would have modified and stitched together these three entirely different systems to create the claimed method.” *Id.*

Based on our review of the arguments and evidence, Petitioner establishes that Browne discloses the limitations of claim 4 that are different than those in claim 1. Pet. 52–53 (citing Ex. 1003 ¶¶ 113, 222; Ex. 1008, 5:12–37, 8:21–25, Abstract). With the exception of Patent Owner’s arguments over the claim terms “operation indicator” and “transparently” that we identified as unpersuasive in our analysis of claim 1, Patent Owner does not raise any additional arguments against the limitations of claim 4, and does not argue that the combination of Kim, Baker, and Browne fails to disclose all of the limitations of claim 4. *See* PO Resp. 58–59; Pet. Reply 25. We have reviewed Petitioner’s arguments and evidence as to the undisputed limitations of claim 4 and find that Petitioner establishes that the combination of Kim, Baker, and Browne discloses all of the limitations of claim 4. We adopt Petitioner’s arguments and evidence as to these limitations as our own. *See* Pet. 52–53.

As to motivation to combine, we find that Petitioner establishes that a POSITA would have been motivated to combine the references, with a reasonable expectation of success, for the reasons provided by Petitioner. *See* Pet. 53–55 (citing Ex. 1001, 8:35–37; Ex. 1003 ¶¶ 225, 227–230; Ex. 1005 ¶ 82; Ex. 1006, 1:15–19; Ex. 1007, Abstract; Ex. 1008, 1:21–24, 6:10–12; Ex. 1009 ¶ 39). For example, Petitioner persuasively argues that both Kim and Baker “both contemplate storing data on the location of a vehicle

and directing users to specific locations” and “Browne similarly discloses an embodiment in which ‘the mapping software 306 provides verbal and/or displayed directions to a selected available parking space.’” *Id.* at 54 (citing Ex. 1008, 6:10–12). These commonalities support Petitioner’s argument that all of the references were in the same field, confronting similar issues. Petitioner also identifies persuasive reasoning to support a combination of these analogous references, arguing that a POSITA would have been motivated “to implement the additional parking notification feature of Browne, with the locating feature of Baker in the terminal of Kim” because “Browne discloses the need for a device to direct drivers to available parking spaces,” while “Kim and Baker identify the need for the provision of services, including parking locators, on portable devices.” *Id.* (citing Ex. 1003 ¶ 229; Ex. 1008, 1:21–24).

Patent Owner’s arguments do not undermine Petitioner’s showing as to the motivation to combine because Patent Owner’s arguments fail to address the vast majority of Petitioner’s arguments and evidence. *See* PO Resp. 58–59. Patent Owner also fails to support its arguments with citations to the record or any testimony from the perspective of a POSITA. *See id.* Further, the arguments Patent Owner does set forth lack merit. For example, Patent Owner argues that Kim cannot be directly combined with Browne because “Kim does not even mention parking, while Browne is a method of finding parking spots.” *Id.* at 58. Kim need not mention parking to support a combination with other prior art that does address the issue, given the other commonalities between the references. As Petitioner points out in Reply, “Browne includes ‘a method for identifying available parking spaces,’ by using ‘a cellular telephone’ which could readily be implemented on the

Kim’s device.” Pet. Reply 25 (citing Ex. 1008, Abstract, 8:21–25). Patent Owner also states that the fact that the references “both refer generally to mobile devices” does not adequately support their combination, but that statement ignores all of Petitioner’s argument and evidence on this issue, which goes far beyond an argument that the references should be combined because they merely refer to mobile devices. PO Resp. 58. Finally, Patent Owner’s argument that “Baker is a secondary reference that does not render obvious any claim of the ’140 patent” lacks merit because a reference may form a part of a proper combination for purposes of obviousness whether deemed a “primary” or “secondary” reference, and whether or not the reference standing alone renders any claims obvious.

Based on our review of Petitioner’s argument and evidence, we find that Petitioner establishes by a preponderance of the evidence that (1) the combination of Kim, Browne, and Baker satisfies all of the limitations of claim 4; and (2) a POSITA would have been motivated to combine Kim, Browne, and Baker in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim, Browne, and Baker renders claim 4 obvious.

f. Kim and Rubin – Dependent Claim 12

Claim 12 depends from independent claim 10 and further requires “determining a type of the vehicle; determining the one or more actions based on the one or more operational states of the vehicle and the one or more predetermined applications and the type of the vehicle.” Ex. 1001, 13:4–8. Petitioner asserts that the combination of Kim and Rubin satisfies all limitations of claim 12. Pet. 55–60. Petitioner asserts that Rubin

discloses the limitations of claim 12, and that it would have been obvious to include Rubin's teachings with Kim's terminal. *Id.* at 56 (citing Ex. 1003 ¶ 98). As to the portion of claim 12 requiring "determining a type of the vehicle," Petitioner asserts that Rubin discloses using "acceleration data pattern matching to detect when a user is riding different vehicles." *Id.* Petitioner points to Figures 1C and 1D of Rubin and the accompanying disclosure describing acceleration patterns consistent with a user riding in a train (Figure 1C) or "in a vehicle in heavy traffic" (Figure 1D). *See id.* at 56–57 (citing Ex. 1006, 5:17–19, 5:31–33, Figs. 1C, 1D). As to the portion of claim 12 requiring "determining the one or more actions based on the one or more operational states of the vehicle and the one or more predetermined applications and the type of the vehicle," Petitioner asserts that Rubin discloses a device that receive real-time acceleration data, correlate that data with an acceleration profile, and activate an application based on the correlation. *Id.* at 58 (citing Ex. 1006, 17:3–7). Petitioner also relies on Rubin's statement that "[i]f a match is determined (212) to exist between the real time acceleration data and one of the stored acceleration profiles, the mobile device can activate (215) an application that is associated with the matching acceleration profile." *Id.* (quoting Ex. 1003 ¶ 267; Ex. 1006, 8:7–10). Petitioner also provides a number of arguments in support of its combination of Kim and Rubin. *See id.* at 58–60 (citing Ex. 1001, 6:38–44; Ex. 1003 ¶¶ 270–274; Ex. 1005 ¶¶ 11, 75; Ex. 1006, 1:15–19, 2:40–46, 17:5–8; Ex. 1007, Abstract; Ex. 1013 ¶ 5).

Patent Owner argues that Rubin fails to disclose the two-step process required by claim 12. PO Resp. 59–60. Patent Owner contends that "Rubin's method does not make a threshold determination of vehicle type,

and then use that determination as a basis to take action.” *Id.* at 59. Instead, according to Patent Owner, “Rubin discloses one step,” where “‘real-time acceleration data’ is correlated with ‘acceleration profiles in order to ‘activate one or more applications.’” *Id.* at 59–60 (citing Ex. 1006, 2:18–22). Based on those teachings, Patent Owner argues that Rubin’s “applications are associated with particular acceleration profiles, not with particular vehicle types.” *Id.* at 60 (citing Ex. 1006, 2:44–53).

Petitioner replies that “Patent Owner does not dispute that Rubin discloses “determining a type of vehicle.” Pet. Reply 25. Petitioner also argues that “Rubin discloses determining an action based on the type of vehicle and the operational state: the device can ‘correlate the processed acceleration information with one or more acceleration profiles, and activate one or more applications based on the correlation.’” Pet. Reply 25–26 (citing Ex. 1006, 17:3–7). Petitioner argues that “[t]his functionality would have been obvious to combine with the terminal of Kim.” *Id.* at 26 (citing Pet. 58–60).

In its Sur-reply, Patent Owner argues that Rubin does not make “a determination about vehicle type in order to determine an action.” PO Sur-reply 24. According to Patent Owner, Rubin may correlate acceleration data with acceleration profiles to “activate one or more applications,” but “Rubin does not disclose considering the type of vehicle to determine an action.” *Id.* (citing Ex. 1006, 2:18–22, 2:44–53).

Based on our review of the arguments and evidence, Petitioner establishes that Rubin discloses the limitations of claim 12. *See* Pet. 55–58. First, Rubin discloses matching real-time acceleration data of a user’s vehicle with stored patterns associated with different vehicles, such as trains

and cars, and looks for a match. *See id.* at 56–57 (citing Ex. 1006, 5:17–19, 5:31–33, Figs. 1C, 1D). Rubin’s Figure 1C shows an acceleration pattern for a train, while Figure 1D shows an acceleration for a car in heavy traffic. *See* Ex. 1006, 5:17–19, 5:31–33, Figs. 1C, 1D. Once Rubin’s system finds a match between real-time acceleration data and stored acceleration profiles, the device activates an application associated with the matching acceleration profile, e.g., a train or a car. *See* Ex. 1006, 8:7–10, 17:3–7. Petitioner also relies on Rubin’s statement that “[i]f a match is determined (212) to exist between the real time acceleration data and one of the stored acceleration profiles, the mobile device can activate (215) an application that is associated with the matching acceleration profile.” Pet. 58 (quoting Ex. 1003 ¶ 267; Ex. 1006, 8:7–10). These teachings establish that Rubin discloses determining a vehicle type (e.g., train or car) and determining an action “based on the one or more operational states of the vehicle” (the real-time acceleration profile) and “the one or more predetermined applications” (an application associated with the matching acceleration profile) and “the type of the vehicle” (e.g., train or car).

Patent Owner argues that Rubin’s steps of comparing real-time acceleration data to stored acceleration data profiles and finding a match fails to disclose using the vehicle type as part of the determination of which action to take, but we disagree. *See* PO Resp. 59–60. In Rubin, the stored application profiles themselves reflect a vehicle type, such as a train or car. *See* Ex. 1006, 5:17–19, 5:31–33, Figs. 1C, 1D. Accordingly, when Rubin describes finding a match between real-time acceleration data and a stored profile in order to determine which application to engage, the comparison necessarily depends on the type of vehicle associated with the stored profile.

See Ex. 1006, 8:7–10, 17:3–7; Pet. Reply 25–26. We find Petitioner’s interpretation of Rubin, supported by credible testimony from Dr. Michalson, more persuasive than Patent Owner’s attorney argument on this issue. *See* Ex. 1003 ¶ 267.

We also find that Petitioner establishes that a POSITA would have been motivated to combine Kim and Barbera for the reasons provided by Petitioner, which we adopt as our own. *See* Pet. 58–60 (citing Ex. 1001, 6:38–44; Ex. 1003 ¶¶ 270–274; Ex. 1005 ¶¶ 11, 75; Ex. 1006, 1:15–19, 2:40–46, 17:5–8; Ex. 1007, Abstract; Ex. 1013 ¶ 5). Patent Owner does not address Petitioner’s arguments and evidence as to motivation to combine.

Based on our review of Petitioner’s argument and evidence, we find that Petitioner establishes by a preponderance of the evidence that (1) the combination of Kim and Rubin satisfies all of the limitations of claim 12; and (2) a POSITA would have been motivated to combine Kim and Rubin in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim, Baker, and Browne renders claim 12 obvious.

g. Kim, Barbera, and Kohli – Dependent Claim 16

Claim 16 depends from independent claim 15 and further requires “determining the one or more operational states of the vehicle when the vehicle is moving and the individual is a driver based on the position of the portable device that indicates that the vehicle is turning the corner and the one or more predetermined criteria.” Ex. 1001, 14:9–14.

Petitioner asserts that Kim in combination with Barbera and Kohli discloses all of the limitations of claim 16. Pet. 60–68. Petitioner provides

analysis of each limitation in claim 16, with citations to the references that correspond to each of the claim limitations. *Id.* Petitioner argues that Barbera discloses using GPS technology to permit “the determination of whether a user is closer to the middle of the street or the edge of the street’ and from this information ‘the position of the user in a car (e.g., driver side or passenger side) may be inferred,’ including while determining whether the car is ‘traveling at a speed above the threshold.’” *Id.* at 61 (citing Ex. 1007, 9:24–38). Petitioner asserts that this teaching satisfies the limitation requiring “determining the one or more operational states of the vehicle when the vehicle is moving and the individual is a driver.” *Id.* (citing Ex. 1003 ¶ 300). Petitioner also asserts that Kohli discloses a “GPS receiver” that tracks “position information” of a vehicle including “[t]urn detection” that “may be accomplished by monitoring changes in the vehicle vector velocity derived from changes in the GPS derived position information.” *Id.* (citing Ex. 1003 ¶ 301; Ex. 1016, 3:5–9, 9:45–52, 10:9). Based on these teachings, Petitioner asserts that Kohli discloses “using positional information to determine when a vehicle is turning,” such that the “combination of the terminal of Kim, the driver detecting functionality of Barbera, and the turning identification functions of Kohli therefore discloses the limitations of claim 16.” *Id.* at 61–62 (citing Ex. 1003 ¶ 302).

Petitioner also asserts that a POSITA would have been motivated to combine the three references for a number of reasons. *Id.* at 62 (citing Ex. 1003 ¶¶ 303–304; Ex. 1005 ¶ 12; Ex. 1007, 2:37–38; Ex. 1016, 5:7–10). With respect to the addition of Kohli to the Kim/Barbera combination, Petitioner argues that Kohli also relates to detecting motion in vehicles using sensors on devices, and both Kim and Barbera use GPS technology to

determine the vehicle's position, supporting the use of Kohli's turn detection GPS functionality in combination with Kim and Barbera. *Id.* (citing Ex. 1003 ¶ 303).

Patent Owner argues that “[a]t most, Kohli detects that a car is turning a corner based on GPS” and “does not involve the use of ‘predetermined criteria’ or the ‘individual is a driver.’” PO Resp. 60. Patent Owner also argues that Petitioner fails to show an adequate reason to combine the references with a reasonable expectation of success. *Id.* According to Patent Owner, “[n]either Kim nor Barbera contain any disclosures regarding turning, and Kohli gives no information about how its GPS analysis of a car's movements could be combined with ‘one or more predetermined criteria’ to derive any information about a vehicle's operational state.” *Id.*; *see also* PO Sur-reply 24–27 (arguing insufficient evidence of motivation to combine).

Petitioner replies that Patent Owner improperly argues “that Kohli does not disclose detecting that the user is a driver and that the vehicle is turning” because “the claim only requires determining the state of the vehicle ‘when the individual is a driver,’ which Barbera discloses.” Pet. Reply 26 (citing claim 16; Pet. 61). Petitioner also argues that the claim does not forbid the use of GPS to determine positional information. *Id.* (citing claim 16). Finally, Petitioner argues that a “POSITA would have been motivated to combine the references and would have had an expectation of success because all three utilize the sensors on a mobile device and GPS for related goals.” *Id.* (citing Pet. 62).

Based on our review of the arguments and evidence, we find that Petitioner establishes that the combination of Kim, Barbera, and Kohli

discloses all of the limitations of claim 16. First, Barbera discloses “determining the one or more operational states of the vehicle when the vehicle is moving and the individual is a driver” by using GPS to determine the speed of the car and the position of the user in the car (i.e., whether the user is a driver or passenger). *See* Ex. 1007, 9:24–38. Second, Kohli discloses using positional information to determine when a vehicle is turning a corner by employing its GPS-based turn detection technique. Ex. 1016, 3:5–9, 9:45–52. We agree with Petitioner that “[i]t would have been obvious to include additional elements of determining the operational state of the vehicle based on ‘position of the portable device that indicates that the vehicle is turning the corner’ and ‘one or more predetermined criteria’ in a method using the terminal of Kim in view of Barbera, in further view of” Kohli. Pet. 60–61 (citing Ex. 1003 ¶ 296).

Patent Owner makes a brief argument that the combination does not teach all of the limitations of the claim because “[a]t most, Kohli detects that a car is turning a corner based on GPS” and “does not involve the use of ‘predetermined criteria’ or the ‘individual is a driver.’” PO Resp. 60. But, Petitioner correctly points out in Reply that “the claim only requires determining the state of the vehicle ‘when the individual is a driver,’ which Barbera discloses.” Pet. Reply 26 (citing claim 16; Pet. 61). Patent Owner does not respond to this argument in its Sur-reply. *See* PO Sur-reply 24–27. In addition, the “operational states” and “predetermined criteria” limitations refer to back to claim 15, from claim 16 depends, and we found above that Kim already discloses those limitations in the context of claim 15. *See* Pet. 29–30.

We also find that Petitioner establishes that a POSITA would have been motivated to add Kohli to the Kim/Barbera combination with a reasonable expectation of success for the reasons stated by Petitioner, which we adopt as our own. Pet. 62 (citing Ex. 1003 ¶¶ 303–304; Ex. 1005 ¶ 12; Ex. 1007, 2:37–38; Ex. 1016, 5:7–10). Petitioner persuasively sets forth the common technology and issues surrounding the references, which use similar sensors to detect vehicle motion and position information. *See id.* Patent Owner argues against the combination because “[n]either Kim nor Barbera contain any disclosures regarding turning, and Kohli gives no information about how its GPS analysis of a car’s movements could be combined with ‘one or more predetermined criteria’ to derive any information about a vehicle’s operational state.” PO Resp. 60–61; PO Sur-reply 24–27 (arguing insufficient evidence of motivation to combine). These arguments fail to address Petitioner’s arguments in support of the combination and merely point out isolated differences between the references, while ignoring their commonalities. In addition, Petitioner argues, with the support of credible declarant testimony, that the “use of the driver identification techniques in Barbera and the turn detection in Kohli as applied to the terminal in Kim would therefore have been well within the level of ordinary skill in the art, would not have resulted in any unpredictable results and could have been readily accomplished without undue experimentation and with a reasonable expectation of success.” Pet. 62 (citing Ex. 1003 ¶ 304). We find Petitioner’s interpretation of the references and motivation to combine, supported by credible testimony from Dr. Michalson, more persuasive than Patent Owner’s insufficiently supported attorney argument on these issues. *See* Ex. 1003 ¶¶ 303–304.

Based on our review of Petitioner's argument and evidence, we find that Petitioner establishes by a preponderance of the evidence that (1) the combination of Kim, Barbera, and Kohli satisfies all of the limitations of claim 16; and (2) a POSITA would have been motivated to combine Kim, Barbera, and Kohli in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim, Baker, and Browne renders claim 16 obvious.

h. Kim and Mitrovic—Independent Claim 18

Independent claim 18 recites

A method of determining a movement and location status using an accelerometer located on a portable device comprising: generating acceleration sequences by measuring accelerations of the vehicle at predetermined sampling periods in one or more directions using the accelerometer;

detecting when the acceleration sequences meet a predetermined pattern recognition criteria, wherein the predetermined pattern recognition criteria include at least one markov model generated for variety of the one or more operational states of the vehicle; determining the one or more operational states based on the predetermined selected pattern recognition criteria.

Ex. 1001, 14:23–34.

Petitioner asserts that Kim in combination with Mitrovic discloses all of the limitations of claim 18. Pet. 63–68. Petitioner provides analysis of each limitation in claim 18, with citations to the references that correspond to each of the claim limitations. *Id.* Petitioner also cites to the relevant declarant testimony as support. *Id.* (citing various portions of Ex. 1003). Petitioner asserts that Kim discloses several limitations that are common to claims 1 and 18 for the reasons provided in the context of claim 1. *See id.* at

63 (referring back to analysis for claim 1 for several limitations). Petitioner asserts that Mitrovic discloses a “simple and reliable method for the recognition of driving events using hidden Markov models,” satisfying the claim limitation requiring “predetermined pattern recognition criteria include[ing] at least one markov model.” *Id.* at 65 (quoting Ex. 1010, 198). Petitioner also asserts that “Mitrovic explains that the markov models may be generated for several types of ‘driving events’ such as ‘driving a vehicle along left and right curves’ and ‘turning a vehicle left and right on intersections,’ a model that is ‘generated for variety of the one or more operational states of the vehicle.’” *Id.* (citing Ex. 1003 ¶ 316; Ex. 1010, 203). Petitioner also argues that the data collected by Mitrovic’s sensors satisfy the remaining limitations of claim 18, such that the combination of Kim and Mitrovic discloses all of the limitations of claim 18. *Id.* at 65–66 (citing Ex. 1003 ¶¶ 316–318; Ex. 1010, 201–203).

As to the combination, Petitioner argues that it “would have been obvious to combine the capability of Kim’s portable terminal with the pattern matching markov models of Mitrovic” and provides a number of reasons in support of the combination. Pet. 66–68 (citing Ex. 1003 ¶¶ 319–323). For example, Petitioner argues that Kim, like Mitrovic, uses acceleration sensors to determine the motion of a vehicle and compares sensor output to stored patterns, and Mitrovic uses sensor input for its markov models to determine driving events. *Id.* at 67 (citing Ex. 1003 ¶ 321; Ex. 1005 ¶¶ 73–74; Ex. 1010, 204). Petitioner also argues that “the use of the vehicle movement based markov models disclosed in Mitrovic to inform the pattern recognition of vehicle movement in Kim would have been obvious to one of skill in the art.” *Id.* (citing Ex. 1003 ¶ 321). Petitioner

further contends that a POSITA would have had a reason to make the combination because “Kim discloses the need for specific tailoring of services on a portable device based on the state of the vehicle and a method of meeting that need by comparing measured signals with reference signals” and “Mitrovic discloses that markov models may be used as pattern recognition tools in determining driving events, such as turning a car.” *Id.* at 67–68 (citing Ex. 1003 ¶ 322; Ex. 1005 ¶¶ 73–74, 82; Ex. 1010, 204). Finally, Petitioner argues that the combination involves “the arrangement of old elements (portable device, a portable device’s accelerometer, markov models) with each performing the same function it had been known to perform (portability, detecting movement, pattern matching) and yielding no more than what one would expect from such an arrangement (determination that a vehicle’s state matches a predetermined pattern), as Mitrovic demonstrates.” *Id.* at 68 (citing Ex. 1003 ¶ 323).

Patent Owner argues that “a POSITA would not be motivated to combine Kim with Mitrovic and would lack a reasonable expectation of success.” PO Resp. 24. According to Patent Owner, “Mitrovic does not involve the use of an “accelerometer located on a portable device,” as required by claim 18, and “[i]nstead, Mitrovic requires an elaborate system of fixed sensors and computers” that “are not on a portable device.” *Id.* at 24–25 (citing Ex. 1010, 201). Patent Owner also argues that “[n]either reference gives any reason to believe that Mitrovic’s Markov models would work on Kim’s mobile device.” *Id.* at 25. Patent Owner also contends that “Mitrovic makes clear that the configuration of the sensors may affect the system’s success rate” and “the configuration of the sensors in Kim is completely different from Mitrovic.” *Id.* at 26 (citing Ex. 1005 ¶ 79;

Ex. 1010, 204). Patent Owner also alleges that the use of accelerometers in Kim and Mitrovic to detect a vehicle's motion "is a far cry from establishing that analysis of acceleration sequences via Markov models would work on a mobile device." *Id.* (citing Ex. 1003 ¶¶ 320–22). Finally, Patent Owner argues that "Mitrovic requires the 'tight coupling with the car' that the '140 patent disclaims." *Id.* at 26–27 (citing Ex. 1001, 1:32–36).

Petitioner replies that Patent Owner "misrepresents the combination of Kim's terminal with Mitrovic's markov models" by arguing that "the physical aspects of the system of Mitrovic are too difficult to combine with Kim's device." Pet. Reply 19 (citing PO Resp. 24–25). Petitioner states that "the Petition did not argue combining the hardware of Mitrovic with Kim—Kim already provides the hardware, and Mitrovic is needed only to provide an additional gloss on the pattern-matching approach." *Id.* (citing Pet. 63–65). Petitioner also argues that even if Mitrovic's markov model "may be imperfect when implemented in Kim" that does not mean that "[s]imply utilizing a markov model, such as that of Mitrovic, on the device in Kim," would not work as claim 18 requires. *Id.* (citing PO Resp. 26; Ex. 1001, claims 1 and 18; Ex. 1003 ¶¶ 321–323).

In its Sur-reply, Patent Owner argues that "Petitioner does not explain why the analytic approach used on the type of data collected by Mitrovic's elaborate series of fixed sensors could be incorporated to the pattern matching techniques that are used on the indirect vibration data collected by Kim's single accelerometer in a portable device." PO Sur-reply 25 (citing PO Resp. 24–26).

Based on our review of the arguments and evidence, we find that Petitioner establishes that the combination of Kim and Mitrovic discloses all

of the limitations of claim 18. *See* Pet. 63–66. Patent Owner does not argue that the combination fails to disclose any limitations of claim 18. *See* PO Resp. 24–27. We agree with Petitioner that Kim discloses the limitations that claim 18 has in common with claim 1 and that Mitrovic disclose the limitations that are different than claim 1. We adopt Petitioner’s arguments and evidence as to these undisputed assertions as our own. *See* Pet. 63–66.

We also find that Petitioner establishes that a POSITA would have been motivated to combine Kim and Mitrovic with a reasonable expectation of success for the reasons stated by Petitioner. Pet. 66–68 (citing Ex. 1003 ¶¶ 319–323). Petitioner provides detailed reasoning based on the similarities between Kim and Mitrovic, including the use of acceleration sensors to determine the motion of a vehicle and comparison between sensor outputs to stored patterns to interpret driving events. *Id.* at 67 (citing Ex. 1003 ¶ 321; Ex. 1005 ¶¶ 73–74; Ex. 1010, 204). Petitioner also persuasively argues that “Kim discloses the need for specific tailoring of services on a portable device based on the state of the vehicle and a method of meeting that need by comparing measured signals with reference signals” and “Mitrovic discloses that markov models may be used as pattern recognition tools in determining driving events, such as turning a car.” *Id.* at 67–68 (citing Ex. 1003 ¶ 322; Ex. 1005 ¶¶ 73–74, 82; Ex. 1010, 204). We also agree with Petitioner that many of Patent Owner’s arguments improperly interpret Petitioner’s proposed combination, which does not involve adding Mitrovic’s hardware to Kim’s system. *See id.* at 66–68; Pet. Reply 19 (citing PO Resp. 24–25). Patent Owner also argues that Mitrovic’s markov models may not work on Kim’s system, or not work as well, but Petitioner correctly points out that claim 18 merely requires the utilization of the

models—the fact that the models may work better using Mitrovic’s hardware does not fatally undermine Petitioner’s showing as to a motivation to combine. *See* Pet. Reply 19. We find Petitioner’s interpretation of the references and motivation to combine issue, supported by credible testimony from Dr. Michalson, more persuasive than Patent Owner’s attorney argument on these issues. *See* Ex. 1003 ¶¶ 319–323.

Based on our review of Petitioner’s argument and evidence, we find that Petitioner establishes by a preponderance of the evidence that (1) the combination of Kim and Mitrovic satisfies all of the limitations of claim 18; and (2) a POSITA would have been motivated to combine Kim and Mitrovic in the manner Petitioner proposes with a reasonable expectation of success. Accordingly, we determine that Petitioner establishes by a preponderance of the evidence that the combination of Kim and Mitrovic renders claim 18 obvious.

3. Conclusion as to Obviousness of Claims 2–4, 6–9, 11, 12, 14, and 16–18

A preponderance of the evidence persuades us that claims 1–5, 7, 8, 10–16, and 18 of the ’140 patent are unpatentable as obvious for the reasons provided by Petitioner; claims 6, 9, and 17 have not been shown to be unpatentable as obvious.

CONCLUSION²⁰

A summary of our conclusions appears in the chart below:

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 5, 10, 13, 15	102	Kim	1, 5, 10, 13, 15	
2, 7	103(a)	Kim	7	2
2, 11, 14	103(a)	Kim, Barbera	2, 11, 14	
3, 6, 8, 9, 17	103(a)	Kim, Baker	3, 8	6, 9, 17
4	103(a)	Kim, Browne, Baker	4	
12	103(a)	Kim, Rubin	12	
16	103(a)	Kim, Barbera, Kohli	16	
18	103(a)	Kim, Mitrovic	18	
Overall Outcome			1–5, 7, 8, 10– 16, 18	6, 9, 17

²⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–5, 7, 8, 10–16, and 18 of U.S. Patent 8,527,140 B2 have been shown, by a preponderance of the evidence, to be unpatentable;

FURTHER ORDERED that claims 6, 9, and 17 of U.S. Patent 8,527,140 B2 have not been shown, by a preponderance of the evidence, to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2021-01118
Patent 8,527,140 B2

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