

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

iQAR, INC. F/K/A INVENTLY AUTOMOTIVE, INC.,
Patent Owner

Case IPR2024-00630
Patent 10,850,616

PATENT OWNER'S RESPONSE

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LISTING OF EXHIBITS

Exhibit	Description
Ex. 2001	Declaration of Dr. David M. Bevly
Ex. 2002	U.S. Pub. 2005/0065711 A1 (“Dahlgren”)
Ex. 2003	U.S. Patent No. 7,363,138 (“Scelers”)
Ex. 2004	U.S. Pub. 2008/0004783 A1 (“Mizon”)
Ex. 2005	Declaration of Dr. Vassilios Morellas from the <i>Ex Parte</i> Reexamination of U.S. Patent No. 10,850,616
Ex. 2006	U.S. Patent No. 4,595,866 (“Fukatsu”)
Ex. 2007	U.S. Patent No. 5,898,183 (“Teder”)
Ex. 2008	U.S. Patent No. 6,376,824 (“Michenfelder”)
Ex. 2009	U.S. Patent No. 12,104,981 (“Ziehl”)
Ex. 2010	Mukherjee, “Effect of Pavement Conditions on Rolling Resistance,” American Journal of Engineering Research, Vol. 3, Issue 7, pp. 141-148 (2014)
Ex. 2011	Jackson et al., “Synthesis of the Effect of Pavement Properties on Tire Rolling Resistance,” NCAT Report 11-05 (Aug. 2011)
Ex. 2012	U.S. Patent No. 4,131,834 (“Blaszkowski”)
Ex. 2013	U.S. Patent No. 4,652,745 (“Zanardelli”)
Ex. 2014	Excerpts from Mavrigian, M. (1998) <i>Brake System: OEM & Racing brake technology</i> .
Ex. 2015	U.S. Patent No. 6,741,926 (“Zhao”)
Ex. 2016	U.S. Patent Application Publication No. 2004/0225434 (“Gotfried”)
Ex. 2017	U.S. Patent No. 6,405,132 (“Breed’132”)

Ex. 2018	U.S. Patent Application Publication No. 2002/0188392 (“Breed’392)
Ex. 2019	U.S. Patent No. 5,710,565 (“Shirai”)
Ex. 2020	U.S. Patent 6,596,978 (“Hochstein”)
Ex. 2021	U.S. Patent Application Publication No. 2004/0016870 (“Pawlicki”)
Ex. 2022	Omitted
Ex. 2023	U.S. Patent No. 4,907,154 (“Yasuda”)
Ex. 2024	Omitted
Ex. 2025	Omitted
Ex. 2026	U.S. Patent No. 3,983,746 (“Phillips”)
Ex. 2027	U.S. Patent Application Publication No. 2005/0080543 (“Lu”)
Ex. 2028	Omitted
Ex. 2029	WIPO Application No. WO 2008/138067 (“Rozyn”)
Ex. 2030	U.S. Patent No. 4,827,416 (“Kawagoe”)
Ex. 2031	Transcript of December 13, 2024 Deposition of Dr. Vassilios Morellas.

Patent Owner iQar, Inc. submits this response to Tesla, Inc.’s Petition for *Inter Partes* Review (Paper 1, the “Petition”) of U.S. Patent No. 10,850,616 (“the ’616 Patent”).

I. INTRODUCTION

The ’616 Patent is a straight line continuation from – and claims priority to – U.S. Patent No. 8,712,650 (“Koebler650”).¹ Petitioner presents two invalidity Grounds, but both are based on Koebler650. Thus, this proceeding raises a single narrow question. Did Petitioner prove that the ’616 Patent is not entitled to the benefit of Koebler650’s filing date? If not – and the evidence proves they failed – then the challenged claims must be confirmed.

Petitioner’s entire argument is premised on its mistaken belief that Koebler650 does not provide adequate written description support for certain “Enumerated Conditions” described in the challenged claims. Specifically, the claims describe determining one or more of 21 different Enumerated Conditions

¹ Koebler650 issued from U.S. Application No. 13/066,189 (the “’189 application”) and the ’616 Patent claims priority to the ’189 application. For simplicity, this Response will refer to the priority application as “Koebler650.”

based, at least in part, on data from one or more of 13 Enumerated Sensors.²

Petitioner concedes that there is written description support for each Enumerated Sensor and for 11 of the Enumerated Conditions but argues that Koebler650 fails to provide written description support for 10 of the Enumerated Conditions.

Petitioner is wrong. Its argument was premised on an overly narrow and legally wrong assumption that Koebler650 must use the same words as the claim or inherently disclose the claimed subject matter. For example, Petitioner provides a single paragraph to argue that Koebler650 fails to provide written description support for the traction Enumerated Condition because “[t]he word ‘traction’ is absent. Nor is there any disclosure for any synonym of ‘traction’” and “[t]here is also no inherent disclosure that data collected by the Enumerated Sensors are used to determined **traction**.” Petition at 18-19 (emphasis in original; citations omitted). Petitioner made similar arguments for the other two Enumerated Conditions it focused on. *Id.* at 15-17 (moisture) and 17-18 (vibration).

The Board properly rejected this approach. “For completeness, we note that we find Petitioner’s argument that Koebler650 does not provide verbatim or

² For the convenience of the Board, Patent Owner adopts the “Enumerated Sensor” and “Enumerated Condition” terms used in the Petition and Institution Decision. Institution Decision, 6.

synonymous disclosures of the words ‘moisture,’ ‘vibration,’ or ‘traction’ unavailing, as *there is no requirement for verbatim or synonymous disclosure* in the prior applications. Similarly, *there is no requirement for ‘inherent disclosure’* of the recited conditions.” Institution Dec. at 17 (citations omitted; emphasis added).

The Board specified that “the relevant inquiry is whether the application relied upon (here, Koebler) reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” Institution Dec. at 18. The Board recognized that in its initial response Patent Owner explained how each challenged Enumerated Condition “are determined by analyzing data samples from one of the Enumerated Sensors.” Institution Dec. at 16. The Board did not disagree with the analysis, but found that “Patent Owner does not provide citation to any supporting evidence of record. Notably, Patent Owner does not submit the testimony of an expert witness that explains how skilled artisans would conclude that Koebler discloses such an arrangement.” *Id.* at 17. With this Response, Patent Owner addresses the Board’s concern and has provided both contemporaneous evidence and expert testimony substantiating its analysis. In light of this evidence and applying the correct legal standard articulated by the Board, Petitioner fails to prove Koebler650 is not prior art and, thus, its Petition fails.

II. BACKGROUND

A. The '616 Patent's Invention

The '616 Patent describes devices, systems, and methods for creating a route database that can be used to effectively manage the power consumption of an automotive vehicle. Ex. 1001, Title, Abstract, 2:19-22.

Specifically, the '616 Patent notes that many parameters can impact the optimal power consumption of a vehicle. These include external factors (*e.g.*, forces and conditions that act on the vehicle), internal conditions (*e.g.*, the status of the vehicle and component parts), operator commands (*e.g.*, control commands from the operator preparing to or driving the vehicle), and operational parameters (*e.g.*, performance / historical capabilities of the vehicle based on make and model). *Id.*, 1:54-63.

Claim 1 is representative. That claim discloses an apparatus that includes an interface configured to receive sensor data samples from one or more of the Enumerated Sensors. A processor is configured to determine Enumerated Conditions based, at least in part, on the sensor data. Those current conditions are associated with particular route segments and uploaded to a remote in a database. *See, e.g.*, Claim 1. This database of route segments associated with relevant data can be used to determine the most energy efficient route to a desired location. *See, e.g., id.*, 18:55-58.

B. Claim Construction

1. *At Least One Of*

The claims require sensor data samples received from “at least one of” the Enumerated Sensors and determining current conditions that includes “at least one of” 21 Enumerated Conditions. *See, e.g.*, Claim 1. In its Petition, Petitioner offered two alternative constructions for “at least one of.” As Petitioner argued, “under a *conjunctive read* of the ***at least one...and*** phrases, the relevant limitations would require all of the recited elements (e.g., thirteen sensors, twenty-one current conditions). Under a *disjunctive read*, the limitations would only require one of the recited elements.” Petition at 8 (original emphasis)

The Board correctly interpreted the “at least one of” limitations in the disjunctive (as opposed to the conjunctive). Institution Decision, 10-12. In other words, the claims “require only one of the enumerated elements or parameters but allowing for more than one of the enumerated elements or parameters.” *Id.*, 12. As the Board correctly noted, Petitioner’s “conjunctive” construction misapplies the holding of *SuperGuide*, and essentially reads out the language “at least one of,” which is improper. *Id.*, 10-12 (citing *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 888 (Fed. Cir. 2004)). The Board should adopt this disjunctive construction for purposes of this proceeding.

2. *The Wherein Clauses*

Representative independent Claim 1 recites, in relevant part, “wherein” the sensor data samples are received from one of 13 Enumerated Sensors and “wherein” the determined current conditions are one of 21 Enumerated Conditions. Ex. 1001 at claim 1. Consistent with the “at least one of” construction, the Board noted that this language “only requires one of the Enumerated Sensors to be present and one of the Enumerated Current Conditions to be determined.” Institution Decision, 14. The Board further noted that “claim 1... allows for the presence of additional non-recited sensors.” *Id.* Accordingly, the claims do not exclude implementations in which the system determines one Enumerated Current Conditions by analyzing data from one Enumerated sensor *and* other enumerated or non-enumerated sensors. *See id.* For purposes of this proceeding, the Board should adopt this construction.

At times, the Petition appears to assume or argue that a current condition must be determined using **only** sensor data samples from the Enumerated Sensors without considering any other information or analysis. That is inconsistent with the plain language of the claims and the Board’s determination that the claims “allow[] for the presence of non-recited sensors.” Institution Decision, 14. A POSITA would not have interpreted the claims to exclude other information from the analysis. The claims require that the processor be configured to “analyze said

sensor data samples stored in memory to determine current conditions,” but it does not preclude the processor from consider other information along with the data samples as part of that analysis. Ex. 2001, ¶¶46-48.

C. The Petition

The Petition asserts two Grounds, both of which rely in whole or relevant part on Koebler650:

<u>Ground</u>	<u>Claim(s)</u>	<u>References</u>
1	1-16	§ 102 / 103: Koebler650
2	1-16	§ 103: Koebler650, Kabel, Lagerstedt, Okano, Kirkwood, Breed

The '616 Patent claims priority to Koebler650 through a direct chain of continuation applications. Ex. 1001. The specification for Koebler650 is substantially identical to the specification of the '616 Patent. Koebler650 is the primary reference for both Grounds and if Koebler650 is not prior art then both Grounds fail. *See, e.g.*, Petition at 23-56 (Koebler650 entire basis for Ground 1) and at 70-78 (Koebler650 entire basis for certain limitations for Ground 2).

Petitioner concedes there is written description support for the Enumerated Sensors and for 11 of the 21 Enumerated Conditions. Petition at 10-11. Petitioner argues that there is no written description support for 10 of the Enumerated Conditions:

Supported Current Conditions	Allegedly Unsupported Current Conditions
drag	location of stoplights
wind resistance	timing of stoplights
tire resistance	weather
location relative to a destination	wind direction
traffic patterns	wind velocity
amount of light energy	temperature
position of the sun	air pressure
geographical information	moisture
elevation of said vehicle	amount of vibration
grade of a road	traction
visibility	

Of these 10, however, Petitioner and the Board focus on three Enumerated Conditions – moisture, vibration, and traction. Institution Dec. at 16 (“Petitioner focuses its arguments on three of the current conditions . . . and we likewise focus our analysis on these three current conditions); Petition at 15-19. Petitioner’s argument fails because the specification of Koebler650 – like the specification of the ’616 Patent – satisfies the written description requirement for each of the allegedly unsupported conditions.

III. ARGUMENT

The '616 Patent is entitled to the priority date of Koebler650. Accordingly, Koebler650 is not prior art and all of Petitioner's argument fail.

Petitioner bears the burden to prove the '616 Patent is not entitled to the Koebler650 priority date. As a matter of law, a patent claim's effective filing date is the filing date of an earlier filed patent application if: (1) the earlier filed patent application shares at least one common inventor with the later filed patent application; (2) the patent contains a specific reference to the earlier filed application; (3) the later filed application is filed before the patenting or abandonment of the first application or an application similarly entitled to the benefit of the filing date of the first application; and (4) the claim is described and enabled³ under § 112 by the earlier filed application. 35 U.S.C. § 120 (pre-AIA).

³ The Petition does not dispute enablement or discuss any of the factors relevant to an enablement analysis (*e.g.*, the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples, the nature of the invention, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art, and the breadth of the claims). *See, e.g., In re Wands*, 858 F.2d 731, 737 (Fed.Cir.1988).

Koebler650 satisfies each of these requirements. Thus, Petitioner has failed to meet their burden to prove Koebler650 is prior art and all Grounds fail.

A. There Is No Dispute That Koebler650 Satisfies the First Three Elements Required for The '616 Patent To Claim Priority.

The Petition does not, and cannot, dispute that the first three conditions of 35 U.S.C. § 120 are met. *First*, the earlier filed priority applications (Koebler650 and the other continuations) have the same inventors as the later filed application (the '616 Patent) – Martin Koebler, Jason Harper, Stephen Brown, and Nicole Goldstein. Ex. 1005, 1; Ex. 1006, 1; Ex, 1007, 1; Ex, 1004, 1.

Second, the '616 Patent, and each intervening priority document, includes a specific reference to earlier filed applications. In particular, the '616 Patent includes a specific reference to the application of the '977 patent, the application of the '624 patent, the application of the '162 patent, and the application of Koebler650. Ex. 1001, 1. The '977 patent includes a specific reference to the application of the '624 patent, the application of the '162 patent, and the application of Koebler650. Ex. 1005, 1. The '624 patent includes a specific reference to the application of the '162 patent and the application of Koebler650. Ex. 1006, 1. And the '162 patent includes a specific reference to the application of Koebler650. Ex. 1007, 1.

Third, the '616 Patent and each priority application was co-pending with at least one earlier priority application. The '616 Patent was filed on September 1, 2017, during the pendency of the '977 patent. Ex. 1001, 1. The '977 patent was filed on June 19, 2017, during the pendency of the '624 patent. Ex. 1005, 1. The '624 patent was filed December 11, 2014, during the pendency of the '162 patent. Ex. 1006, 1. And the '162 patent was filed on March 12, 2014, during the pendency of Koebler650. Ex. 1007, 1.

B. Legal Standard for Written Description

Thus, the only argument raised here is, **fourth**, whether the challenged claims are described by Koebler650. They are, so Koebler650 is not prior art to the '616 Patent.

The Petition incorrectly argued that to provide written description support a specification must refer *verbatim* or provide “inherent” support for each claim limitation. Petition at 15-19. In its Institution Decision, the Board properly rejected Petitioner’s overly restrictive standard. “For completeness, we note that we find Petitioner’s arguments that Koebler does not provide verbatim or synonymous disclosure of the words ‘moisture,’ ‘vibration,’ or ‘traction’ unavailing, as there is no requirement for verbatim or synonymous disclosure in the prior application. Similarly, there is no requirement for ‘inherent disclosure’ of the recited current conditions.” Institution Dec. at 17 (citations omitted); *see also*

PowerOasis, Inc. v. T-Mobile USA, Inc., 522 F.3d 1299, 1306 (Fed. Cir. 2008) (“a prior application need not contain precisely the same words as are found in the asserted claims”); *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.”).

As the Board recognized, courts determining whether the written description requirement is met 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.” Institution Decision at 8 (quoting *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.*

As the Board held, “the relevant inquiry is whether the application relied upon (here, Koebler) reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.*

C. **A POSITA Would Have Understood Koebler650’s Broad and Non-Limiting Disclosure of Example Sensors and Conditions To Encompass More Than The Listed Examples.**

Petitioner proposed – and the Board adopted – a high level of experience and skill where a POSITA “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.” Institution Decision at 25 *citing* Pet. at 15 n.12 and Ex. 1003, ¶ 28. Such a POSITA would have understood the invention extended beyond the examples specifically listed in the specification and encompasses the challenged claims.

Koebler650 expressly states the invention encompasses any conditions and sensors. Koebler650 at 21:29-62 (“Any appropriate sensors, detectors or data inputs may be used with the power management devices and systems disclosed herein.”). Koebler650 then provides numerous ***non-exhaustive*** examples of such sensors and conditions that the invention may use and incorporate. *See, e.g., id.*, 8:12-19 (listing “optical sensors” and “weather sensors”); *id.* at 8:63 (“weight sensors”); *id.* at 19:62-65 (listing “environmental sensors” and “operational status

detectors”); *id.* at 21:29-62 (listing optical sensors, mechanical sensors, electrical sensors, magnetic sensors, position (GPS) sensors, speedometer, gyroscope, RPM sensor, accelerator and brake pedal sensors, weather sensors, battery sensors, tire pressure sensors, weight sensors, airflow sensors, gas flow sensors, etc.); *id.* at 4:1-18 (listing conditions, including speed, motor speed, vehicle orientation, RPM of motor, wheel rotations per minute, battery state, battery voltage, temperature of battery, tire pressure, drag force, vehicle weight, weight of driver, etc.); *id.* at 8:12-24 (listing as conditions visibility, distance from nearby vehicles, temperature, wind direction and velocity, air pressure, etc.); *id.* at 21:29-62 (listing as conditions location, elevation, terrain, destination, speed, motor speed, orientation, slope/grade, pressure applied and/or angle of petals, rain, sun, snow, etc.).

Koebler650 expressly does **not** limit the invention to such examples and, instead, discloses that the inventors knew their invention may be applied using various types of sensors and input information. *See, e.g., id.*, 8:65-9:4 (“The examples of operational status information inputs are only intended to illustrate the kinds of operation status information that may be used by the power management devices and systems described herein. Any appropriate information about the operational state of the vehicle may be provided to the power management device or used by the power management device.”).

A POSITA – particularly with the level of education and experience Petitioner and the Board adopted – would have understood from Koebler650 that the inventors were in possession of the claimed invention implemented with more sensors and conditions than those specifically listed *verbatim* in the specification. Ex. 2001, ¶¶64-67; *see ScriptPro LLC v. Innovation Assoc., Inc.* 833 F.3d 1336, 1341 (Fed. Cir. 2016) (confirming “a specification’s focus on one particular embodiment or purpose cannot limit the described invention where the specification expressly contemplates other embodiments or purposes.”).

At a minimum, a POSITA would have understood the ’616 Patent/Koeber650 inventors were in possession of the invention when implemented with other commonly measured conditions. *Id.* This would include at least (1) determining moisture using data from optical sensors, (2) determining traction using data from wheel speed sensors, and (3) determining the amount of vibrations using data from inertial measurement units (comprising gyroscopes and accelerometers) or position sensors (e.g., linear potentiometers and displacement sensors). Ex. 2001, ¶68; *see also* § III.E-G, *infra*. As of the priority date of Koebler650, measuring each of these conditions in a vehicle using the stated sensors was well known and common. Ex. 2001, ¶68. Given Koebler650’s broad and expressly non-limiting disclosure and the high level of ordinary skill in the art, that is sufficient written description for these conditions.

D. Koebler650 Provides Written Description Support For The Enumerated Weather and Traffic Related Conditions: Weather / Wind Direction / Wind Velocity / Temperature /Air Pressure / Location of Stop Lights / Timing of Stop Lights.

The Petition argues that Koebler650 does not adequately describe several weather-related and traffic-related “current conditions,” including weather, wind direction, wind velocity, temperature, air pressure, location of stop lights, and timing of stop lights. Petition, 19-20. As the Board noted in the Institution Decision, however, Petitioner does not “focus” on these conditions and argues them only in passing. *Id.*; Ex. 1003, ¶¶90-91; Institution Decision at 16.

Petitioner does not “focus” on these allegedly missing conditions because the Koebler650 specification expressly discloses each of them. Koebler650, 8:12-19 (“The power management device may include or may be connected to sensors or other inputs to directly determine some of the information inputs [current conditions]. For example... weather sensors (e.g., temperature, wind direction and velocity, air pressure, etc.).”); *see also id.* at 7:45-62 (“Examples of environmental information inputs include, but are not limited to... the location of stoplights, the timing of stoplights..., the weather around the vehicle, present wind direction..., present wind velocity..., current temperature..., current air pressure”); *id.* at 21:47-48 (listing weather conditions, including “rain, sun, snow, etc.”). Accordingly, these current conditions are disclosed by Koebler650.

Koebler650 also expressly discloses that Enumerated Sensors including, for example, positions sensors and optical sensors provide data used to determine these conditions. *Id.* at 8:12-19, 21:31-33; Ex. 2001, ¶¶76-87. Koebler650 discloses, for example, using data from a position sensor to determine weather information and traffic information. Ex. 2001, ¶¶76-85. Specifically, Koebler650 discloses that the power management system may determine a vehicle's position using a position sensor as part of a GPS system. *See, e.g.*, Ex. 1004 (Koebler650) at 21:29-37 (“Sensors may be monitored (e.g., polled) in real-time, as described above. For example, polling logic may coordinate continuous polling of Global Positioning System (GPS) information”). By analyzing that sensor information, the power management system can determine local weather conditions and traffic conditions from external services. *See, e.g.*, Ex. 1004 (Koebler650) at 8:19-24 (“In some variations, the power management system receives some of this information by telemetry with off-board information sources such as databases and the like. For example, the power management system may communicate with a weather service, a map service, a traffic service, etc.”). Accordingly, a POSITA would have understood the inventors knew how to analyze data from a position sensor to determine weather information and traffic conditions. Ex. 2001, ¶¶76-85.

A POSITA would have further understood the claimed “data from said telemetry systems” (weather and traffic) would include the conditions at issue here,

i.e., weather, temperature, wind direction, wind velocity, air pressure, location of stoplights, and timing of stoplights. Ex. 2001, ¶¶80; *see also, e.g.*, Ex. 1010, 3:39-44 (explaining that “real-time weather information includes a variety of real-time weather characteristics” including “temperature,” “wind speed,” “wind direction,” “barometric pressure,” etc.); “rain,” “hail,” and “snow”), Fig 19 (showing provided “rain” and “snow” information); Ex. 1011, 6:24-31 (similarly noting that information about the “environment surrounding the vehicle” routinely includes “weather conditions” such as “temperature,” “wind force,” “wind velocity,” etc.); Ex. 1014, 9:23-34 (noting that location-based weather information includes “temperatures,” “barometric pressure,” “sun,” “rain,” “cloudy,” etc.); Ex. 2015 (Zhao Patent issuing from 2001 Application), 4:49-5:7 (noting that traffic databases may include “for each traffic light, the number of traffic light cycles until a car can pass through the intersection”), 6:32-56 (noting that traffic databases may include “for each light... the timing cycle (e.g., the number of seconds that the light is ‘green’ and number of seconds that it is ‘red’) and the number of cycles required for a typical driver to pass through the intersection.”); Ex. 2016 (Publication of Application filed in 2003) at [0027] (noting that navigational databases may contain “latitudinal and longitudinal coordinates for each [stoplight].”), [0019] (noting that navigation system may determine “the amount of time remaining before the [stoplight] changes the flow of traffic.”).

Koebler650 also discloses other sensors, such as optical sensors and weather sensors, that provide data that could be used to determine various weather and traffic conditions. A POSITA would have understood, for example, that optical sensors could be used to determine certain weather conditions (e.g., rain, snow, sun, cloudiness), and traffic-related conditions (e.g., location of stoplights, timing of stoplights). Ex. 2001, ¶¶86-87; Ex. 2018 (Publication of 2002 Patent Application) at [0045] (noting that an “environment sensor may be an optical or other image-obtaining sensor”); Ex. 2019 (Patent issued from 1996 Application) at 31:22-25 (noting that a “weather sensor” can be “a sensor which optically detects the amount of particles floating in the air”); Ex. 2020 (Patent issued from 2001 application) at 1:43-45 (describing prior art and noting that optical sensors are one of the “most common rain or moisture detectors.”); Ex. 2017 (Patent issued from 2000 application) at 70:45-50 (noting that “Cameras are used generally for interrogating environment nearby the host vehicle for... visual information”), 69:62-64 (noting that sensors can indicate “that an approaching stoplight is red, yellow or green”); Ex. 2021 (publication of 2003 application) at [0019] (disclosing that camera system can be used to detect stop lights and warn driver).

In short, Koebler650 expressly discloses each of the weather-related and traffic-related Enumerated Conditions and sensors that provide data that can be used to determine them. Accordingly, a POSTIA would have understood that the

inventors of Koebler650 were in possession of the invention, including implementations that determined these weather-related and traffic-related conditions using data from Enumerated Sensors.

As the Board noted, the Petition “focuses” on three conditions – moisture, traction and vibration. Institution Decision, 16. Koebler650 adequately describes each of these current conditions and Enumerated Sensors that can be used to determine them. *See* Petition, 18-19; Ex. 1003, ¶¶87-89.

E. Moisture

A POSITA would have understood from Koebler650 that the inventors were in possession of determining the “moisture” Enumerated Condition using, at least in part, data from the Enumerated Sensors. *See* Ex. 2001, ¶¶88-101.

1. *Koebler650 Adequately Discloses Determining Moisture Conditions.*

A POSITA would have understood the Koebler650 inventors were in possession of the claimed invention, including determining moisture conditions such as rain.

The Board properly found there is no requirement that Koebler650 use *verbatim* the term “moisture” and, as noted above, Koebler650 broadly discloses the use of various known sensors to detect current conditions and provides an expressly non-exhaustive list of examples. *See* § II.C, *supra*; Koebler650 at 21:29-

62, 8:12-19, 19:62-65, 21:29-62, 4:1-18. Given this disclosure, a POSITA would have understood from Koebler650 that the inventors were in possession of the claimed invention, including implementations that involve determining common conditions (such as moisture from rain) using known sensors. *See* § III.C; Ex. 2001, ¶¶64-68.

At the time Koebler650 was filed, determining moisture conditions such as rain was well known and common for purposes of, for example, automatically triggering windshield wipers. *Id.*, ¶100; *see also, e.g.*, Ex. 2006, Abstract (1984 patent discussing detection of rain on windshields); Ex. 2007, Abstract (1999 patent discussing the same); Ex. 2008, 1:8-21 (2002 patent discussing prior art “optical rain sensor[s]” that control a “windshield wiper system”); Ex. 2012 (1978 patent discussing detection of rain on windshields); Ex. 2013 (1987 patent assigned to Ford Motor company discussing the same); Ex. 2020 (Patent issued from 2001 application) at 1:23-26 (noting that “[t]he sensing of rain or moisture on the windshield of a vehicle for automatically controlling wiping systems has become a popular driving convenience item in the last several years” and discussing image sensors). Accordingly, a POSITA would have understood that Koebler650 contains adequate written description support for determining moisture.

Even if more a more specific disclosure were required – it is not – Koebler650 specifically discloses detecting moisture conditions such as rain.

Specifically, Koebler650 discloses determining “the weather around the vehicle” and specifically mentions “rain.” Ex. 1004 at 21:47-48 (disclosing the use of “*e.g.*, wind direction and velocity, ***rain***, sun, snow, etc.”) (emphasis added). A POSITA would have understood that precipitation conditions like rain are moisture conditions. Ex. 2001, ¶¶92-93; *see also* Ex. 2020 (Patent issued from 2001 application) at 1:50-51 (describing various “moisture variants” including “water film, drops, mist, fog, snow, ice, etc.”).

In arguing that Koebler650 does not disclose determining moisture conditions, Petitioner makes two mistakes. ***First***, the Petition ignores moisture conditions other than humidity. Indeed, during his deposition, Petitioner’s expert admitted that he limited his analysis to “atmospheric moisture” (*i.e.*, humidity) and that he did not consider any other types of moisture conditions (*e.g.*, moisture on a windshield from rain). Ex. 2031 (Depo. Tr.) at 27:8-28:23. As noted above, however, rain is a known moisture conditions and Koebler650 provides written description support for this condition. Ex. 2001, ¶¶92-93; *see also* Ex. 2020 (Patent issued from 2001 application) at 1:50-51 (describing various “moisture variants”). ***Second***, the Petition takes an overly-narrow and restrictive view of the written description requirement. Petitioner essentially argues that Koebler650 must recite the condition verbatim or “inherently.” Petition at 15-17. As the

Board has already determined, that is not a correct interpretation of the written description requirement. *See* Section III.B, *supra*.

Accordingly, Koebler650 contains adequate support for determining moisture conditions.

2. *Koebler650 Adequately Discloses Determining Moisture Conditions Using Data From An Enumerated Sensor*

Koebler650 also discloses using Enumerated Sensor data to determine moisture conditions. As noted above, for example, Koebler650 discloses that the claimed system can determine weather conditions using an Enumerated position sensor by (a) determining the vehicle's location and (b) importing local weather information from a weather service. *See* § III.D, *supra*; Ex. 2001, ¶¶93-96, 76-84; *see also, e.g.*, Koebler650 at 21:29-37, *id.* at 8:19-24 (“In some variations, the power management system receives some of this information by telemetry with off-board information sources such as databases and the like. For example, the power management system may communicate with a weather service, a map service, a traffic service, etc.”). Accordingly, a POSITA would have understood the inventors knew how to obtain common weather information by analyzing information from an Enumerated position sensor. Ex. 2001, ¶¶93-96, 76-84. Moreover, a POSITA would have also understood that such weather information included moisture conditions, such as rain, snow, humidity, etc. *Id.*, ¶¶94; *see*

also, e.g., Ex. 1010, 3:39-44 (explaining “real-time weather information includes a variety of real-time weather characteristics” including “rain,” “hail,” and “snow”), Fig 19 (showing provided “rain” and “snow” information); Ex. 1011, 6:24-31 (similarly noting that information about the “environment surrounding the vehicle” routinely includes “weather conditions” such as “whether it is raining or not” and “humidity”); Ex. 1014, 9:23-34 (noting that location-based weather information includes information such as “rain, showers, drizzle,” and “humidity”).

As another example, Koebler650 specifically discloses the use of Enumerated “optical sensors.” Ex. 2001, ¶¶97-99; Koebler650 at 21:31-33 (disclosing “sensors for detecting external environmental information may be used (*e.g.*, optical, mechanical, electrical, or magnetic sensors).”). At the time Koebler650 was filed, it was well-known and common that such Enumerated sensors could be used to detect moisture (*e.g.*, rain) in order to, for example, automatically trigger windshield wipers. Ex. 2001, ¶¶100.; *see also, e.g.*, Ex. 2006, Abstract (1984 patent referencing the use of optical emitters and detectors to detect rain and control vehicle windshield wipers); Ex. 2007, 1:5-4:4 (discussing the use of “optical moisture sensor[s]” in detail) Ex. 2008, 1:8-21 (discussing prior art “optical rain sensor[s]” that control a “windshield wiper system”) Ex. 2012 (1978 patent discussing use of optical sensors to detect moisture on vehicles); Ex. 2013 (1987 patent assigned to Ford Motor company discussing the same); Ex.

2020 (Patent issued from 2001 application) at 1:23-26 (noting that “[t]he sensing of rain or moisture on the windshield of a vehicle for automatically controlling wiping systems has become a popular driving convenience item in the last several years” and discussing image sensors).

Given Koebler650’s broad disclosure of conditions and sensors (including the numerous examples and non-limiting language) and the wide use of Enumerated Sensors to determine moisture, a POSITA would have concluded that the inventors were in possession of the invention implemented using position sensors and/or optical sensors to determine moisture. Accordingly, contrary to Petitioner’s arguments, Koebler650 provide written description support for detecting moisture as a current condition.

F. Traction

The Petition also argues that Koebler650 does not adequately disclose the “traction” Enumerated Condition. Petition, 18-19; Ex. 1003, ¶¶87-89. A POSITA, however, would have understood from the Koebler650 disclosure that the inventors were possession of the invention, including implementations that determine vehicle traction. Ex. 2001, ¶¶125-134.

1. *Koebler650 Adequately Discloses Determining Traction Conditions.*

Koebler650 discloses determining traction conditions. As noted above, Koebler650 broadly discloses the use of known sensors to determine current conditions, provides numerous non-exhaustive examples of such sensors and conditions, and expressly states the invention is not limited to those non-exhaustive examples. See § III.D, *supra*; Koebler650 at 21:29-62, 8:12-19, 19:62-65, 21:29-62, 4:1-18; 8:65-9:4.

Given this broad, non-limiting disclosure, a POSITA would have understood the Koebler650 inventors were in possession of the claimed “traction” Enumerated Condition. Indeed, it was well-known and common to measure traction in vehicles long before Koebler650 in, for example, traction control systems and anti-lock braking systems.⁴ Ex. 2001, ¶131; Ex. 2014 (Brake Systems: OEM racing and Brake Technology, 1998) at 86-87 (noting that “[a]ll ABS systems” use wheel speed sensors to detect loss of traction); Ex. 1015, 8:24-42 (explaining that traction control systems use data from “wheel speed sensor[s]” to detect loss of wheel traction and the need for activating the control system); Ex. 2003, 1:12-24, 2:17-36

⁴By measuring the rotational speeds of the vehicle’s wheels relative to each other, the system could determine when a particular tire started to lose traction. Ex. 2001, ¶132.

(noting that in known systems, “wheel speeds may be monitored to detect wheel spin” for purposes of determining if the vehicle’s “driven wheels... lose... grip on the road” such that “traction control” is required); Ex. 2004, ¶¶ [0002]-[0004], [0042] (explaining that “wheel speed differences” were routinely used to detect “when traction is lost at the driven wheels”). Given the wide use of these systems and the broad and expressly non-limiting disclosure in Koebler650, a POSITA would have understood that Koebler650 contains adequate written description support for determining traction.

Even if a more specific disclosure were required – it is not – Koebler650 discloses determining traction conditions. Specifically, a POSITA would have understood that “traction” is a measure of the amount of power that is transferred from the engine to the road, which is a function of the friction between the vehicle’s drive wheels and the road surface. Ex. 2001, ¶129. Thus, a vehicle’s wheels have “traction” when wheel rotation acts to propel the vehicle along the roadway. *Id.* 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. *Id.*

Koebler650 explains that its system is able to make various determinations regarding the operational status of vehicle. *See, e.g.*, Koebler650, 4:1-18, 6:7-11, 6:58-7:4, 8:32-40. This vehicle “operational status” information can include, for

example, information about the vehicle's "tires." *Id.*, 8:32-40. The system can also determine "[e]xternal environment information" including "forces acting on the vehicle" like "tire resistance." *Id.* 7:36-38. And Koebler650 notes that its system determines information such as "rolling resistance of the vehicle." *Id.*, 7:1-4; *see also id.*, 15:51-55 (noting that energy calculations can be performed using "rolling resistance[,] "acceleration" and other information).

By referencing the determination of frictional interactions between a vehicle's tires and the roadway – including the determination of "tire resistance" and "rolling resistance" – a POSITA would have understood Koebler650 to describe the determination of "traction." Ex. 2001, ¶130. When "tire resistance" or "rolling resistance" is zero or low, the vehicle has lost traction. When "tire resistance" and "rolling resistance" are not zero, they vehicle has traction. Ex. 2001, ¶130; *see also, e.g.*, Ex. 2002, ¶ [0052] (noting that "traction control systems" "detect events relating to the frictional interaction between the tires and the roadway").

In arguing that Koebler650 does not disclose determining traction conditions, Petitioner misapplies the law regarding written description and take an overly narrow and restrictive view requiring that Koebler650 must recite the condition *verbatim* or "inherently." Petition at 15-17. As the Board determined, that is not wrong as a matter of law. *See* § III.B, *supra*; Institution Decision at 17.

Moreover, Petitioner ignores the discussion of traction concepts discussed above. Given (i) the broad disclosures of Koebler650, (ii) the admittedly high level of ordinary skill in the art, and (iii) Koebler650's express references, Koebler650 contains written description for determining traction.

2. *Koebler650 Adequately Discloses Determining Traction Conditions Using Data From Enumerated Sensors.*

A POSITA would understand Koebler650 discloses using the Enumerated Sensors to determine traction conditions. Specifically, Koeber650 expressly discloses that the invention encompasses wheel speed sensors and, as noted above, it was well-known and common that such sensors were used to measure traction. Ex. 2001, ¶¶68, 131-133; Ex. 2014 (Brake Systems: OEM racing and Brake Technology, 1998) at 86-87; Ex. 1015, 8:24-42; Ex. 2003, 1:12-24, 2:17-36; Ex. 2004, ¶¶ [0002]-[0004], [0042], Koebler650, 21:29-62 (listing RPM sensors for measuring, "e.g., motor and wheel rotations per minute."); *see also id.* at 4:1-18 (noting that status information can include "RPM of the vehicle's motor" and "wheel rotations per minute."); 8:41-51 (referencing various "information inputs" such as "wheel rotations per minute," "tire pressure" and engine RPM). A POSITA would have thus understood that using those disclosed wheel speed sensors to measure traction as part of the claimed invention was within the inventors' possession. Ex. 2001, ¶¶131-134; *see also* Ex. 2031, 37:4-14, 39:18-24.

Accordingly, Koebler650 adequately discloses detecting traction conditions and sensors for detecting those conditions and satisfies the written description requirement for this limitation.

G. Amount of Vibration

A POSITA would have understood from Koebler650 that the inventors were in possession of the invention, including implementations that use data from Enumerated Sensors to determine the amount of vibrations. Ex. 2001, ¶¶102-121.

1. *Koebler650 Adequately Discloses Determining the Amount of Vibrations.*

Again, Koebler650 broadly discloses using sensor data to determine current conditions and provides numerous non-exhaustive examples. *See* § IIC, *supra*; Koebler650 at 21:29-62, 8:12-19, 19:62-65, 21:29-62, 4:1-18. Koebler650 expressly states the invention is not limited to those non-exhaustive examples. *See, e.g., id.*, 8:65-9:4.

Given this broad disclosure, a POSITA would have understood from Koebler650 that the inventors were in possession of the invention, including implementations that use data from the Enumerated Sensors to determine an amount of vibration. *See* § III.C; *ScriptPro*, 833 F.3d at 1341; Ex. 2001, ¶¶64-68, 105. Indeed, determining the amount of vibrations in a vehicle was well known and common long before Koebler650 for purposes of, for example, assessing the

condition of a road. *Id.*; *see also, e.g.*, Ex. 2023 (patent issued from a 1987 application), 1:11-23 (disclosing a vibration control apparatus for vehicle suspension, and noting that “conventional vibration control apparatuses include... a semiactive control apparatus for detecting a vibration state.”), 13:16-14:30 (disclosing system for detecting vibrations to determine a “road surface state”), 10:10-11 (noting that the system “discriminat[es] a smooth road from a rough road”); Ex. 2026 (patent issued from 1975 application), 1:21-32 (describing prior art systems for measuring “vibrations from the road surface” to determine road conditions); Ex. 2029, 6:4-6 (noting that “The system comprises one or more sensors of instruments for measuring movements of the vehicle. The movements are typically generated or excited by the vehicle travelling over, for example, and uneven surface 106 and may constitute a mechanical excitation such as a vibration of the vehicle.”); Ex. 2030 (patent issued from 1986 application) at 12:30-45 (“The road condition indicative signal includes high-frequency components representative of the vibration of the road wheels and low-frequency components representative of vehicle body vibrations”). Accordingly, a POSITA would have understood such measurements to be within the scope of the invention. Ex. 2001, ¶¶105-114.

Even if a more specific disclosure were needed – it is not – Koebler⁶⁵⁰ discloses that the system uses “terrain” and the “condition of a road” to assess

efficiency. *See, e.g.*, 7:45-62 (“Examples of environmental road inputs include... present road conditions”); *id.*, 3:41-67 (same); *id.*, 13:57 (discussing “the gradient or condition of a road”); Ex. 2001, ¶¶106-113. As noted above, a POSITA would have understood that the amount of vibrations in a vehicle is a proxy for determining the condition of a road and thus, would have understood that determining vibrations – which again was well known and common at the time – was part of the invention. Ex. 2001, ¶105; Ex. 2023, 13:16-14:30, 10:10-11; Ex. 2026 at 1:21-32; Ex. 2029, 6:4-6.

In arguing that Koebler650 does not disclose determining vibrations, Petitioner misapplies the law regarding written description. Specifically, as noted above, Petitioner takes an overly-restrictive view requiring that Koebler650 recite the condition verbatim or “inherently.” Petition at 15-17. As the Board has already determined, that is not a correct interpretation of the written description requirement. *See* § III.B, *supra*; Institution Decision at 17.

Accordingly, given (i) the broad and expressly non-limiting disclosures of Koebler650, (ii) the admittedly high level of ordinary skill in the art, and (iii) the specific disclosures in Koebler650 about the use of terrain and road conditions, a POSITA would have understood the inventors were in possession of the claimed invention, including implementations that determine vibration Enumerated Condition. Ex. 2001, ¶¶64-68, 105-114.

2. *Koebler650 Adequately Discloses Determining Amounts of Vibrations Using Data From Enumerated Sensors.*

Koebler650 discloses and claims Enumerated Sensors that can be used to detect vibrations. Ex. 2001, ¶¶116-122.

As one example, Koebler650 discloses and claims gyroscopic sensors. See Koebler650 at 21:42 (discussing the collection of “gyroscopic information”), claim 1. As of the filing date of Koebler650, it was well known that gyroscopic sensors could be used to determine certain types of vibrations for purposes of, for example, measuring road conditions. Specifically, it was common for automobiles at that time to include an “inertial measurement unit” (IMU) comprising gyroscopic sensors and accelerometers. Ex. 2001, ¶121; Ex. 2027 (publication of 2004 Application) at [0007] (in background, “Currently, inertial measurement units (IMUs) and various other sensors used in aerospace vehicle controls have been incorporated into automotive vehicles for inertial control.... An IMU sensor set includes gyros and three linear accelerometers.”); *see also* Ex. 1013, 11:30-32, 11:33-36 (similar). IMUs were used to determine various types of vibrations, including, for example, using accelerometers to determine linear vibrations, and using gyroscopic sensors to determine angular vibrations or pitch vibrations (also referred to as pitching or pitch oscillations). Ex. 2001, ¶122. IMUs were also

known to determine “heave,” which is a type of vibration determined using a combination of accelerometers and gyroscopic sensors. *Id.*

A POSITA would have understood, for example, that such gyroscopic Enumerated Sensors could be used to determine vibrations in order to measure road conditions. As of the filing date of Koebler650, it was known that accelerometers could be used to measure the conditions of relatively smooth roads characterized by minor vibrations. Ex. 2001, ¶123; Ex. 2026 (1976 Patent) at 1:31-42 (noting that accelerometer systems were “suitable primarily for smooth surfaces” but were not useful for uneven or unpaved roads). It was also known, however, that gyroscopes could be used for determining larger vibrations (*i.e.*, fluctuations in angular movement) such as those a car would experience when traveling rougher and bumpier route segments, *i.e.*, the types of route segments that would materially affect efficiency (e.g. unpaved roads, potholes, speedbumps, etc.). Ex. 2001, ¶123; Ex. 2026 (1976 Patent) at 1:31-42 (noting that known accelerometer systems were not suitable for “more severe variations in the road surface” such as on “unpaved roads”) and 2:33-47 (disclosing a gyroscope-based system for measuring more severe roughness in road conditions). Accordingly, a POSITA would have understood the inventors were in possession of the claimed invention, including implementations that determined certain types of vibration using, at least in part, data from gyroscopic sensors.

As another example, Koebler650 discloses and claims the use of tire pressure sensors as one of the Enumerated Sensors. Ex. 1004, 4:3-11, 8:48-49, 21:49-51, claim 1. When Koebler650 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. Ex. 2001, ¶118; Ex. 2012, Abstract; *see also id.*, 2:1-11 (noting that “[r]oadway surface vibrations, circumferential tire vibrations and air pressure vibrations are generated as the tire rolls over the surface of asphalt, concrete or other roadway surface”); *see also* Ex. 2013, pp. 2-3 (discussing the use of “dynamic pressure” measurements to detect vibrations).

As yet another example, a POSITA would have understood that position sensors (which are Enumerated Sensors) could be used to determine certain types of vibrations. Specifically, as of the filing date of Koebler650, 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). Ex. 2001, ¶¶68, 124; *see also* Ex. 2023 (patent issued from 1987 application) at 13:16-26 and 16:46-47 (disclosing “vibration control apparatus” wherein “suspension displacement” is “detected by the linear potentiometer” and used to determine the “road surface state”); Ex. 2030 (patent issued from 1986 application) at 5:65-6:2 (“The second sensor comprises a potentiometer monitoring relative displacement between the vehicle body and the

road wheel and producing the second sensor signal indicative of the displacement between the vehicle body and the road wheel.”). 10:38-42 (“the road sensor 116 comprises a kind of potentiometer which produces an analog signal representative of the relative distance between the vehicle and the wheel axle.”)

Accordingly, Koebler⁶⁵⁰ adequately discloses detecting vibration conditions and sensors for detecting those conditions, and thus satisfies the written description requirement for this limitation.

IV. CONCLUSION

For the above reasons, Patent Owner respectfully requests that the Board reject Petitioner’s arguments and confirm the patentability of the ’616 Patent’s Claims.

Dated: December 19, 2024

Respectfully submitted,

/K. Patrick Herman/

K Patrick Herman

Registration No. 75,018

Orrick, Herrington & Sutcliffe LLP

51 West 52nd Street

New York, NY 10019

T: 212-506-3596; F: 212-506-5151

Email: P52PTABDocket@orrick.com

Counsel for Patent Owner

WORD COUNT CERTIFICATION

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Preliminary Response contains 7,390 words based on the word count indicated by Microsoft Word, excluding the portions exempted by 37 C.F.R. §§ 42.24(a) and (b).

Dated: December 19, 2024

Respectfully submitted

/K. Patrick Herman/

K. Patrick Herman

Registration No. 75,018

Orrick, Herrington & Sutcliffe LLP

51 West 52nd Street

New York, NY 10019

Counsel for Patent Owner

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6, I hereby certify that the foregoing Patent Owner's Response was served by electronic mail on the following counsel of record for Petitioner:

W. Karl Renner, Robert Devoto, Ryan Chowdhury,
Patrick Darno: IPR49649-0021IP1@fr.com
Ashraf A. Fawzy: afawzy@tesla.com

Dated: December 19, 2024

Respectfully submitted

/K. Patrick Herman/

K. Patrick Herman

Registration No. 75,018

Orrick, Herrington & Sutcliffe LLP

51 West 52nd Street

New York, NY 10019

Counsel for Patent Owner