

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

IQAR INC.,
Patent Owner.

IPR2024-00630
Patent 10,850,616 B2

Before ROBERT L. KINDER, SEAN P. O'HANLON, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

Tesla Inc. (“Petitioner”) filed a Petition for *inter partes* review of claims 1–16 (“the challenged claims”) of U.S. Patent No. 10,850,616 B2 (Ex. 1001, “the ’616 patent”). Paper 2 (“Pet.”), 1. iQar, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6. On September 26, 2024, we instituted an *inter partes* review of the challenged claims on all grounds raised in the Petition. Paper 7 (“Institution Decision” or “Inst. Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 12, “PO Resp.”), Petitioner filed a Reply to the Patent Owner Response (Paper 14, “Pet. Reply”), and Patent Owner filed a Sur-reply to Petitioner’s Reply (Paper 15, “PO Sur-reply”). An oral hearing was held on July 1, 2025. A transcript of the hearing has been entered into the record. Paper 22 (“Tr.”).

For the reasons that follow, we conclude that Petitioner has proven by a preponderance of the evidence that claims 1–16 of the ’616 patent are unpatentable.

B. Real Parties in Interest

Petitioner identifies itself as its sole real party in interest. Pet. 84.

Patent Owner identifies itself (stating that it is “formerly known as Invently Automotive, Inc.”) as its sole real party in interest. Paper 4, 1.

C. Related Matters

The parties indicate that the ’616 patent is the subject of the following district court proceeding:

iQar Inc. v. Tesla, Inc., No. 3-24-cv-01337 (N.D. Cal. filed March 6, 2024).

Pet. 84; Paper 4, 1.

D. The Challenged Patent

The '616 patent is titled “Using Vehicle Systems to Generate a Route Database” and issued on December 1, 2020, from Application No. 15/693,899 (“the '899 application”) filed on September 1, 2017, which is a continuation of Application No. 15/626,676 filed on June 19, 2017, now U.S. Patent No. 11,065,977 (Ex. 1005), which is a continuation of Application No. 14/566,848 filed on December 11, 2014, now U.S. Patent No. 9,682,624 (Ex. 1006), which is a continuation of Application No. 14/206,138 filed on March 12, 2014, now U.S. Patent No. 8,972,162 (Ex. 1007), which is a continuation of Application No. 13/066,189 filed on April 8, 2011, now U.S. Patent No. 8,712,650 (Koebler), which is a continuation-in-part of Application No. 11/283,137 filed on November 17, 2005, now U.S. Patent No. 7,925,426 (Ex. 1008). Ex. 1001, codes (21), (22) (45), (54), (63); Ex. 1004, code (63).

The '616 patent discloses methods and systems for controlling power applied to a vehicle engine. Ex. 1001, 1:15–16. The '616 patent purports that, currently, fuel consumption cannot be precisely controlled by a driver, and operational assisting devices typically do not optimize power consumption of the vehicle. *Id.* at 1:20–24, 1:50–53. The '616 patent purports to improve upon optimization of power consumption of a vehicle via “power management logic that can calculate an applied power for the vehicle engine based on information provided from the external environment of the vehicle, the operational status of the vehicle, one or more command

inputs from a driver, and one or more operational parameters of the vehicle.”
Id. at 2:19–28.

The ’616 patent describes “steps that may be followed to optimize the energy supplied to an engine so that the vehicle travels at a fuel-efficient speed.” Ex. 1001, 11:31–33; *see also id.* at Fig. 2 (illustrating a flowchart of steps to optimize power).

To determine an optimally efficient speed (or the optimal power to be supplied to the engine), a route is determined 201 from the starting position and an actual or estimated ending position, the route is segmented 203 into one or more segments, a model optimal speed (or power) is calculated 205, statistical data from previous trips along the same segment of the route are retrieved 207, and an overall efficiency applied power is calculated from at least the model power and the statistical data 209. Finally, the overall efficient applied power is provided to the engine.

Id. at 11:33–43. “The route is determined based on the current position of the vehicle and a final destination position.” *Id.* at 11:51–52. The destination may be input by the driver before or during the trip (*id.* at 11:58–60), or the destination may be derived from information about the driver, current location, time of day, and past trips (*id.* at 14:5–33). “In some variations, the route may be broken up into segments that may be used by a power management device to optimize the power needed to travel this segment.” *Id.* at 13:65–14:1. Accuracy of the model increases as the number of segments increases. *Id.* at 14:28–30. “The route may be continuously re-segmented” as the vehicle moves. *Id.* at 14:19–20. “The power required by the vehicle to travel along a route, or a segment of the route, may be estimated or calculated, and this calculation may be used to determine a calculated speed for the vehicle so that the power usage is

optimized or minimized.” *Id.* at 14:35–39. The optimal speed for each segment may be calculated by any appropriate method, and may include the use of energy calculating logic. *Id.* at 15:1–6.

E. The Challenged Claims

Petitioner challenges claims 1–16 of the ’616 patent. Pet. 1. Claims 1, 15, and 16 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below.

1. An apparatus comprising:

- an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;
 - a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system; and
 - a processor configured to (i) analyze said sensor data samples stored in said memory to determine current conditions and (ii) associate said current conditions with said route segment, wherein (a) said route segment is identified according to said data from said telemetry system and (b) said current conditions associated with said route segment are uploaded to said remote database to create historical route information for a plurality of route segments;
- wherein the sensor data samples are received from at least one of an optical sensor, a position sensor, a speed sensor, a gyroscopic sensor, a revolutions-per-minute sensor, an accelerator pedal position sensor, a brake pedal position sensor, a battery state sensor, a tire pressure sensor, a proximity sensor, a weight sensor, an airflow sensor, and a gas flow sensor; and
- wherein said current conditions comprise at least one of: drag, wind resistance, tire resistance, a location relative to a

destination, traffic patterns, an amount of light energy, a position of the sun, geographical information, an elevation of said vehicle, a grade of a road, a location of stoplights, a timing of stoplights, weather, a wind direction, a wind velocity, a temperature, air pressure, moisture, visibility, an amount of vibration, and traction.

Ex. 1001, 27:32–65. Petitioner refers to the thirteen recited sensors as the “Enumerated Sensors” and the twenty-one recited current conditions as the “Enumerated Current Conditions.” *See* Pet. 3. We adopt these monikers for convenience in our analysis below.

F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Koebler	US 8,712,650 B2, issued April 29, 2014	1004
Kabel	US 7,516,011 B1, issued April 7, 2009	1010
Okano	US 7,148,648 B2, issued December 12, 2006	1011
Kirkwood	US 7,211,019 B2, issued May 1, 2007	1012
Breed	US 7,983,836 B2, issued July 19, 2011	1013
Lagerstedt	US 7,752,188 B2, issued July 6, 2010	1014

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–16	102	Koebler
1–16	103	Koebler
1–16	103	Koebler, Kabel, Lagerstedt, Okano, Kirkwood, Breed

Pet. 1. Petitioner submits two declarations of Vassilios Morellas, Ph.D. (Ex. 1003, “Morellas Declaration”; Ex. 1054) in support of its contentions.

Patent Owner submits a declaration of David M. Bevly, Ph.D. (Ex. 2001) in support of its contentions.

II. PRIORITY OF THE '616 PATENT

As noted above, Petitioner asserts Koebler in each of its challenges to the '616 patent. Pet. 1. Through a series of continuation applications, the '616 patent claims priority to Koebler. Ex. 1001, code (63). Petitioner argues that the '616 patent is not entitled to its asserted priority, and that Koebler therefore qualifies as prior art. Pet. 10–20. Patent Owner disagrees, arguing that the '616 patent is entitled to its asserted priority and Koebler does not qualify as prior art. PO Resp. 13–36. For the reasons set forth below, we find that Petitioner has shown, by a preponderance of the evidence, that the '616 patent is not entitled to its asserted priority and, therefore, Koebler is prior art with respect to the '616 patent.

A. Principles of Law

“It is elementary patent law that a patent application is entitled to the benefit of the filing date of an earlier filed application only if the disclosure of the earlier application provides support for the claims of the later application, as required by 35 U.S.C. § 112.” *In re Chu*, 66 F.3d 292, 297 (Fed. Cir. 1995) (citing 35 U.S.C. § 120). Section 112 requires, *inter alia*, that the specification contain a written description of the claimed invention. 35 U.S.C. § 112(a). In determining whether the written description requirement is met, we consider “whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Ariad*

Pharm., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). This analysis requires “an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.* Thus, “the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology.” *Id.* For example, the analysis must consider “the existing knowledge in the particular field, the extent and content of the prior art, the maturity of the science or technology, [and] the predictability of the aspect at issue.” *Id.* (alteration in original) (quoting *Capon v. Eshhar*, 418 F.3d 1349, 1359 (Fed. Cir. 2005)).

“While a prior application need not contain precisely the same words as are found in the asserted claims, the prior application must indicate to a person skilled in the art that the inventor was ‘in possession’ of the invention as later claimed.” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1306 (Fed. Cir. 2008) (citations omitted); *see also Purdue Pharma LP v. Faulding Inc.*, 230 F.3d 1320, 1323 (Fed. Cir. 2000) (“In order to satisfy the written description requirement, the disclosure as originally filed does not have to provide *in haec verba* support for the claimed subject matter at issue.”). However, “it is the specification itself that must demonstrate possession. And while the description requirement does not demand any particular form of disclosure . . . , a description that merely renders the invention obvious does not satisfy the requirement.” *Ariad*, 598 F.3d at 1352 (citations omitted); *see also Lockwood v. Am. Airlines*, 107 F.3d 1565, 1572 (Fed. Cir. 1997) (“While the meaning of terms, phrases, or diagrams in a disclosure is to be explained or interpreted from the vantage

point of one skilled in the art, all the limitations must appear in the specification. The question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification. Rather, a prior application itself must describe an invention, and do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought.”).

B. Level of Ordinary Skill in the Art

The level of ordinary 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 presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including: “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Best Med. Int’l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022) (quoting *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007)). “The patent’s purpose can also be informative.” *Id.*

Petitioner’s witness, Dr. Morellas, contends that a person having ordinary skill in the art at the time of the invention “would have had a bachelor’s degree in electrical engineering, computer engineering, mechanical engineering, civil engineering (transportation systems), physics, or a related field, and at least four years of experience (or the academic

equivalent) in the field of transportation systems.” Ex. 1003 ¶ 28; *see also* Pet. 15 n.12 (citing same).

Patent Owner does not contest Petitioner’s proposed definition or proffer a definition of its own, and appears to adopt Petitioner’s proposed definition. *See* PO Resp. 13, 15.

We find Dr. Morellas’s unopposed definition to be consistent with the problems and solutions disclosed in the ’616 patent and prior art of record, and adopt it as our own for purposes of this Decision. *See, e.g., In re GPAC*, 57 F.3d at 1579 (approving the determination of the level of ordinary skill in the art by appeal to the references of record).

C. Claim Construction

In order to analyze the question of priority, we must first address claim construction of certain terms in the claims at issue. *See In re Entresto*, 125 F.4th 1090, 1098 (Fed. Cir. 2025) (“The scope of what is claimed (and must be adequately described) is, in turn, determined through claim construction.”).

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention” and “after reading the entire patent.” *Phillips v. AWH Corp.*, 415

F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (alteration in original) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner presents interpretations of two claim recitations, which we discuss in turn below. Pet. 4–10. We also address the interpretation of “traction” in § II.D.2 below. No further interpretation of claim terms is required for this decision.

1. At Least One Of

Independent claim 1 recites, in relevant part:

wherein the sensor data samples are received from at least one of an optical sensor, a position sensor, a speed sensor, a gyroscopic sensor, a revolutions-per-minute sensor, an accelerator pedal position sensor, a brake pedal position sensor, a battery state sensor, a tire pressure sensor, a proximity sensor, a weight sensor, an airflow sensor, and a gas flow sensor; and

wherein said current conditions comprise at least one of: drag, wind resistance, tire resistance, a location relative to a destination, traffic patterns, an amount of light energy, a position of the sun, geographical information, an elevation of said vehicle, a grade of a road, a location of stoplights, a timing

of stoplights, weather, a wind direction, a wind velocity, a temperature, air pressure, moisture, visibility, an amount of vibration, and traction.

Ex. 1001, 27:50–65. Independent claims 15 and 16 contain similar recitations. *Id.* at 28:65–29:13, 29:17–24, 30:7–15.

In the Institution Decision, “we determine[d] that the ‘at least one of . . . and’ recitations are disjunctive, requiring only one of the enumerated elements or parameters but allowing for more than one of the enumerated elements or parameters.” Inst. Dec. 12 (second alteration in original). The parties agree with our preliminary interpretation. PO Resp. 5 (“The Board correctly interpreted the ‘at least one of’ limitations in the disjunctive (as opposed to the conjunctive).”); Pet. Reply 6 (“[W]hile preliminary, the Panel already identified the proper interpretation of the Current Condition Limitations.”).

Accordingly, for the reasons explained in the Institution Decision (*see* Inst. Dec. 10–12), we reaffirm our interpretation of the “at least one of . . . and” recitations to be in the disjunctive, requiring only one of the enumerated elements or parameters.

2. The Wherein Clauses

Independent claim 1 recites, in relevant part:

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle . . . ;

. . . .

a processor configured to (i) analyze said sensor data samples stored in said memory to determine current conditions . . . ;

wherein the sensor data samples are received from at least one of an optical sensor, a position sensor, a speed sensor, a gyroscopic sensor, a revolutions-per-minute sensor, an

accelerator pedal position sensor, a brake pedal position sensor, a battery state sensor, a tire pressure sensor, a proximity sensor, a weight sensor, an airflow sensor, and a gas flow sensor; and wherein said current conditions comprise at least one of: drag, wind resistance, tire resistance, a location relative to a destination, traffic patterns, an amount of light energy, a position of the sun, geographical information, an elevation of said vehicle, a grade of a road, a location of stoplights, a timing of stoplights, weather, a wind direction, a wind velocity, a temperature, air pressure, moisture, visibility, an amount of vibration, and traction.

Ex. 1001, 27:33–65. Independent claims 15 and 16 contain similar recitations. *Id.* at 28:48–29:13, 29:16–24, 30:6–15.

In the Institution Decision, we determined that “the recited ‘analyze said sensor data samples . . . to determine current conditions’ requires data samples from one Enumerated Sensor be analyzed to determine one Enumerated Current Condition” and, accordingly, “the claims require the Enumerated Current Conditions to be determined by analyzing data from the Enumerated Sensors.” Inst. Dec. 14 (alteration in original).

Petitioner agrees with our preliminary interpretation. *See* Pet. Reply 6 (“[W]hile preliminary, the Panel already identified the proper interpretation of the Current Condition Limitations.”).

Patent Owner also agrees with our preliminary interpretation. *See* PO Resp. 6 (“Consistent with the ‘at least one of’ construction, the Board noted that [the wherein clauses] ‘only require[] one of the Enumerated Sensors to be present and one of the Enumerated Current Conditions to be determined.’” (citing Inst. Dec. 14)). Patent Owner continues, arguing that “the claims do not exclude implementations in which the system determines one Enumerated Current Condition[] by analyzing data from one

Enumerated sensor *and* other enumerated or non-enumerated sensors” and “[do] not preclude the processor from consider[ing] other information along with the data samples as part of that analysis.” *Id.* at 6–7 (citing Ex. 2001 ¶¶ 46–48); *see also* PO Sur-reply 4–5 (presenting similar arguments).

We disagree with Patent Owner’s suggestion that, for purposes of written description, support can be shown by reliance on “non-enumerated” (that is, unrecited) sensors. As we explained in the Institution Decision, “[a]lthough claim 1 uses the open-ended ‘comprising’ transitional phrase, which allows for the presence of additional non-recited sensors, *such sensors are not required by the claim*. Rather, claim 1 only requires one of the Enumerated Sensors to be present and one of the Enumerated Current Conditions to be determined.” Inst. Dec. 14 (emphasis added). We further explained,

[W]e interpret the claims to require the Enumerated Current Conditions to be determined by analyzing data from the Enumerated Sensors, and *it is this claimed invention for which the specification must provide written description support*. Although, as discussed above, the claim requires only one Enumerated Sensor and one Enumerated Current Condition, it additionally requires that data from the sensor be analyzed to determine the current condition. *Thus, to support the full scope of the claims, Koebler must disclose that each of the Enumerated Current Conditions is determined by analyzing data from one of the Enumerated Sensors*.

Id. at 16 (emphases added). Indeed, the Federal Circuit recently stated, “As we have long recognized, ‘[t]he invention is, for purposes of the “written description” inquiry, *whatever is now claimed*.’” *In re Entresto*, 125 F.4th at 1097 (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1564 (Fed. Cir. 1991)).

Accordingly, for the reasons explained in the Institution Decision (*see* Inst. Dec. 12–14), we reaffirm our interpretation that the recited “analyze said sensor data samples . . . to determine current conditions” requires data samples from one Enumerated Sensor be analyzed to determine one Enumerated Current Condition. In other words, the claims require the Enumerated Current Conditions to be determined by analyzing data from the Enumerated Sensors.

D. Priority Analysis

Petitioner acknowledges that Koebler is in the claimed priority chain of the '616 patent, but argues that “the '616 patent is not entitled to the benefit of its priority claim because the [priority documents] do not provide sufficient written description of various claim features.” Pet. 1–2. Specifically, Petitioner argues that “[Koebler] fails to provide sufficient written description support for determination of . . . ten current conditions.” *Id.* at 10 (emphasis omitted). Petitioner argues that three of these Enumerated Current Conditions—moisture, an amount of vibration, and traction—do not have written description support in Koebler because neither the specific words nor any synonyms are disclosed in Koebler, Koebler contains no teaching or suggestion of using data from the Enumerated Sensors to determine these three current conditions, and there is no inherent disclosure of these three current conditions in Koebler. *Id.* at 15–19 (citing Ex. 1001, 8:23–25; Ex. 1004; Ex. 1003 ¶¶ 79–89). Petitioner argues that Koebler also fails to provide sufficient written description support for temperature, weather, wind direction, wind velocity, air pressure, location of stoplights, and timing of stoplights. *Id.* at 19–20 (citing Ex. 1003 ¶¶ 90–91).

Petitioner concludes, therefore, that “the earliest priority date of the ’616 patent is [September 1, 2017],” the date on which the ’899 application was filed. *Id.* at 12 (citing Ex. 1003 ¶¶ 57–61).

As noted above, we interpret the claims to require the Enumerated Current Conditions to be determined by analyzing data from the Enumerated Sensors, and it is this claimed invention for which the Koebler must provide written description support. 35 U.S.C. §§ 112(a), 120. Although, as discussed above, the claims require only one Enumerated Sensor and one Enumerated Current Condition, they additionally require that data from the sensor be analyzed to determine the current condition. Thus, to support the full scope of the claims, Koebler¹ must disclose that each of the Enumerated Current Conditions is determined by analyzing data from one of the Enumerated Sensors. Although Petitioner asserts that Koebler does not provide written description support for ten of the Enumerated Current Conditions (*see* Pet. 10–11), Petitioner focuses its arguments on three of the current conditions (moisture, an amount of vibration, and traction) (*see id.* at 15–20). Petitioner’s arguments for these three current conditions are substantially identical, including that Koebler does not teach or suggest using data from an Enumerated Sensor to determine each of the three current conditions. *See id.* at 15–19. As explained below, we agree with Petitioner that the ’616 patent lacks written description support for two of the Enumerated Conditions.

¹ Petitioner acknowledges that Koebler and the ’616 patent share the same specification and uses Koebler as representative of all of the priority documents. Pet. 2 n.1, 21. Patent Owner also directs its arguments to the disclosure of Koebler. *See* PO Resp. 16–36. We likewise focus our analyses on the disclosure of Koebler.

1. An Amount of Vibration

Patent Owner contends that Koebler discloses three sensors that gather data that can be analyzed to determine an amount of vibration: gyroscopic sensors, tire pressure sensors, and position sensors. PO Resp. 33–36. We discuss each of these asserted sensors in turn below.

a. Gyroscopic Sensors

Patent Owner argues that Koebler discloses gyroscopic sensors and, “[a]s of the filing date of [Koebler], it was well known that gyroscopic sensors could be used to determine certain types of vibrations for purposes of, for example, measuring road conditions.” *Id.* at 33 (citing Ex. 1004, 21:42; Ex. 2001 ¶¶ 121–122; Ex. 1013, 11:30–36; Ex. 2027 ¶ 7). Patent Owner argues that it was also known that gyroscopes could be used to determine vibrations caused by a vehicle traveling over rough or bumpy surfaces. *Id.* at 34 (citing Ex. 2001 ¶ 123; Ex. 2026, 1:31–42, 2:33–47).

Petitioner replies that Koebler discloses its gyroscope sensor as measuring the “‘vehicle’s current orientation’ and ‘current slope/grade of road’—neither of which are the same as or specifically include vibration information.” Pet. Reply 16 (citing Ex. 1004, 21:29–62). Petitioner argues that an ordinarily skilled artisan “would not have understood the process of determining “‘current slope/grade of road’ as involving analyzing sensor data samples to detect an amount of vibration.” *Id.* (citing Ex. 1054 ¶ 55).²

² Although Petitioner’s citation uses “*Id.*” and the previous citation was to Exhibit 1055 (the transcript of Dr. Bevely’s deposition), we understand Petitioner’s intent was to cite to the second declaration of Dr. Morellas, Exhibit 1054. Petitioner makes this mistake several times in its Reply. We correct additional such instances below without further comment.

Patent Owner replies that Petitioner fails to consider the disclosure of Koebler as a whole, instead focusing on disparate parts of the disclosure in isolation. PO Sur-reply 9–11.

We are persuaded by Petitioner’s arguments that Koebler does not provide written description support for using data from a gyroscope sensor to determine an amount of vibration. Koebler discloses that its sensors may be monitored to collect “gyroscope information (e.g., vehicle’s current orientation, current slope/grade of road).” Ex. 1004, 21:42–43. However, Koebler does not disclose that the “gyroscopic information” could be used to determine an amount of vibration. Patent Owner’s witness, Dr. Bevly, recognizes as much, testifying that “[Koebler] doesn’t expressly disclose determining the amount of vibrations.” Ex. 2001 ¶ 106.

Patent Owner’s arguments are unavailing to establish written description support in Koebler for analyzing gyroscope “sensor data samples” to determine “an amount of vibration” as required by the claims of the ’616 patent. Rather than identifying disclosure within Koebler’s specification, Patent Owner argues that a gyroscope “*could* be used to determine certain types of vibration.” PO Resp. 33 (emphasis added) (citing Ex. 2001 ¶ 121). In the cited portion of his declaration, Dr. Bevly opines that “[w]hen [Koebler] was filed, vehicle gyroscopes were typically packaged in an ‘inertial measurement unit.’” Ex. 2001 ¶ 121. Dr. Bevly continues by opining that an ordinarily skilled artisan would understand that inertial measurement units included gyroscopic sensors and other unrecited sensors that, together, could be used to measure vibrations. *Id.* ¶¶ 122–123.

However, neither Patent Owner nor Dr. Bevly identifies *within Koebler* any disclosure of using data from a gyroscope to determine an

amount of vibration—or any discussion of vibration whatsoever. As such, Patent Owner’s arguments and Dr. Bevly’s testimony merely assert what would have been obvious in view of Koebler’s specification rather than an identification, within the specification, demonstrating possession of the claimed subject matter. Such a showing is insufficient to establish written description support. *See Ariad*, 598 F.3d at 1352 (“[I]t is the specification itself that must demonstrate possession. . . . [A] description that merely renders the invention obvious does not satisfy the requirement.”); *Lockwood*, 107 F.3d at 1572 (“One shows that one is ‘in possession’ of *the invention* by describing *the invention*, with all its claimed limitations, not that which makes it obvious.”). Furthermore, although expert testimony regarding how an ordinarily skilled artisan would understand terms of the specification is appropriate and can be useful in determining whether an inventor had possession of the claimed invention, expert testimony regarding what an ordinarily skilled artisan *could* have done with a disclosed sensor, such as the testimony provided by Dr. Bevly, is insufficient to establish written description support. *See Lockwood*, 107 F.3d at 1572 (“While the meaning of terms, phrases, or diagrams in a disclosure is to be explained or interpreted from the vantage point of one skilled in the art, *all the limitations must appear in the specification.*” (emphasis added)).

b. Tire Pressure Sensors

Patent Owner argues that Koebler discloses tire pressure sensors and that, “[w]hen [Koebler] was filed, it was known that such tire pressure sensors could be used to detect vibrations caused by the interaction of the

tire with the road.” PO Resp. 35 (citing Ex. 2001 ¶ 118; Ex. 2012, code (57), 2:1–11; Ex. 2013, 2–3).

Petitioner replies that “[Koebler] teaches tire pressure information as being ‘used to calculate the drag force due to rolling resistance,’” but “fails to describe that this type of calculation involves determining an amount of vibration.” Pet. Reply 16–17 (citing Ex. 1004, 21:49–50; Ex. 1054 ¶ 56). Petitioner argues that an ordinarily skilled artisan “would not have understood the process of determining tire pressure as necessarily requiring determining an amount of vibration.” *Id.* at 17 (citing Ex. 1054 ¶ 56).

Patent Owner replies that Petitioner fails to consider the disclosure of Koebler as a whole, instead focusing on disparate parts of the disclosure in isolation. PO Sur-reply 9–11.

We are persuaded by Petitioner’s arguments that Koebler does not provide written description support for using data from a tire pressure sensor to determine an amount of vibration. Koebler discloses that its system may use tire pressure as an operational status or environmental input (Ex. 1004, 4:10–11, 8:48), that “tire pressure . . . may be used to calculate the drag force due to rolling resistance” (*id.* at 21:49–51), and that, “if the tire pressure sensor notices that the tire pressure is low, a message to that effect will be displayed to the user” (*id.* at 22:56–58). However, Koebler does not disclose that data from tire pressure sensors could be used to determine an amount of vibration. Patent Owner’s witness recognizes as much, testifying that “[Koebler] doesn’t expressly disclose determining the amount of vibrations.” Ex. 2001 ¶ 106.

Patent Owner’s arguments are unavailing to establish written description support in Koebler for analyzing tire pressure “sensor data

samples” to determine “an amount of vibration” as required by the claims of the ’616 patent. Patent Owner argues that a tire pressure sensor “*could* be used to detect vibrations caused by the interaction of the tire with the road.” PO Resp. 35 (emphasis added) (citing Ex. 2001 ¶ 118). In the cited portion of his declaration, Dr. Bevly opines that “when [Koebler] was filed, it was known that ‘tire pressure sensor[s]’ can be employed to detect ‘[t]ire pressure changes caused by ground vibration excitation from the interaction between the tire and pavement.’” Ex. 2001 ¶ 118 (second and third alterations in original) (citing Ex. 2012, code (57), 2:1–11; Ex. 2013, 2–3).

However, neither Patent Owner nor Dr. Bevly identifies within Koebler any disclosure of such use of tire pressure sensor data, vibration, or road interactions. *See* PO Resp. 35; Ex. 2001 ¶ 118. Rather, Patent Owner’s arguments merely assert what would have been obvious in view of the specification, which is insufficient to establish written description support. *See Ariad*, 598 F.3d at 1352; *Lockwood*, 107 F.3d at 1572.

c. Position Sensors

Patent Owner argues that Koebler discloses position sensors and that, “as of the filing date of [Koebler], it was known that potentiometers and displacement sensors (which are types of position sensors) *could* be used to measure movement and vibrations along a particular axis (e.g., vertical movement).” PO Resp. 35 (emphasis added) (citing Ex. 2001 ¶¶ 68, 124; Ex. 2023, 13:16–26, 16:46–47; Ex. 2030, 5:65–6:2, 10:38–42).

Petitioner replies that “[Koebler] describes using a position sensor to determine ‘position and elevation information’ and ‘route tracking

information,’ neither of which necessitate determining vibration information.” Pet. Reply 18 (citing Ex. 1054 ¶¶ 58–61).

Patent Owner replies that Petitioner fails to consider the disclosure of Koebler as a whole, instead focusing on disparate parts of the disclosure in isolation. PO Sur-reply 9–11.

We are persuaded by Petitioner’s arguments that Koebler does not provide written description support for using data from a position sensor to determine an amount of vibration. Koebler discloses that its sensors may be monitored to collect “Global Positioning System (GPS) information (e.g., giving information on the vehicle’s current location, current elevation, upcoming elevations, upcoming terrain, vehicle’s destination, etc.).” Ex. 1004, 21:36–39. However, Koebler does not disclose that the GPS information could be used to determine an amount of vibration. Patent Owner’s witness recognizes as much, testifying that “[Koebler] doesn’t expressly disclose determining the amount of vibrations.” Ex. 2001 ¶ 106.

Patent Owner’s arguments are unavailing to establish written description support in Koebler for analyzing position “sensor data samples” to determine “an amount of vibration” as required by the claims of the ’616 patent. Notably, Patent Owner does not cite to any disclosure of Koebler to support its assertions. *See* PO Resp. 35–36. Instead, Patent Owner argues that “it was known that potentiometers and displacement sensors (which are types of position sensors) *could* be used to measure movement and vibrations along a particular axis (e.g., vertical movement).” *Id.* at 35 (emphasis added) (citing Ex. 2001 ¶¶ 68, 124).

However, neither Patent Owner nor Dr. Bevely identify within Koebler any disclosure of potentiometers, displacement sensors, vibration, or vertical

movement. *See* PO Resp. 35–36; Ex. 2001 ¶¶ 68, 124. Rather, Patent Owner’s arguments merely assert what would have been obvious in view of the specification, which is insufficient to establish written description support. *See Ariad*, 598 F.3d at 1352; *Lockwood*, 107 F.3d at 1572.

d. Conclusion

In view of the foregoing, we are persuaded by Petitioner’s contentions that Koebler does not provide written description support for analyzing data samples from an Enumerated Sensor to determine an amount of vibration, as required by the claims of the ’616 patent.

2. Traction

Patent Owner argues that Koebler discloses wheel speed sensors, which an ordinarily skilled artisan would have known were used to measure traction. PO Resp. 29 (citing Ex. 1004, 4:1–18, 8:41–51, 21:29–62; Ex. 2001 ¶¶ 68, 131–133; Ex. 2014, 86–87; Ex. 1015, 8:24–42; Ex. 2003, 1:12–24, 2:17–36; Ex. 2004 ¶¶ 2–4, 42; Ex. 2031, 37:4–14, 39:18–24); *see also id.* at 27 (“[A] vehicle’s wheels have ‘traction’ when wheel rotation acts to propel the vehicle along the roadway. The vehicle’s wheels lose ‘traction’ when they spin freely relative to the road and thus are no longer acting to propel the vehicle along the roadway.” (citing Ex. 2001 ¶ 129)). Patent Owner also notes that Koebler mentions “tire resistance” and “rolling resistance” and argues that “[b]y referencing the determination of frictional interactions between a vehicle’s tires and the roadway – including the determination of ‘tire resistance’ and ‘rolling resistance’ – [an ordinarily skilled artisan] would have understood [Koebler] to describe the determination of ‘traction.’” *Id.* at 28 (citing Ex. 2001 ¶ 130).

Petitioner replies that “traction is ‘defined as a physical process in which a tangential force is transmitted across the interface between two bodies through dry friction or an intervening fluid film, resulting in motion, stoppage, or the transmission of power.’” Pet. Reply 10 (citing Ex. 1054 ¶ 29); *see also id.* at 14 (defining “traction” as “friction between the vehicle’s tires and the road”). Petitioner argues that Patent Owner’s proposed definition “focuses only on power transfer.” *Id.* at 10.

Continuing, Petitioner acknowledges that Koebler discloses “an RPM sensor” but argues that Patent Owner “fails to identify any description of how such collected data is further processed to determine traction information.” Pet. Reply 12 (citing PO Resp. 29–30; Ex. 1054 ¶¶ 37–43). Petitioner asserts that “determining traction information from wheel RPM requires further analysis, such as ‘determining the wheel slip ratio, longitudinal and lateral forces, and road surface monitoring.’” *Id.* at 13 (citing Ex. 1054 ¶ 39).

Patent Owner disagrees with Petitioner’s interpretation of “traction,” arguing that “[t]he ’616 patent relates to ‘methods and systems for controlling power applied to a vehicle engine,’” and “[i]n this particular field, the term ‘traction’ has a well-understood meaning: it simply refers to whether or not the vehicle’s tires are gripping the road.” PO Sur-reply 6 (citing Ex. 1001, 1:15–16; Ex. 2001 ¶¶ 129–131). Patent Owner argues that Petitioner fails to consider the disclosure of Koebler as a whole, instead focusing on disparate parts of the disclosure in isolation. *Id.* at 7–9.

Initially, we note that, although Petitioner presents a definition for “traction” in its Reply (*see* Pet. Reply 10), Dr. Morellas agreed with Patent Owner’s proposed interpretation during his deposition:

Q. What would a person having ordinary skill in the art understand the word “traction” to mean?

A. It would mean the grip that the -- that the tire has with the road.

Q. So when the tire is gripping the road, the vehicle will have traction; correct?

A. Correct.

Q. But if the wheels are spinning freely and not gripping the road, the vehicle has no traction; correct?

A. Correct.

Ex. 2031, 36:8–17. Accordingly, we adopt Patent Owner’s interpretation of “traction” to be a measure “of the friction between the vehicle’s drive wheels and the road surface” such that “a vehicle’s wheels have ‘traction’ when wheel rotation acts to propel the vehicle along the roadway” and “[t]he vehicle’s wheels lose ‘traction’ when they spin freely relative to the road and thus are no longer acting to propel the vehicle along the roadway.” *See* PO Resp. 27; *see also* Tr. 18:4–5 (Petitioner’s counsel stating that “the ultimate disposition doesn’t matter which definition [of ‘traction’ the Board] adopt[s]”).

Turning to the merits, we are persuaded by Petitioner’s arguments that Koebler does not provide written description support for using data from an Enumerated Sensor to determine traction. The portions of Koebler cited by Patent Owner disclose that its system may use wheel rotations per minute³ as operational status or environmental input. *See* Ex. 1004, 4:6–7, 8:44, 21:44. However, Koebler does not disclose that data from a revolutions-per-minute sensor could be used to determine traction. Patent Owner’s contentions

³ Although Patent Owner references “wheel speed sensors” (PO Resp. 29), that is not one of the Enumerated Sensors. We understand Patent Owner’s intention was to refer to the recited revolutions-per-minute sensor.

suffer the same deficiencies as identified above regarding an amount of vibration – Patent Owner’s arguments amount to an assertion of what an ordinarily skilled artisan would have found obvious based on Koebler’s disclosure, but do not identify, *within Koebler*, any disclosure demonstrating that the inventors had possession of analyzing data from a revolutions-per-minute sensor to determine traction. Patent Owner’s arguments regarding determining tire resistance and rolling resistance (*see* PO Resp. 27–28) are likewise unavailing, as Patent Owner does not identify any disclosure in Koebler of using an Enumerated Sensor to determine these resistances or using these resistances to determine traction (or a loss thereof).

Nor does Dr. Bevly identify written description support for determining traction in Koebler. Dr. Bevly opines that, “[w]hen [Koebler] was filed, it was well-known and common to measure traction for purposes of, for example, anti-lock braking systems.” Ex. 2001 ¶ 131; *see also* PO Resp. 26 (citing same). However, Dr. Bevly does not identify any discussion in Koebler of anti-lock braking systems. Our review of Koebler’s specification also does not reveal any such disclosure in Koebler. Thus, Dr. Bevly again asserts what would have been obvious in view of Koebler, which is insufficient to establish written description support. *See Ariad*, 598 F.3d at 1352; *Lockwood*, 107 F.3d at 1572.

In view of the foregoing, we are persuaded by Petitioner’s contentions that Koebler does not provide written description support for analyzing data samples from an Enumerated Sensor to determine traction, as required by the claims of the ’616 patent.

E. Patent Owner's New Arguments in the Sur-reply

Patent Owner argues that, because the Enumerated Sensors and Enumerated Current Conditions recitations were added via Examiner's Amendment, the recitations must have written description support. PO Sur-reply 3–4.

Patent Owner's contentions are not responsive to arguments presented in Petitioner's Reply, and thus constitute improper new arguments first presented in the Sur-reply. *See* 37 C.F.R. § 42.23(b) (“A sur-reply may only respond to arguments raised in the corresponding reply”). Moreover, Patent Owner's arguments appear to be duplicative of arguments Patent Owner made in its request for rehearing by the Director of the Institution Decision (*see* Paper 9, 1–2, 5–7, 10–15), which was denied (*see* Paper 11).

Thus, we decline to consider Patent Owner's improper arguments other than to express our disagreement with Patent Owner's characterization of the Board's decision in *Apple, Inc. v. Seven Networks, LLC*, IPR2020-00425, Paper 10 (PTAB Sept. 1, 2020) (Decision Denying Institution). Rather than “explaining that the Board should defer to prior Examiner determinations regarding written description support, particularly when limitations are added via examiner's amendment,” as asserted by Patent Owner (PO Sur-reply 3), there the Board relied on the patent owner's claim chart that “provide[d] written description support for each element of claim 1, including the contested element,” in the priority application in determining that the petitioner did not show examiner error. *See Apple*, Paper 10 at 15–16.

F. Conclusion

For the foregoing reasons, we find that Koebler does not provide written description support for the claims of the '616 patent and, therefore, Koebler is available as prior art with respect to the '616 patent.

III. PATENTABILITY ANALYSIS

A. Principles of Law

1. *Inter Partes Review*

“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”)). Petitioner bears the burden of persuasion to prove unpatentability of each challenged claim by a preponderance of the evidence. 35 U.S.C. § 316(e). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

2. *Anticipation*

“Under 35 U.S.C. § 102 a claim is anticipated ‘if each and every limitation is found either expressly or inherently in a single prior art reference.’” *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1274 (Fed. Cir. 2010) (quoting *Celeritas Techs. Ltd. v. Rockwell Int’l Corp.*, 150 F.3d 1354, 1360 (Fed. Cir. 1998)). “Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the

claim.” *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (quoting *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

A reference inherently discloses an element of a claim “if that missing characteristic is necessarily present, or inherent, in the single anticipating reference.” *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (citing *Cont’l Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991)). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Therasense*, 593 F.3d at 1332 (quoting *Cont’l Can*, 948 F.2d at 1269).

3. Obviousness

A patent claim is unpatentable 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 the subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (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) when in evidence, any objective evidence of nonobviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

⁴ The parties have not directed us to any such objective evidence.

B. Overview of the Asserted Prior Art

1. *Koebler*

The '616 patent claims priority to Koebler through a series of continuation applications. Ex. 1001, code (63). Koebler contains substantially the same disclosure as the '616 patent, which is summarized in § I.D above.

2. *Kabel*

Kabel discloses a vehicle navigation device that acquires location and weather data, and displays the location and real-time weather information on a display of the navigation device. Ex. 1010, code (57), 1:5–6, 3:5–48.

3. *Okano*

Okano discloses a vehicle controller for controlling an actuator to minimize operating noise and increase comfort in the vehicle. Ex. 1011, code (57), 1:13–16, 1:54–57. The controller can measure an acoustic or vibrational wave using a sensor such as a vibrometer. *Id.* at 15:15–23.

4. *Kirkwood*

Kirkwood discloses a power transmission device for use in motor vehicle driveline applications having a pair of torque transfer mechanisms, which are each equipped with a power-operated clutch actuator that is operable for controlling actuation of a multi-plate friction clutch. Ex. 1012, 1:19–24. “An adaptive four-wheel drive mode is made available under control of traction control system 416 to vary the front-rear drive torque distribution ratio based on the tractive needs of the front and rear wheels as detected by the various sensors.” *Id.* at 17:19–23.

5. Breed

Breed discloses systems and methods for timely conveying information from or about traffic control devices, such as stoplights and stop signs, to vehicles. Ex. 1013, 2:15–19. Breed discloses that its system “includes at least one traffic control device and a communication system arranged in a vehicle and communicating with each traffic control device to provide information about travel of the vehicle to the traffic control device(s) and/or receive information about a status of the traffic control device(s).” *Id.* at 2:47–54. The system includes a map database that contains the location of all stop signs and stoplights and that works in conjunction with a vehicle navigation system to provide warnings to the driver. *Id.* at 77:8–15.

6. Lagerstedt

Lagerstedt discloses a system that retrieves weather information, such as rain or snow, based on a user’s location information and associates the weather information with calendar information provided by a calendar application. Ex. 1014, code (57), 9:23–37.

C. Asserted Anticipation by Koebler

Petitioner argues that claims 1–16 are anticipated by Koebler. Pet. 23–56. In support of its showing, Petitioner relies upon the Morellas Declaration. *Id.* (citing Ex. 1003). Patent Owner does not challenge Petitioner’s contentions, arguing only that Koebler is not prior art with respect to the ’616 patent. *See generally* PO Resp. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons

explained below, Petitioner has shown, by a preponderance of the evidence, that these claims are anticipated by Koebler.

1. Independent Claim 1

a. The Preamble

Claim 1 recites “[a]n apparatus.” Ex. 1001, 27:32. Petitioner maps Koebler’s power management device to the recited apparatus. Pet. 23 (citing Ex. 1004, 2:18–25, 2:27–30, 3:30–40, 10:4–7, 16:64–65; Ex. 1003 ¶ 96).

Koebler discloses a “device[] . . . for managing the power consumption of an automotive vehicle, and thereby for optimizing the power consumption of the vehicle.” Ex. 1004, 2:18–21. Koebler refers to the device as a “power management device.” *E.g., id.* at 6:42–44.

Accordingly, for the foregoing reasons, to the extent the preamble is limiting, Koebler supports Petitioner’s contentions.

b. The Interface Recitation

Claim 1 recites “an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database.” Ex. 1001, 27:33–36. Petitioner argues that Koebler’s power management device includes a central processing unit (“CPU”) that uses control logic to acquire sensor data samples from a sensor interface and a GPS receiver. Pet. 23–24 (citing Ex. 1004, 5:64–67, 19:38–65, 20:39–50, 21:29–62, 23:40–61, Figs. 6, 10, 11; Ex. 1003 ¶¶ 97–98). Petitioner argues that the power management device accesses a record of historical route information that is stored in a remote database. *Id.* at 27 (citing Ex. 1004, 5:50–52, 8:5–11, 8:19–24,

10:15–19, 12:48–50, 13:38–40, 16:65–17:17, 17:50–58, 17:62–18:14, 19:54–57, 21:11–18, 22:11–19, 23:40–60, 23:62–24:14, Figs. 3B, 6, 11).

Koebler discloses that its power management device may include a CPU that executes control logic such as polling logic. Ex. 1004, 23:46–51. The CPU receives input from sensors and the GPS receiver. *Id.* at 23:51–57. “The power management device may refer to a record of historical route information,” which may be stored in a remote database. *Id.* at 16:65–17:6.

Accordingly, for the foregoing reasons, Koebler supports Petitioner’s contentions.

c. The Memory Recitation

Claim 1 recites “a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system.” Ex. 1001, 27:37–40. Petitioner argues that Koebler’s power management device stores polled data from the sensors and the GPS system in memory, including historical route information stored in association with segments of a route. Pet. 28–29 (citing Ex. 1004, 8:8–24, 17:6–17, 18:51–56, 19:52–57, 19:61–65, 20:39–50, 21:29–61, Fig. 6; Ex. 1003 ¶ 103).

Koebler discloses that its “power management device . . . may include polling logic for acquiring information inputs,” such as “data from sensors,” and for storing the acquired data in memory. Ex. 1004, 19:47–57. The information inputs are linked to the statistical route analysis logic, and may be stored along segments of a route. *Id.* at 17:6–12, 20:41–43.

Accordingly, for the foregoing reasons, Koebler supports Petitioner’s contentions.

d. The Processor Recitation

Claim 1 recites,

a processor configured to (i) analyze said sensor data samples stored in said memory to determine current conditions and (ii) associate said current conditions with said route segment, wherein (a) said route segment is identified according to said data from said telemetry system and (b) said current conditions associated with said route segment are uploaded to said remote database to create historical route information for a plurality of route segments.

Ex. 1001, 27:41–49. Petitioner maps Koebler’s power management logic to the recited processor and argues that the power management logic “derives ‘information about the external environment of the vehicle.[’]” Pet. 30 (citing Ex. 1004, 3:63–67, 18:51–56, 23:62–24:5). Petitioner argues that “sensor data samples may be obtained from an optical sensor and tire pressure sensor and analyzed to determine drag and visibility.” *Id.* (emphasis omitted) (citing Ex. 1004, 8:14–18, 21:29–62; Ex. 1003 ¶ 107). Petitioner argues that the sensor data is stored in the record of historic route information and the vehicle location is detected via GPS and used to identify the route segment. *Id.* at 31–33 (citing Ex. 1004, 3:41–67, 7:64–8:1, 8:41–67, 17:6–10, 17:50–19:36, 21:29–40, 23:40–57, 23:62–24:24, Fig. 5, 10, 11). Petitioner argues that the stored data is uploaded to a remote database to create the historical route information for a plurality of route segments. *Id.* at 35 (citing Ex. 1004, 8:19–24, 16:66–17:17, 18:51–56, 21:11–18, 22:11–18, 23:62–24:5, Fig. 5; Ex. 1003 ¶ 114).

Koebler discloses polling sensors in real time to detect external environmental information. Ex. 1004, 21:29–34. Such sensors include optical and tire pressure sensors. *Id.* at 21:31–57. Power management logic

coordinates operation of the power management device and controls the overall activity of the power management system. *Id.* at 20:30–39. “The power management system may also contribute to a database of information about route, road conditions, and the like, such as a database of historical route information.” *Id.* at 23:66–24:2.

Accordingly, for the foregoing reasons, Koebler supports Petitioner’s contentions.

e. The First Wherein Recitation

Claim 1 recites,

wherein the sensor data samples are received from at least one of an optical sensor, a position sensor, a speed sensor, a gyroscopic sensor, a revolutions-per-minute sensor, an accelerator pedal position sensor, a brake pedal position sensor, a battery state sensor, a tire pressure sensor, a proximity sensor, a weight sensor, an airflow sensor, and a gas flow sensor.

Ex. 1001, 27:50–56. Petitioner argues that Koebler’s power management device includes an optical sensor and a tire pressure sensor. Pet. 37 (citing Ex. 1004, 8:8–19, 19:61–65, 21:29–62).

Koebler discloses that the power management device includes a number of sensors, including optical and tire pressure sensors. Ex. 1004, 21:31–57.

Accordingly, for the foregoing reasons, Koebler supports Petitioner’s contentions.

f. The Second Wherein Recitation

Claim 1 recites,

wherein said current conditions comprise at least one of: drag, wind resistance, tire resistance, a location relative to a

destination, traffic patterns, an amount of light energy, a position of the sun, geographical information, an elevation of said vehicle, a grade of a road, a location of stoplights, a timing of stoplights, weather, a wind direction, a wind velocity, a temperature, air pressure, moisture, visibility, an amount of vibration, and traction.

Ex. 1001, 27:57–65. Petitioner argues that Koebler’s power management device determines a drag condition and a current visibility condition from sensor data samples. Pet. 38 (citing Ex. 1004, 8:8–19, 21:29–51).

Koebler discloses that the power management device can include optical sensors to determine visibility and tire pressure sensors to calculate drag force. Ex. 1004, 8:14–19, 21:31–56.

Accordingly, for the foregoing reasons, Koebler supports Petitioner’s contentions.

g. Conclusion

For the foregoing reasons, on this record, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claim 1 is anticipated by Koebler.

2. Dependent Claims 2–14

Claims 2–14 depend, directly or indirectly, from claim 1. Petitioner contends that Koebler discloses the recitations of these claims and supports these contentions with declaration testimony. Pet. 39–53 (citing Ex. 1003).

We determine that Petitioner’s contentions regarding these dependent claims are fully supported by the record. Accordingly, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 2–14 are anticipated by Koebler. *See In re NuVasive*, 841 F.3d 966,

974 (Fed. Cir. 2016) (“The Board, having found the only disputed limitations together in one reference, was not required to address undisputed matters.”); Paper 8, 9 (emphasizing that “arguments not raised in the response may be deemed waived”).

3. Independent Claim 15

Independent claim 15 contains similar recitations as claim 1. Specifically, claim 15 recites a vehicle having a power train and a drive train and including the components recited in claim 1. Ex. 1001, 28:45–29:13. Petitioner relies on its showing made for claim 1 and further argues that an ordinarily skilled artisan would understand that the vehicles disclosed by Koebler would include a power train and a drive train. Pet. 53–54 (citing Ex. 1004, 4:49–55, 6:21–25, 18:51–56, 23:62–24:5; Ex. 1003 ¶¶ 152–154).

The cited portions of Koebler support Petitioner’s contentions. Accordingly, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claim 15 is anticipated by Koebler.

4. Independent Claim 16

Independent claim 16 contains similar recitations as claim 1. Specifically, claim 16 recites a method performed by a processor for creating a database of route conditions comprising: monitoring sensors to generate sensor data, storing the sensor data and telemetry data, analyzing the sensor data to determine current conditions, associating the current conditions with a route segment, and uploading the current conditions associated with the route segment to a remote database to create historical route information. Ex. 1001, 29:14–30:22. Petitioner relies on its showing made for claim 1. Pet. 53–56 (citing Ex. 1004, 4:49–55, 6:21–25, 8:8–19,

17:3–17, 18:51–56, 19:52–54, 19:61–65, 19:47–20:6, 21:29–51, 23:62–24:5; Ex. 1003 ¶¶ 152–161).

The cited portions of Koebler support Petitioner’s contentions. Accordingly, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claim 16 is anticipated by Koebler.

D. Asserted Obviousness Based on Koebler

Petitioner argues that claims 1–16 would have been obvious in view of Koebler. Pet. 23–56. In support of its showing, Petitioner relies upon the Morellas Declaration. *Id.* (citing Ex. 1003). Patent Owner does not challenge Petitioner’s contentions, arguing only that Koebler is not prior art with respect to the ’616 patent. *See generally* PO Resp. We have reviewed the parties’ briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has shown, by a preponderance of the evidence, that these claims would have been obvious in view of Koebler.

Petitioner relies on Koebler as in the anticipation challenge discussed in § III.C above, and further provides additional arguments that it would have been obvious to use a centralized server to calculate optimized speeds (Pet. 27–28 (citing Ex. 1004, 26:14–37; Ex. 1003 ¶ 102)), to receive and store sensor data in memory for each route segment (*id.* at 29–30 (citing Ex. 1004, 10:15–17, 17:6–17, 18:51–56, 21:29–61, 23:62–24:5; Ex. 1003 ¶ 106)), to store current conditions in memory (*id.* at 32 (citing Ex. 1004, 8:14–18, 16:66–17:17, 18:51–56, 21:29–51, 22:8–19, 23:62–24:5; Ex. 1003 ¶¶ 109–110)), and to store historical route information in a remote database (*id.* at 35–36 (citing Ex. 1004, 16:66–17:6, 26:22–37)).

The cited portions of Koebler support Petitioner's contentions. For example, Koebler discloses calculating optimized segment speeds based on energy usage information obtained from multiple cars traveling overlapping segments in a centralized server and using this information in the power optimization calculation. Ex. 1004, 26:22–34. Dr. Morellas testifies that it would have been obvious to an ordinarily skilled artisan to use a centralized server to store such information. Ex. 1003 ¶ 102.

Accordingly, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–16 would have been obvious in view of Koebler.

E. Asserted Obviousness Based on Koebler, Kabel, Lagerstedt, Okano, Kirkwood, Breed

Petitioner argues that claims 1–16 would have been obvious in view of Koebler, Kabel, Lagerstedt, Okano, Kirkwood, and Breed. Pet. 62–78. In support of its showing, Petitioner relies upon the Morellas Declaration. *Id.* (citing Ex. 1003). Patent Owner does not challenge Petitioner's contentions, arguing only that Koebler is not prior art with respect to the '616 patent. *See generally* PO Resp. We have reviewed the parties' briefs and the evidence of record and determine that, for the reasons explained below, Petitioner has shown, by a preponderance of the evidence, that these claims would have been obvious in view of the combination of Koebler, Lagerstedt, Okano, Kirkwood, and Breed.

Petitioner relies on Koebler as in the anticipation challenge discussed in § III.C above, and further provides additional arguments that it would have been obvious to determine current conditions based on the teachings of Kabel, Lagerstedt, Okano, Kirkwood, and Breed. Pet. 70–78. Specifically,

Petitioner argues that it would have been obvious to incorporate into Koebler's system: Kabel's teaching of determining temperature, weather, wind direction, wind velocity, air pressure, and moisture; Okano's teaching of determining an amount of vibration; Kirkwood's teaching of determining traction; and Breed's teaching of determining location and timing of stoplights. *Id.* at 74–76. Petitioner advances arguments asserting why an ordinarily skilled artisan would have been motivated to so modify Koebler's system. *Id.* at 62–70.

The cited portions of Kabel, Lagerstedt, Okano, Kirkwood, and Breed support Petitioner's contentions. For example, Kabel discloses a GPS-based weather interface service loaded and processed on a vehicle navigation system that acquires real-time weather information, such as wind speed, wind direction, rain, hail, snow, and barometric pressure, for the vehicle's route. Ex. 1010, 4:4–39. Dr. Morellas testifies that it would have been obvious to an ordinarily skilled artisan to include Kabel's weather interface service in Koebler's system because "moisture information was known to impact aspects of vehicle operation relating to fuel efficiency." Ex. 1003 ¶ 175. We are persuaded by Patent Owner's uncontested arguments and Dr. Morellas's uncontested testimony.

Accordingly, we are persuaded that Petitioner has shown, by a preponderance of the evidence, that claims 1–16 would have been obvious in view of the combination of Koebler, Lagerstedt, Okano, Kirkwood, and Breed.

IV. CONCLUSION⁵

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments, Petitioner has shown, by a preponderance of the evidence, that claims 1–16 of the '616 patent are unpatentable. In summary,

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–16	102	Koebler	1–16	
1–16	103	Koebler	1–16	
1–16	103	Koebler, Kabel, Lagerstedt, Okano, Kirkwood, Breed	1–16	
Overall Outcome			1–16	

V. ORDER

Accordingly, it is

⁵ 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).

ORDERED that claims 1–16 of the '616 patent have been shown to be unpatentable; and

FURTHER ORDERED that, because this is a final written decision, 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.

IPR2024-00630
Patent 10,850,616 B2

For PETITIONER:

W. Karl Renner
Roberto Devoto
Ryan Chowdhury
Patrick Darno
FISH & RICHARDSON P.C.
axf-ptab@fr.com
devoto@fr.com
rchowdhury@fr.com
darno@fr.com

Ashraf Fawzy
TESLA, INC.
afawzy@tesla.com

For PATENT OWNER:

Bas de Blank
K. Patrick Herman
ORRICK, HERRINGTON & SUTCLIFFE LLP
M2BPTABDocket@orrick.com
P52PTABDocket@orrick.com