

Petitioner's Oral Hearing Demonstratives

Tesla, Inc. (Petitioner)

v.

iQar Inc. (Patent Owner)

IPR2024-00630 (U.S. Patent No. 10,850,616)

Before Hon. Jason W. Melvin, Sean P. O'Hanlon, and Brent M. Dougal

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Overview

IPR Grounds

Overview of IPR Grounds

Challenged Claim(s)	Prior Art	Claim Interpretation
1-16	Koebler650	Disjunctive
1-16	Koebler650, Kabel, Lagerstedt, Okano, Kirkwood, Breed	Conjunctive

Institution Decision

. . . on this preliminary record, we determine 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

Dec., 12

Claims 1, 15, 16

Claim 1

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

[1d] 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

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

Comparison of Limitations - Claims 1, 15 and 16

Claim 1	Claim 15	Claim 16
[1c-1]	[15e-1]	[16a]
[1d]	[15f]	[16a]
[1e]	[15g]	[16e]

Koebler650

Koebler650 – Overview

Abstract

An apparatus comprising an interface, a memory and a processor. The interface may be 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. The memory may be configured to store (a) the sensor data samples over a number of points in time and (b) the data from the telemetry system. The processor may be configured to (i) analyze the sensor data samples stored in the memory to determine current conditions and (ii) associate the current conditions with a route segment traveled by the vehicle. The route segment is identified according to the data from the telemetry system. The current conditions associated with the route segment are uploaded to the remote database to enable historical route information for a plurality of route segments.

TESLA-1004, Abstract

Koebler650 – Overview

Specification

Any appropriate sensors, detectors or data inputs may be used with the power management devices and systems described herein. For example, sensors for detecting external environmental information may be used (e.g., optical, mechanical, electrical, or magnetic sensors). Sensors may be monitored (e.g., polled) in real-time, as described above. For example, polling logic may coordinate continuous or periodic polling of 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.), speedometer information (e.g., vehicle's current speed, motor speed), date and time information (e.g., the date and time may be used to determine personal driving habits and sun angle), gyroscope information (e.g., vehicle's current orientation, current slope/grade of road), RPM (e.g., motor and wheel rotations per minute), accelerator and brake pedal position (e.g., pressure applied and/or current angle of the pedals), the angle of sun (e.g., sensors may detect latitude, longitude, time of day, date), weather (e.g., wind direction and velocity, rain, sun, snow, etc.), battery state (e.g., voltage, amp hour meter, etc.), tire pressure (e.g., may be used to calculate the drag force due to rolling resistance), headway control information (e.g., the distance from a car in front of the vehicle), the weight of car (e.g., weight of cargo, passengers, driver), airflow (e.g., the amount of air going to the engine), gas flow sensor (e.g., the amount of gas going to engine of a hybrid or ICE car), weight of driver (e.g., may be used identify the driver and linked to personal driving habits). Different detectors or sensors may be polled at different intervals, including continuously, or only occasionally. Polling may also depend upon the availability of a resource. For example, information may be available only when a telecommunications network (e.g., satellite, cellular, etc.) is available.

TESLA-1004, 21:29-62 (cited in Reply, 2; also cited in POR, 13-14, and Sur-Reply, 7-8)

Koebler650 – Overview

Specification

The power management logic may determine an applied power for the vehicle engine based on information about the external environment of the vehicle that is selected from the group consisting of: the current location of the vehicle, the elevation of the vehicle, upcoming elevations of the vehicle, the current slope/grade of the route, the predicted slope/grade of the next segments (or upcoming segments) of the route, speed limit information of the current route segment, speed limit information of upcoming route segments, the condition of the known or predicted route (or a portion thereof), traffic information or data, traffic surrounding the vehicle, the location of stoplights, the timing of stoplights, a map of the roadway, the present angle of the sun, the predicted angle of the sun for upcoming route segments, the weather around the vehicle, present wind direction, the predicted wind direction for upcoming route segments, present wind velocity, the predicted wind velocity for upcoming route segments, current temperature, the predicted temperature for upcoming route segments, current air pressure, predicted air pressure for upcoming route segments, time of day, date, day of week, visibility, present road conditions, predicted road conditions for upcoming route segments, and the distance to/from other vehicles. Any of this information may be acquired by measuring (e.g., from sensors), or it may be detected or input (e.g., from manual inputs, telemetry, detectors, a memory, etc.), or it may be derived (e.g., based on other information, including other environmental information).

TESLA-1004, 4:1-18 (cited in Reply, 11; also cited in POR, 13-14, and Sur-Reply, 7-8)

Koebler650 – Overview

Specification

Examples of environmental information inputs include, but are not limited to: the current location of the vehicle, geographical information about the surrounding area, the elevation of the vehicle, upcoming elevations of the vehicle, the current slope/grade of road, the predicted slope/grade of the next segments of road, traffic surrounding the vehicle, the location of stoplights, the timing of stoplights, a map of the roadway, the present angle of the sun, the predicted angle of the sun for upcoming route segments, the weather around the vehicle, present wind direction, the predicted wind direction for upcoming route segments, present wind velocity, the predicted wind velocity for upcoming route segments, current temperature, the predicted temperature for upcoming route segments, current air pressure, predicted air pressure for upcoming route segments, time of day, date, day of week, visibility, present road conditions, predicted road conditions for upcoming route segments, and the distance from other vehicles.

TESLA-1004, 7:46-62 (cited in Reply, 2)

Limitations That Lack Written Description Support

Claim 1

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

[1d] 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

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

Koebler650 – Lack of Written Description Support

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

Entitlement to Priority Date & Written Description

Entitlement to Priority Date Requires Sufficient Written Description

35 U.S.C. § 120

An application for patent for **an invention disclosed in the manner provided by section 112(a)** (other than the requirement to disclose the best mode) in an application previously filed in the United States...shall have the same effect, as to such invention, as though filed on the date of the prior application...

Lockwood v. Am. Airlines (“Lockwood”)

In order to gain the benefit of the filing date of an earlier application under 35 U.S.C. § 120, **each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112.**

107 F.3d 1565, 1571-72 (Fed. Cir. 1997) (Cited in Pet., 12)

Sufficient Written Description Under 35 U.S.C. § 112(a)

35 U.S.C. § 112(a)

(a) In General.—

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

Entitlement to Priority Date Based On Sufficient Written Description May Not Be Established Through Obviousness

Research Corp. Techs., Inc. v. Microsoft Corp. (“Research”)

Entitlement to a filing date extends only to the subject matter that is disclosed; not to that which is obvious....”

627 F.3d 859, 870 (Fed. Cir. 2010) (internal citations omitted) (cited in Pet., 12-13)

Lockwood

It is not sufficient for purposes of the written description requirement of § 112 that the disclosure, when combined with the knowledge in the art, would lead one to speculate as to the modifications that the inventor might have envisioned, but failed to disclose.

107 F.3d, at 1572 (cited in Reply, 25)

Sufficient Written Description Requires Specificity

Lockwood v. Am. Airlines (“Lockwood”)

In order to gain the benefit of the filing date of an earlier application under 35 U.S.C. § 120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112.

107 F.3d 1565, 1571-72 (Fed. Cir. 1997) (Cited in Pet., 12)

It is not sufficient for purposes of the written description requirement of § 112 that the disclosure, when combined with the knowledge in the art, would lead one to speculate as to the modifications that the inventor might have envisioned, but failed to disclose.

Lockwood, at 1571-72 (Cited in Pet., 12 and Reply, 1, 5, 8, 25)

Sufficient Written Description Requires Specificity

Lockwood v. Am. Airlines (“Lockwood”)

In order to gain the benefit of the filing date of an earlier application under 35 U.S.C. § 120, each application in the chain leading back to the earlier application must comply with the written description requirement of 35 U.S.C. § 112.

107 F.3d 1565, 1571-72 (Fed. Cir. 1997) (Cited in Pet., 12)

It is not sufficient for purposes of the written description requirement of § 112 that the disclosure, when combined with the knowledge in the art, would lead one to speculate as to the modifications that the inventor might have envisioned, but failed to disclose.

Lockwood, at 1571-72 (Cited in Pet., 12 and Reply, 1, 5, 8, 25)

Sufficient Written Description Requires Specificity

Knowles v. Cirrus Logic (“Knowles”)

[Patent Owner] contends that the PTAB disregarded ‘the state of the art at the time of filing’ and ‘prior art knowledge’ that would have demonstrated that a PHOSITA knew solder pads were ‘intended to be capable of reflow attachment to a user's board.’...**Knowles misunderstands the PTAB's analysis.”**

883 F.3d 1358, 1366 (Fed. Cir. 2018) (cited in Reply, 24, 26-28)

The PTAB acknowledged that solder reflow was a process of connecting a board to a solder pad but found that other processes of connection existed in the prior art. Therefore, the '231 patent's specification, detailing only the broad idea of solder pads connected to the circuit board, ‘fail[e]d completely to disclose the newly claimed species of such pads—pads that are connectable to a board specifically by using a reflow process.’

883 F.3d 1358, 1366 (Fed. Cir. 2018) (cited in Reply, 24, 26-28)

Koebler650 – Lack of Sufficient Written Description

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

Issue 1: Interpretation of “Current Condition” Limitations*

* These limitations include [1c-1], [1e], [1f], [15e-1], [15f], [15g], [16a], and [16e]. See Reply, 1.

Claim 1 – The Current Condition Limitations

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

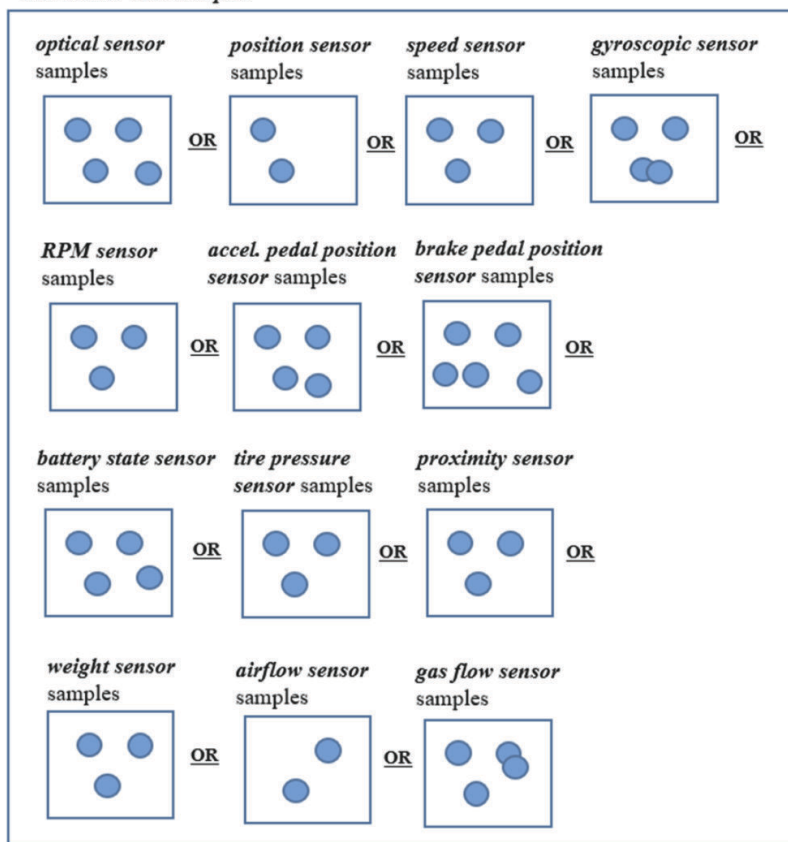
[1d] wherein the sensor data samples are received from at least one of an optical sensor, a position sensor, a speed sensor, a gyroscopic sensor, a revolutions-per-minute sensor, an accelerator pedal position sensor, a brake pedal position sensor, a battery state sensor, a tire pressure sensor, a proximity sensor, a weight sensor, an airflow sensor, and a gas flow sensor; and

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

The Current Condition Limitations – Petition

said sensor data samples



*“a processor configured to
(i) analyze said sensor data samples...to determine
current conditions”*



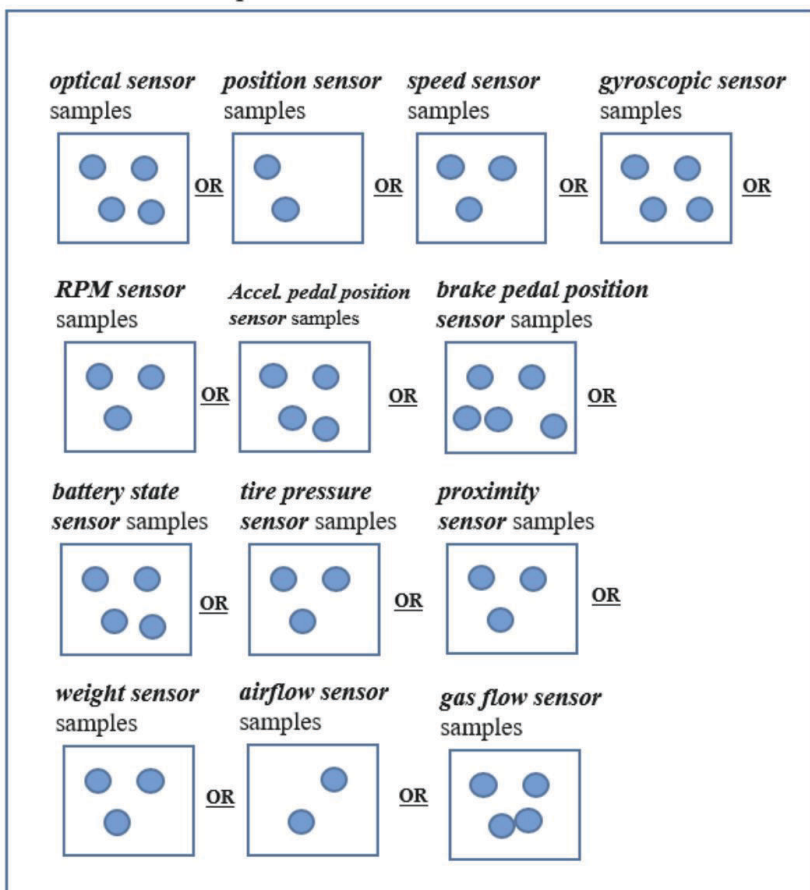
current conditions

- (1) at least one of drag OR
- (2) at least one of wind resistance OR
- (3) at least one of tire resistance OR
- (4) at least one of a location relative to a destination OR
- (5) at least one of traffic patterns OR
- (6) at least one of an amount of light energy OR
- (7) at least one of a position of the sun OR
- (8) at least one of geographical information OR
- (9) at least one of an elevation of said vehicle OR
- (10) at least one of a grade of a road OR
- (11) at least one of a location of stoplights OR
- (12) at least one of a timing of stoplights OR
- (13) at least one of weather OR
- (14) at least one of a wind direction OR
- (15) at least one of a wind velocity OR
- (16) at least one of a temperature OR
- (17) at least one of air pressure OR
- (18) at least one of moisture OR
- (19) at least one of visibility OR
- (20) at least one of an amount of vibration OR
- (21) at least one of traction

Pet., 9

The Current Condition Limitations – Petition

said sensor data samples



“a processor configured to (i) analyze said sensor data samples ...to determine current conditions”



current conditions

- (1) *location of stoplights*
- (2) *timing of stoplights*
- (3) *weather*
- (4) *wind direction*
- (5) *wind velocity*
- (6) *temperature*
- (7) *air pressure*
- (8) *moisture*
- (9) *amount of vibration*
- (10) *traction*

Pet., 14

The Current Condition Limitations – Petitioner’s Expert

Morellas Declaration

...the independent claims of the '616 patent each require analyzing **sensor data samples** to determine 21 enumerated **current conditions** (e.g., moisture) (“Enumerated Current Conditions”). The **sensor data samples** are collected from 13 enumerated sensor[s] (e.g., optical sensor) (“Enumerated Sensors”).

TESLA-1003, ¶41 (cited in Pet., 4)

...the use of said sensor data samples in these limitations ([1b], [15d]) references the requirements of sensor data samples in the first “wherein” clause of claims 1 and 15 ([1d], [15f]), which further requires that the sensor data samples are received from at least one of the Enumerated Sensors.

TESLA-1003, ¶44 (cited in Pet., 4)

The Current Condition Limitations – Petitioner’s Expert

Claim 1

[1c-1] 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

TESLA-1001, Claim 1 (cited in Pet., v)

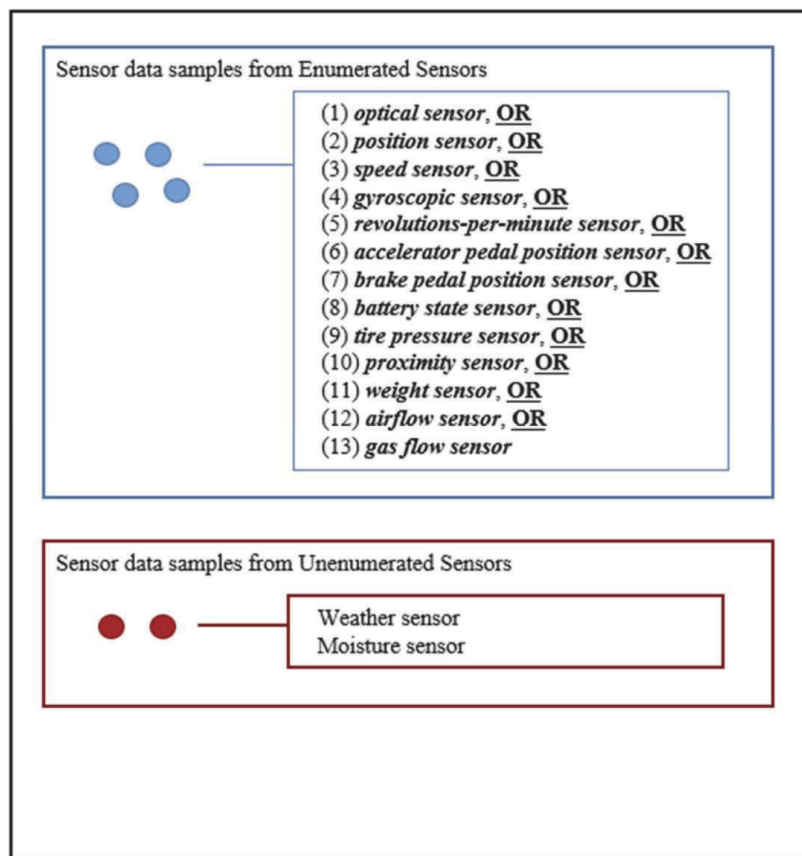
Supplemental Declaration

...sensor data samples from unenumerated sensors cannot represent the said sensor data samples recited in [1c-1], [15e-1], and [16e] because their corresponding sensors are not enumerated in [1d], [15f], and [16a].

TESLA-1054, ¶18 (cited in Reply, 7-8)

The Current Condition Limitations – Petitioner’s Reply

“SAID SENSOR DATA SAMPLES”



*“a processor configured to
(i) analyze said sensor data
samples...to determine
current conditions”*



Enumerated Current Conditions

- (1) at least one of drag OR
- (2) at least one of wind resistance OR
- (3) at least one of tire resistance OR
- (4) at least one of a location relative to a destination OR
- (5) at least one of traffic patterns OR
- (6) at least one of an amount of light energy OR
- (7) at least one of a position of the sun OR
- (8) at least one of geographical information OR
- (9) at least one of an elevation of said vehicle OR
- (10) at least one of a grade of a road OR
- (11) at least one of a location of stoplights OR
- (12) at least one of a timing of stoplights OR
- (13) at least one of weather OR
- (14) at least one of a wind direction OR
- (15) at least one of a wind velocity OR
- (16) at least one of a temperature OR
- (17) at least one of air pressure OR
- (18) at least one of moisture OR
- (19) at least one of visibility OR
- (20) at least one of an amount of vibration OR
- (21) at least one of traction

Reply, 7

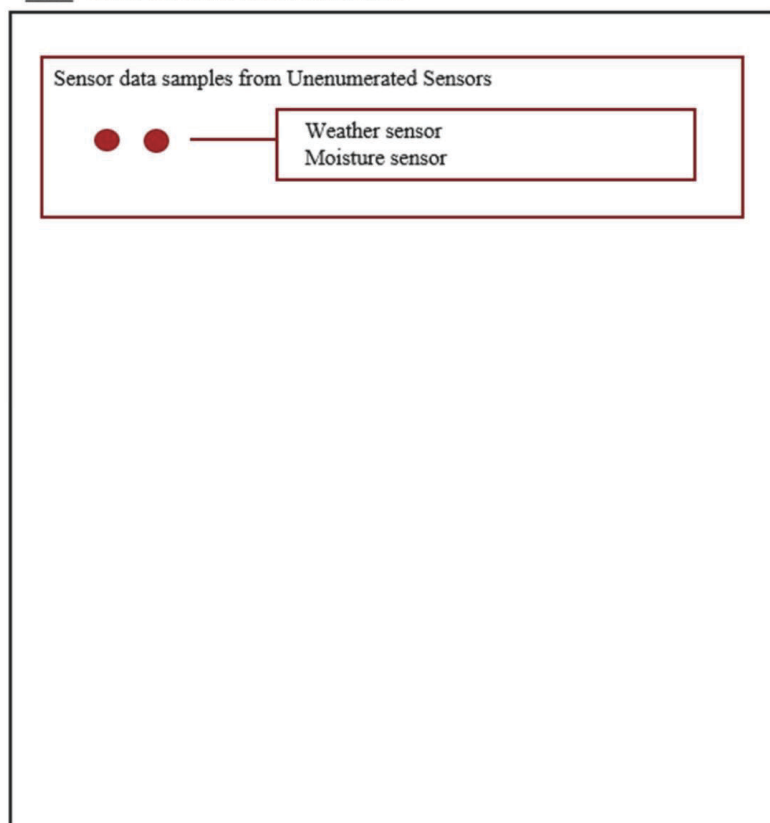
The Current Condition Limitations – Petitioner’s Reply

Reply

iQar’s interpretation also encompasses configurations in which only sensor data samples from unenumerated sensors are analyzed to determine the Enumerated Current Conditions. See POR, 13.

Reply, 7

NOT “SAID SENSOR DATA SAMPLES”



*“a processor configured to
(i) analyze said sensor data
samples...to determine
current conditions”*



Enumerated Current Conditions

- (1) at least one of drag OR
- (2) at least one of wind resistance OR
- (3) at least one of tire resistance OR
- (4) at least one of a location relative to a destination OR
- (5) at least one of traffic patterns OR
- (6) at least one of an amount of light energy OR
- (7) at least one of a position of the sun OR
- (8) at least one of geographical information OR
- (9) at least one of an elevation of said vehicle OR
- (10) at least one of a grade of a road OR
- (11) at least one of a location of stoplights OR
- (12) at least one of a timing of stoplights OR
- (13) at least one of weather OR
- (14) at least one of a wind direction OR
- (15) at least one of a wind velocity OR
- (16) at least one of a temperature OR
- (17) at least one of air pressure OR
- (18) at least one of moisture OR
- (19) at least one of visibility OR
- (20) at least one of an amount of vibration OR
- (21) at least one of traction

Reply, 7

The Current Condition Limitations – Patent Owner Response

POR

...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.

...

A POSITA would not have interpreted the claims to exclude other information from the analysis.

POR, 6-7

Bevly Declaration

Koebler650 expressly does not limit the invention to such examples and, to the contrary, states that **the 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.”).

Ex-2001, ¶66 (cited in POR, 15)

The Current Condition Limitations – Patent Owner’s Sur-Reply

Sur-Reply

The Response—just like the '616 patent's claims themselves—makes clear that while at least one “sensor data sample[]” considered by a system needs to be of the type claimed, other input can also be employed along with that “sensor data sample” when determining a “current condition.” See Response, 6–7. In other words, it is not necessary to use only the claimed “sensor data samples”: other input can also play a role in “current condition” determination so long as at least “sensor data sample” is also used.

Sur-Reply, 4-5

Issue 2:
**Whether Koebler650 Sufficiently
Describes Determining *Traction***

Koebler650 – Lack of Sufficient Written Description

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

Claim 1 – Patent Owner’s Arguments Regarding *Traction*

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

[1d] 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

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

Determining *Traction* – Petition

Petition

Nothing in Koebler650 would have led a POSITA to discern that patentee had possession of a system that determines traction in the manner required by the claims.

Pet.,18

Morellas Declaration

Specifically, nothing in Koebler650 provides sufficient written description of a processor that ***analyzes sensor data samples/sensor data*** received from, or generated by, monitoring at least one of the Enumerated Sensors (i.e., any one of them under a disjunctive read or all of them under a conjunctive read) to determine *traction*. For example, there is no disclosure of analyzing sensor data samples collected by a rotational speed sensor to determine traction associated with the detection of wheel slippage.

TESLA-1003, ¶88 (cited in Pet., 18)

Parameters Described in Koebler650

Patent Owner's Positions

Enumerated Current Condition	Parameter(s) Identified in POR
<i>Traction</i>	"operational status" "tire resistance" "rolling resistance" <i>See</i> POR, 26-29
<i>amount of vibration</i>	"terrain" "condition of a road" <i>See</i> POR, 30-32
<i>Moisture</i>	"weather around the vehicle," e.g., "rain" <i>See</i> POR, 20-23

Reply, 9

Determining *Traction* – Patent Owner’s Position

Enumerated Current Condition	Parameter(s) Identified in POR
<i>Traction</i>	“operational status” “tire resistance” “rolling resistance” <i>See</i> POR, 26-29
<i>amount of vibration</i>	“terrain” “condition of a road” <i>See</i> POR, 30-32
<i>Moisture</i>	“weather around the vehicle,” e.g., “rain” <i>See</i> POR, 20-23

Reply, 9

Determining *Traction* – Petitioner’s Reply

Reply

...iQar also fails to produce evidence sufficiently demonstrating possession of determining traction based on Koebler650’s disclosure of “operational status,” “tire resistance,” and “rolling resistance.”

Reply, 11

Supplemental Morellas Declaration

As to “operational status,” Koebler650 uses this term to represent a generic category of status information.

TESLA-1054, ¶32 (cited in Reply, 11)

As to “tire resistance,” this parameter represents a measure of how much energy is lost due to deformation and road interaction while a tire rolls. In contrast, traction measures the force that allows a tire to grip the road to facilitate motion.

TESLA-1054, ¶33 (cited in Reply, 11); *see id.*, ¶¶34-35

As to “rolling resistance,” this parameter is the resistive force that opposes the rotation of a tire as it moves along a surface. Rolling resistance arises from internal tire deformation and friction unrelated to surface grip, which does not necessarily represent traction information

TESLA-1054, ¶36 (cited in Reply, 11)

Determining *Traction* – Patent Owner's Expert

Bevly Deposition Transcript

Q If tire resistance includes traction, it means that they're not the same thing, correct?

...

A Correct.

TESLA-1055, 45:13-17 (cited in Reply, 11)

Q Rolling resistance is not the same thing as traction, correct?

...

A They are -- they are both subsets of tire resistance, but they are slightly different.

Q And traction is not the same thing as a force that opposes the rolling motion of the tire?

A Correct.

TESLA-1055, 48:15-23 (cited in Reply, 11)

Q And the wheel rotations per minute is not the same thing as traction, correct?

A By itself, no.

TESLA-1055, 52:9-11 (cited in Reply, 4)

Determining *Traction* – Patent Owner’s Sur-Reply

Sur-Reply

In 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...This requires nothing more than determining whether the vehicle has traction (i.e., whether its tires are gripping the road or not)

Sur-Reply, 6

Patent Owner’s expert Dr. Bevly also explained that when tire and rolling resistance are zero, the vehicle has lost traction. See *id.*, ¶ 130. When they are not zero, the vehicle has traction. See *id.* Koebler 650 also employs sensors—engine and wheel speed sensors—that are routinely used in the art to determine vehicle traction.

Sur-Reply, 7

Analysis to Determine *Traction*

Analysis to Determine *Traction* – Patent Owner Response

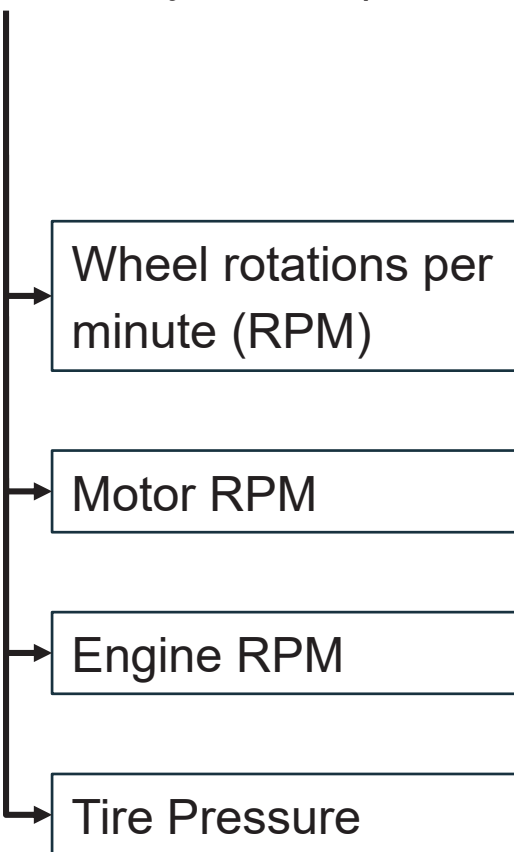
POR

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.

POR, 29

Analysis to Determine *Traction* – Petitioner’s Reply

Parameters identified in POR as collected by “wheel speed sensors”



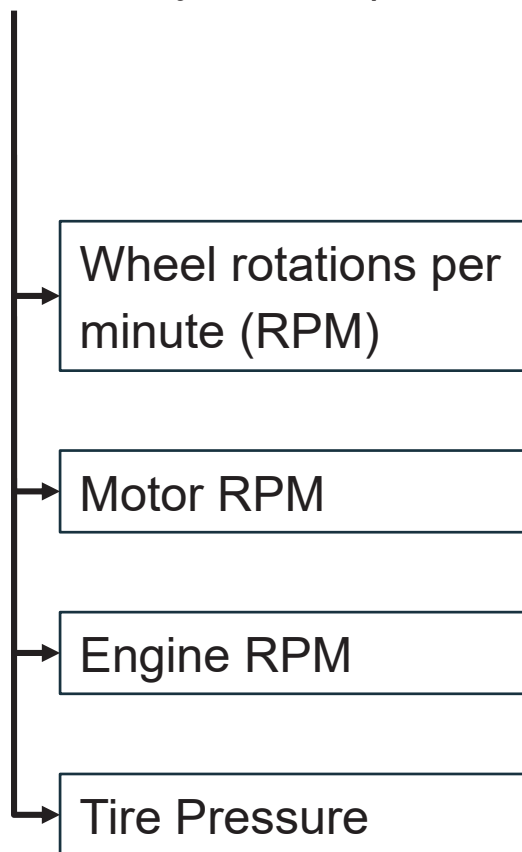
Reply

iQar also fails to produce evidence sufficiently demonstrating possession of processing techniques relating to traction based on Koebler’s disclosure of sensor functionality. The POR focuses on Koebler650’s description of collecting “motor and wheel rotations per minute” using an RPM sensor but fails to identify any description of how such collected data is further processed to determine traction information.

Reply, 12

Analysis to Determine *Traction* – Petitioner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



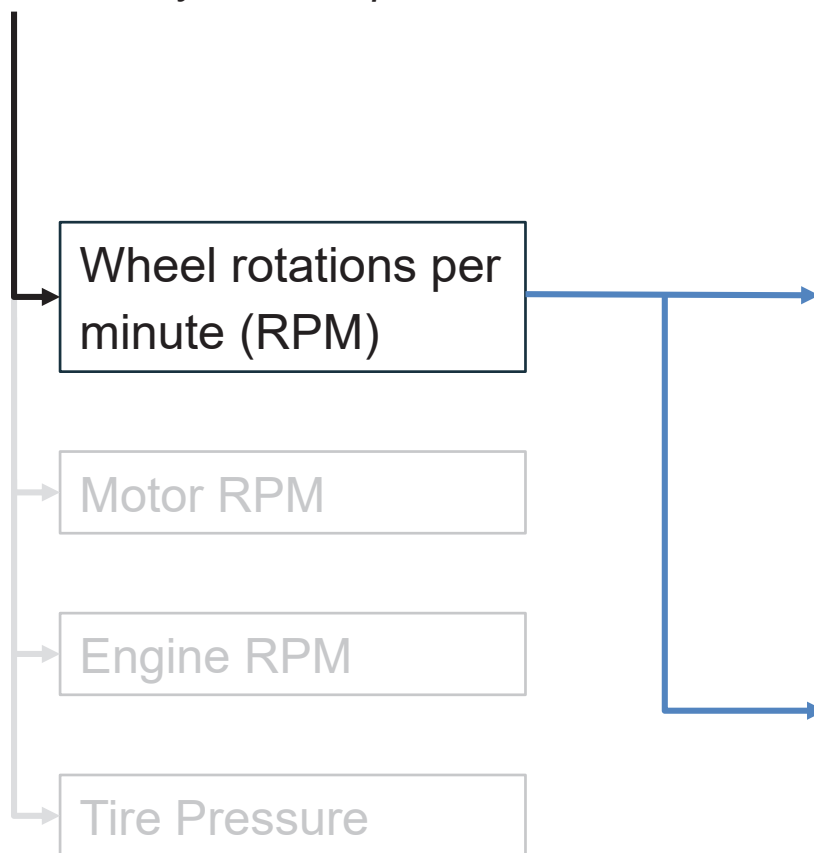
Supplemental Morellas Declaration

The examples of RPM sensor measurements described in Koebler650 do not necessarily relate to traction information.

TESLA-1054, ¶38 (cited in Reply, 13)

Analysis to Determine *Traction* – Petitioner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



Supplemental Morellas Declaration

Wheel RPM only provides information about the rotational speed of the wheel. It does not directly indicate whether the tire is maintaining effective grip with the road. Wheel RPM also measures how fast a wheel is spinning, which similarly does not indicate traction information without further processing.

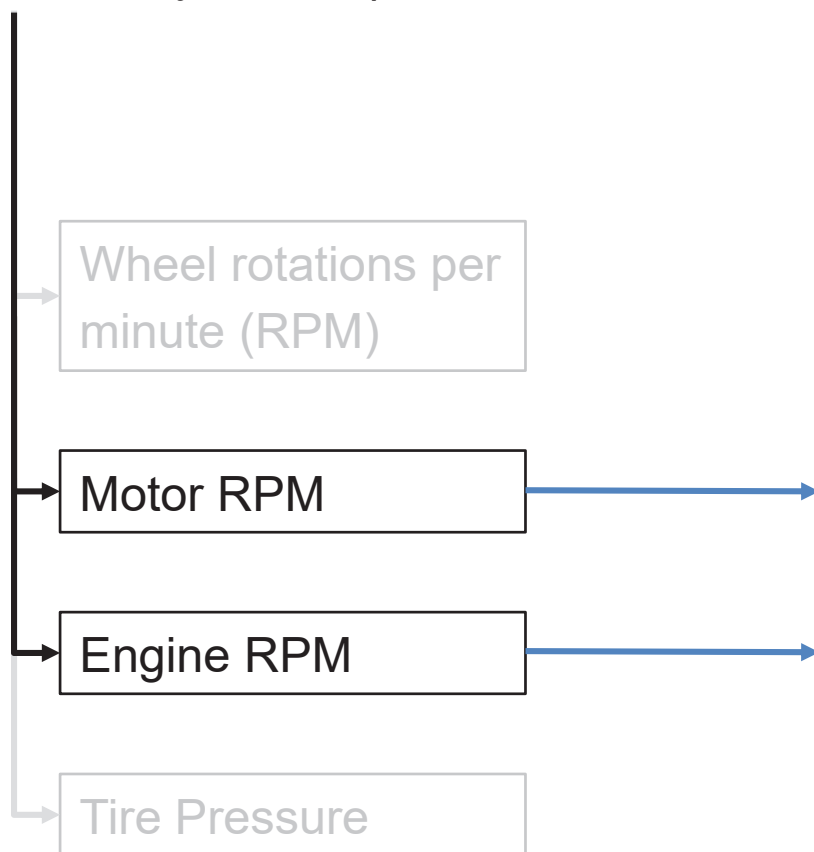
TESLA-1054, ¶38 (cited in Reply, 13)

Determining traction information from wheel RPM measurements requires further analysis that is not described in Koebler650. This may include determining the wheel slip ratio, longitudinal and lateral forces, and road surface monitoring.

TESLA-1054, ¶39 (cited in Reply, 13)

Analysis to Determine *Traction* – Petitioner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



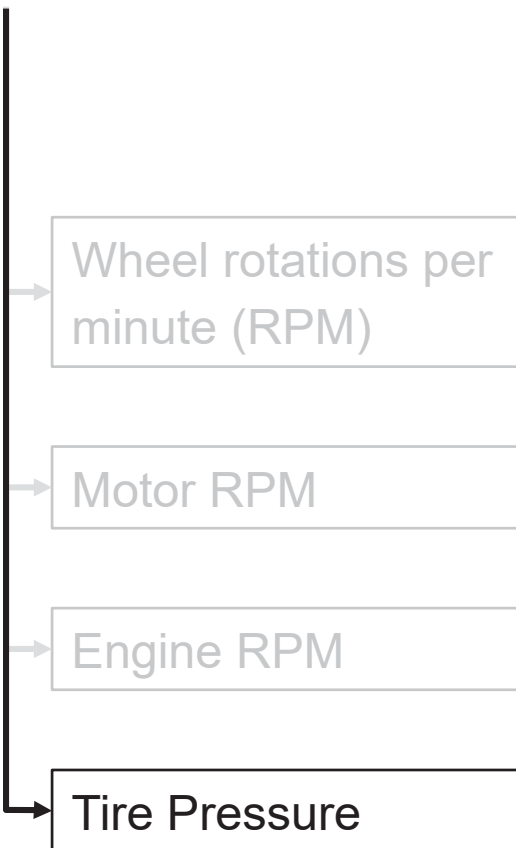
Supplemental Morellas Declaration

These measurements pertain to rotational speeds of a vehicle power source. In contrast, traction is fundamentally about the interaction between the tires and the road surface. Engine RPM measures the speed of the engine’s crankshaft in an internal combustion engine. Motor RPM measures the speed of the rotor in an electric motor. Each of these measurements provide no direction information about whether the tires are effectively gripping the road as they only show how fast the power source is spinning.

TESLA-1054, ¶41 (cited in Reply, 13)

Analysis to Determine *Traction* – Petitioner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



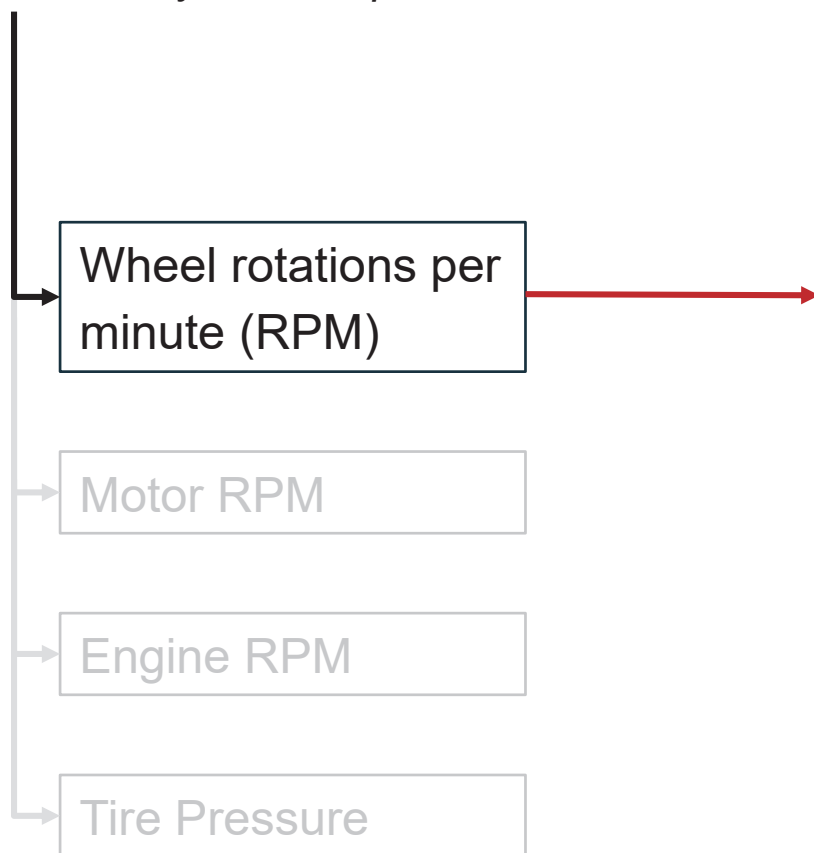
Supplemental Morellas Declaration

Tire pressure is a static property of the tire that influences its overall performance characteristics. In contrast, traction is determined dynamically and involves real-time interaction between the tires and the road surface. Tire pressure measures the amount of air pressure inside the tire, which is typically expressed in pounds per square inch (PSI) or kilopascals (kPa).

TESLA-1054, ¶42 (cited in Reply, 13)

Analysis to Determine *Traction* – Patent Owner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



Bevly Deposition Transcript

Q You would agree with me that one way to understand wheel rotations per minute is a measure of how fast a wheel is spinning, correct?

A Correct.

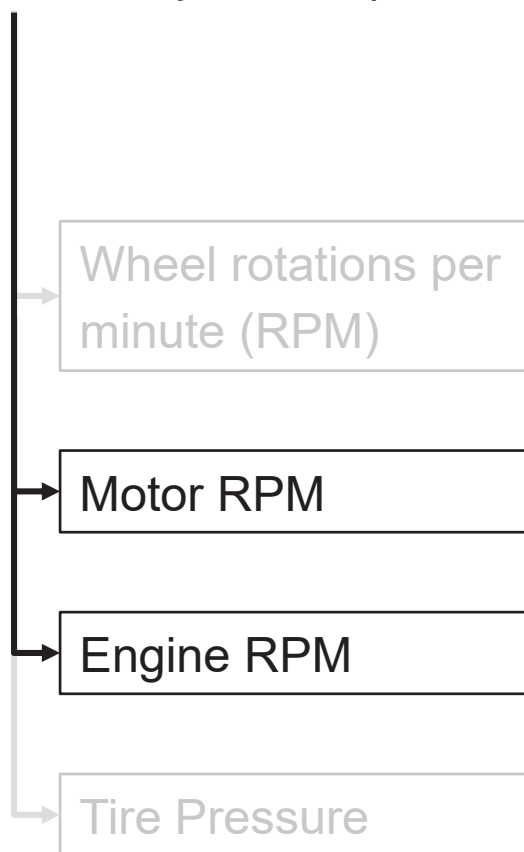
Q And how fast a wheel is spinning does not directly indicate a frictional force between a tire and the road, true?

A True.

TESLA-1055, 52:16-23 (cited in Reply, 4)

Analysis to Determine *Traction* – Patent Owner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



Bevly Deposition Transcript

Q Is it possible to measure how fast the motor shaft is spinning without determining friction between the vehicle's drive wheels and the road surface?

A Yes.

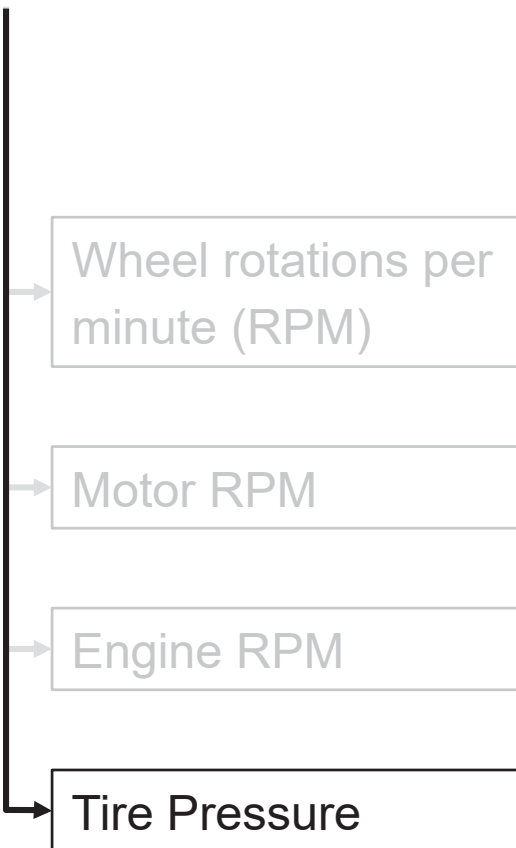
Q Is it possible to measure how fast the motor's shaft is spinning without knowing whether the vehicle -- vehicle's wheels are slipping or gripping the road?

A Yes.

TESLA-1055, 51:11-18 (cited in Reply, 14)

Analysis to Determine *Traction* – Patent Owner’s Expert

Parameters identified in POR as collected by “wheel speed sensors”



Bevly Deposition Transcript

Q And the measurement of internal air pressure inside the tire by a tire pressure sensor can be performed independently of measuring friction between the vehicle's drive wheels and the road surface, correct?

A Correct.

Q And the internal air pressure inside the tire does not depend on whether the wheels are slipping or gripping on the road, correct?

A For the most part.

TESLA-1055, 54:5-13 (cited in Reply, 4)

Analysis to Determine *Traction* – Patent Owner’s Sur-Reply

Sur-Reply

...Koebler 650’s system determines vehicle efficiency, information about the vehicle tires, rolling resistance, and tire resistance. See Koebler 650, 7:1-4, 7:36-38, 8:32-40, 15:51-55. As explained by Patent Owner’s expert, traction is a key part of any such efficiency determination. See Ex. 2001, ¶¶ 129-131.

Sur-Reply, 7

Issue 3:
**Whether Koebler650 Sufficiently
Describes Determining *Amount of*
*Traction***

Claim 1 – Determining *An Amount of Vibration*

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

[1d] 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

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

Determining *Amount of Vibration* – Petition

Petition

Nothing in Koebler650 would have led a POSITA to discern that patentee had possession of a system that determines amount of vibration in the manner required by the claims.

Pet., 17

Morellas Declaration

...nothing in Koebler650 provides sufficient written description of a processor that analyzes sensor data samples/sensor data received from, or generated by, monitoring at least one of the Enumerated Sensors (i.e., any one of them under a disjunctive read or all of them under a conjunctive read) to determine amount of vibration. For example, there is no disclosure of analyzing sensor data samples collected by a rotational speed sensor to determine the amount of vibration associated with the detection of wheel slippage.

TESLA-1003, ¶185 (cited in Pet., 17)

Parameters Described in Koebler650

Amount of Vibration – Patent Owner’s Position

Enumerated Current Condition	Parameter(s) Identified in POR
<i>Traction</i>	“operational status” “tire resistance” “rolling resistance” <i>See</i> POR, 26-29
<i>amount of vibration</i>	“terrain” “condition of a road” <i>See</i> POR, 30-32
<i>Moisture</i>	“weather around the vehicle,” e.g., “rain” <i>See</i> POR, 20-23

Reply, 9

Determining *Amount of Vibration* – Petitioner’s Reply

Reply

iQar fails to produce evidence sufficiently demonstrating possession of determining an amount of vibration based on Koebler’s disclosure of “terrain” and “condition of a road.”

Reply, 14

Supplemental Morellas Declaration

As to “terrain,” Koebler650 uses this term to represent a generic category of road information. For example, column 13, lines 52-58 reference “the gradient or condition of a road” as examples of “terrain” information. TESLA-1004, 13:52-58.

TESLA-1054, ¶¶36 (cited in Reply, 14); see *id.*, ¶¶47

As to “condition of a road,” this phrase reflects a generic category of condition information associated with a road. A condition of a road broadly refers to various static or structural states of the roadway surface, which do not imply dynamic parameters such as vibration. For example, describing a road as “wet” or “icy” indicates road condition without conveying any vibration-related information.

TESLA-1054, ¶¶48 (cited in Reply, 14); see *id.*, ¶¶49-51

Determining *Amount of Vibration* – Patent Owner's Expert

Bevly Deposition Transcript

Q A condition of a road is not the same thing as an amount of vibration, correct?

A The condition of the road could include amount of vibration.

TESLA-1055, 25:7-10 (cited in Reply, 11)

TESLA-1055, 48:15-23 (cited in Reply, 11)

Determining *Amount of Vibration* – Patent Owner’s Sur-Reply

Sur-Reply

...Koebler 650 references the determination of conditions that result in (or at least would be understood to include) vehicle vibration. This includes determination of the “terrain” over which the vehicle is traveling and the “condition of a road.”

Sur-Reply, 9-10 (citing Koebler650, 3:41-67, 7:45-62, 13:57)

Analysis to Determine *Amount of Vibration*

Analysis to Determine *Amount of Vibration* – Patent Owner's Response

POR

Koebler650 discloses and claims Enumerated Sensors that can be used to detect vibrations.

POR, 33

As one example, Koebler650 discloses and claims **gyroscopic sensors**.

POR, 33

As another example, Koebler650 discloses and claims the use of **tire pressure sensors** as one of the Enumerated Sensors.

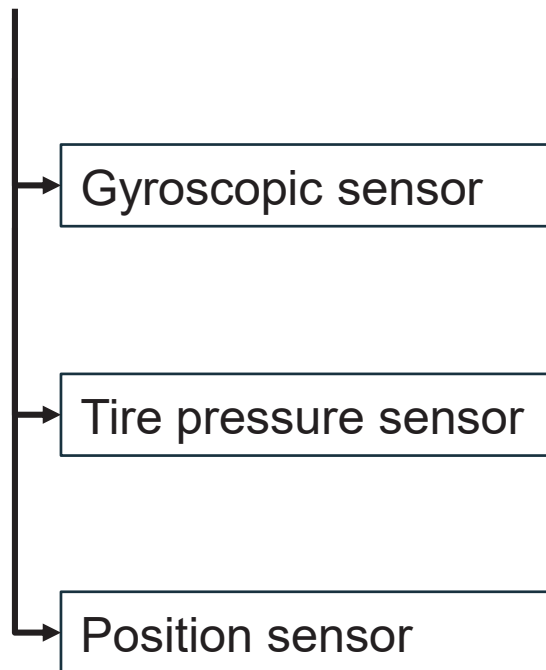
POR, 35

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.

POR, 35

Analysis to Determine *Amount of Vibration* – Petitioner’s Reply

Relevant sensors identified in POR



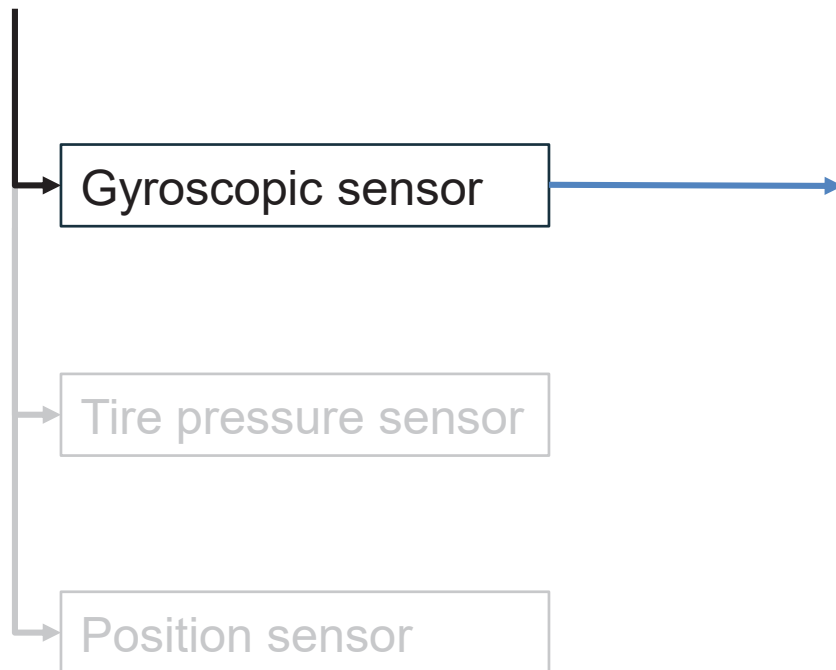
Reply

iQar also fails to produce evidence sufficiently demonstrating possession of processing techniques relating to ***an amount of vibration*** based on Koebler650’s disclosure of sensor functionality. The POR focuses on Koebler650’s description of sensor data samples collected by a gyroscopic sensor, a tire pressure sensor, and a position sensor but fails to identify any description of how such collected data is further processed to determine vibration information.

Reply, 15-16

Analysis to Determine *Amount of Vibration* – Petitioner's Expert

Relevant sensors identified in POR



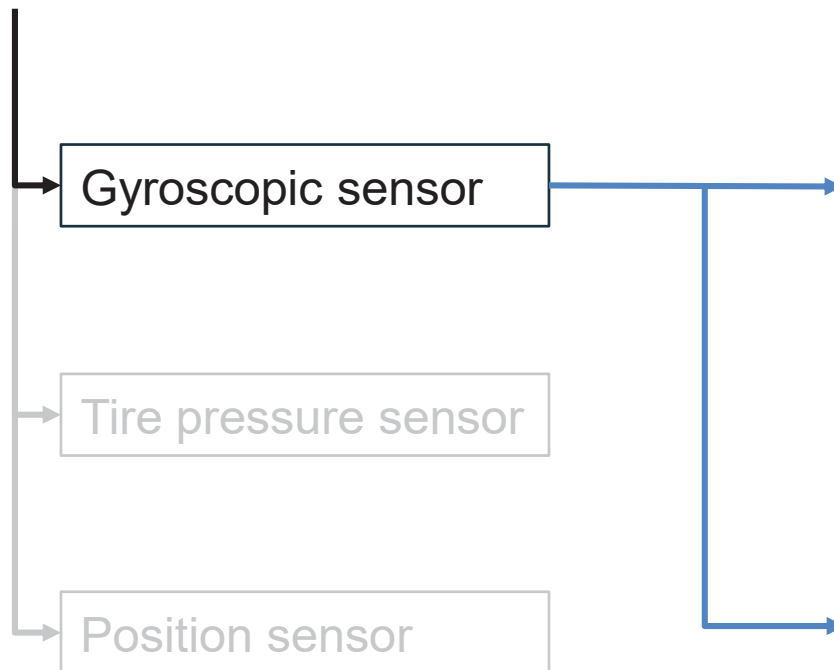
Supplemental Morellas Declaration

As to the gyroscope sensor, the examples of “gyroscope information” in the cited portion of Koebler650 are “vehicle’s status information” and “current slope/grade of road.” However, these examples of information do not necessarily represent vibration information. Koebler650 does not describe how “vehicle’s status information” and “current slope/grade of road” are further processed to identify vibration information.

TESLA-1054, ¶153 (cited in Reply, 16)

Analysis to Determine *Amount of Vibration* – Petitioner's Expert

Relevant sensors identified in POR



Supplemental Morellas Declaration

A “vehicle’s status information” represents a generic category of status information relating to the vehicle...while certain parameters described in Koebler650...[that] may correlate with vibration, Koebler650 fails to describe processing these parameters to determine vibration information.

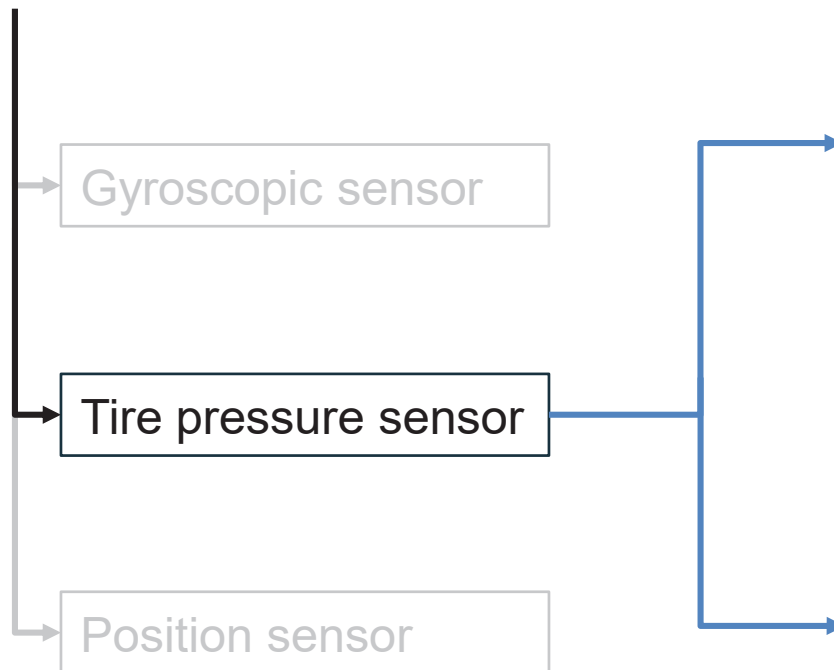
TESLA-1054, ¶¶53 (cited in Reply, 16)

Since slope/grade and vibration describe distinct physical characteristics of the driving environment, determining slope/grade of a road does not necessarily require analyzing vibration information.

TESLA-1054, ¶¶55 (cited in Reply, 16)

Analysis to Determine *Amount of Vibration* – Petitioner's Expert

Relevant sensors identified in POR



Supplemental Morellas Declaration

A vehicle can experience vibration even when tire pressure remains constant. Conversely, tire pressure can change without inducing measurable vibration. As such, the process of determining tire pressure does not necessarily require or involve determining an amount of vibration.

TESLA-1054, ¶¶56 (cited in Reply, 16-17)

Koebler650 describes one example where a tire pressure measurement is “used to calculate the drag force due to rolling resistance.” TESLA-1004, 21:49-50. However, a drag force due to rolling resistance does not necessarily represent vibration information.

TESLA-1054, ¶¶57 (cited in Reply, 17-18)

Analysis to Determine *Amount of Vibration* – Petitioner's Expert

Relevant sensors identified in POR

Gyroscopic sensor

Tire pressure sensor

Position sensor

Supplemental Morellas Declaration

Koebler650 suggests data collected by a position sensor may be used for determining (a) position and elevation information...and (b) destination and route tracking information...

TESLA-1054, ¶59 (cited in Reply, 18)

A vehicle can experience vibration without any meaningful change in position or elevation (e.g., shaking while idling at a stoplight) and can change position or elevation without experiencing vibration (e.g., driving smoothly uphill).

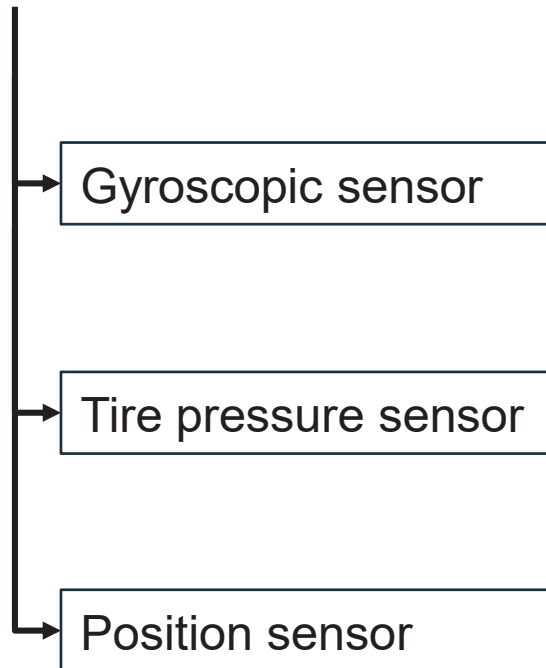
TESLA-1054, ¶60 (cited in Reply, 18)

A vehicle can experience vibration without changing its route or destination (e.g., sitting at a vibrating stoplight) and can change its route or destination without experiencing vibration (e.g., smoothly rerouting due to GPS guidance).

TESLA-1054, ¶61 (cited in Reply, 18)

Analysis to Determine *Amount of Vibration* – Patent Owner's Expert

Relevant sensors identified in POR



Bevly Deposition Transcript

Q Is it fair to say that some types of road conditions can be measured without determining any vibration experienced by the vehicle?

A Yes, I'll agree to that.

TESLA-1055, 32:14-17 (cited in Reply, 18)

Q A vehicle's current orientation can be measured without determining vibration experienced by a vehicle, correct?

A Correct.

Q And the current slope/grade of a road can also be measured without determining vibration experienced by a vehicle?

A Correct.

TESLA-1055, 37:13-20 (cited in Reply, 18)

Determining *Amount of Vibration* – Patent Owner’s Sur-Reply

Sur-Reply

...Koebler 650 references the use of sensors that a POSITA would have understood collect vibration information, including gyroscopes, tire pressure sensors, and position sensors. See *id.*, 21:42, 4:3-11, 8:48-49, 21:49-51.

Sur-Reply, 10 (citing Koebler650, 21:42, 4:3-11, 8:48-49, 21:49-51)

Koebler 650 also explains that its system considers “forces and conditions that act on the vehicle.” Koebler 650, 1:54-56. This of course informs how a POSITA would have interpreted Koebler 650’s reference to road “condition.” Koebler 650 plainly is referring not just to the fact that a road is a road, but the road’s “condition” and how that condition bears on the vehicle’s operation.

Sur-Reply, 10 (citing Koebler650, 1:54-56)

**Issue 4:
Whether Koebler650 Sufficiently
Describes Determining *Moisture***

Claim 1 – Determining *Moisture*

Claim 1

[1pre] An apparatus comprising:

...

[1c-1] 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

...

[1d] 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

[1e] 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.

TESLA-1001, Claim 1 (cited in Pet., v)

Determining *Moisture* – Petition

Petition

Nothing in Koebler650 would have led a person of ordinary skill in the art (“POSITA”) to discern that patentee had possession of a system that determines moisture in the manner required by the claims.

Pet., 15

Morellas Declaration

While the ‘616 patent describes configurations of a “power management system may communicate with a weather service,” it fails to describe the type of weather service, the type of information provided by the weather service, and how that information is received by the vehicle.

TESLA-1003, ¶180 (cited in Pet., 15)

Parameters Described in Koebler650

Determining *Moisture* – Patent Owner’s Position

Enumerated Current Condition	Parameter(s) Identified in POR
<i>Traction</i>	“operational status” “tire resistance” “rolling resistance” <i>See</i> POR, 26-29
<i>amount of vibration</i>	“terrain” “condition of a road” <i>See</i> POR, 30-32
<i>Moisture</i>	“weather around the vehicle,” e.g., “rain” <i>See</i> POR, 20-23

Reply, 9

Determining *Moisture* – Petitioner’s Reply

Reply

iQar fails to produce evidence sufficiently demonstrating possession of determining moisture based on Koebler’s disclosure of “rain.”

Reply, 18

Supplemental Morellas Declaration

Rain and moisture are correlated, but Koebler650 does not describe how moisture information is determined from detecting rain. Koebler650 also provides no detail regarding examples of rain information that are determined by its vehicle system.

TESLA-1054, ¶62 (cited in Reply, 18)

A vehicle system detecting rain typically relies on rain sensors (e.g., optical or acoustic sensors on the windshield) to determine active precipitation, which may be used for automatic wipers or weather-adaptive driving systems. In contrast, detecting moisture could involve other types of sensors, including one or more of humidity sensors, road condition sensors, and tire slip detection to assess surface wetness, which impacts traction control, braking performance, and adaptive cruise control, regardless of whether rain is currently falling.

TESLA-1054, ¶63 (cited in Reply, 18)

Determining *Moisture* – Patent Owner's Expert

Bevly Deposition Transcript

Q Koebler650 doesn't describe determining moisture information from rain, does it?

...

A Sorry. Not directly from rain, no.

TESLA-1055, 20:1-14 (cited in Reply, 19)

Determining *Moisture* – Patent Owner’s Sur-Reply

Sur-Reply

Koebler 650 discloses determination that it is raining at the vehicle’s location. See, e.g., Koebler 650, 21:29-63 (“appropriate sensors” can determine conditions such as “rain”); Fig. 9 (showing receipt of rain/precipitation information for the vehicle’s location). Rain is undeniably a type of moisture.

Sur-Reply, 11 (citing Koebler650, 21:29-63; and Ex-2031, 27:19-21)

Analysis to Determine *Moisture*

Analysis to Determine *Moisture* – Patent Owner Response

POR

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.

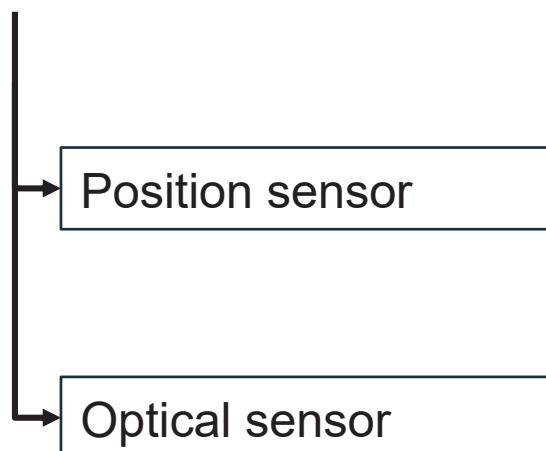
POR, 23

As another example, Koebler650 specifically discloses the use of Enumerated "optical sensors."

POR, 24

Analysis to Determine *Moisture* – Petitioner’s Reply

Relevant sensors identified in POR



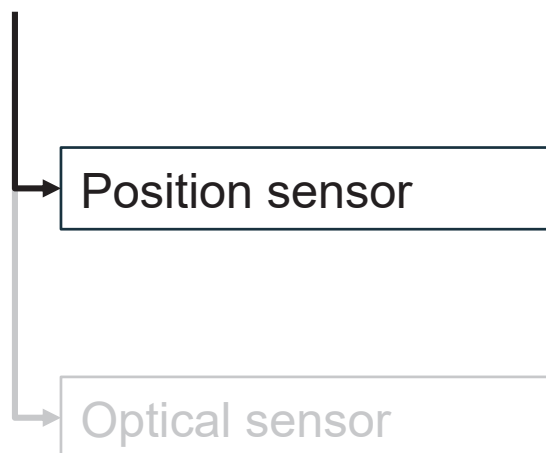
Reply

iQar also fails to produce evidence sufficiently demonstrating possession of processing techniques relating to ***an amount of vibration*** based on Koebler650’s disclosure of sensor functionality. The POR focuses on Koebler650’s description of sensor data samples collected by a gyroscopic sensor, a tire pressure sensor, and a position sensor but fails to identify any description of how such collected data is further processed to determine vibration information.

Reply, 15-16

Analysis to Determine *Moisture* – Petitioner’s Expert

Relevant sensors identified in POR



Supplemental Morellas Declaration

As to the position sensor, the Bevely Declaration references communications with a “weather service” and analyzing such communications in relation to position information.

TESLA-1054, ¶¶65 (cited in Reply, 20)

The phrase “weather information” broadly includes various types of parameters, including some that are not related to moisture information. For example, a weather service may only provide information related to temperature, wind, visibility, and barometric pressure.

TESLA-1054, ¶¶65 (cited in Reply, 20)

Analysis to Determine *Moisture* – Petitioner’s Expert

Relevant sensors identified in POR

Position sensor

Optical sensor

Supplemental Morellas Declaration

As to the optical sensor, the Bevly Declaration references generic descriptions relating information input. Ex-2001, ¶¶98 (citing TESLA-1004, 2:27-29, 3:63-67, 4:14-18, 4:25-30, 7:26-31, 19:59-65). These descriptions do not provide specific examples of processing techniques to determine moisture information.

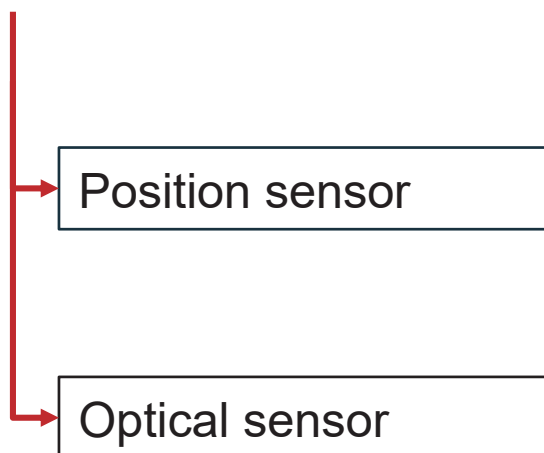
TESLA-1054, ¶¶66 (cited in Reply, 20-21)

Koebler650 focuses generally on processing relating to “external environmental information,” but this is a broad phrase that does not necessarily include moisture information.

TESLA-1054, ¶¶67 (cited in Reply, 21)

Analysis to Determine *Moisture* – Patent Owner's Expert

Relevant sensors identified in POR



Bevly Deposition Transcript

Q Koebler650 doesn't describe determining moisture information from rain, does it?

..

A Sorry. Not directly from rain, no.

TESLA-1055, 20:1-4 (cited in Reply, 21)

Determining *Moisture* – Patent Owner’s Sur-Reply

Sur-Reply

Koebler 650 discloses determination that it is raining at the vehicle’s location. See, e.g., Koebler 650, 21:29-63 (“appropriate sensors” can determine conditions such as “rain”); Fig. 9 (showing receipt of rain/precipitation information for the vehicle’s location). Rain is undeniably a type of moisture.

Sur-Reply, 11 (citing Koebler650, 21:29-63; and Ex-2031, 27:19-21)