

**UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD**

**TESLA, INC.,
Petitioner**

v.

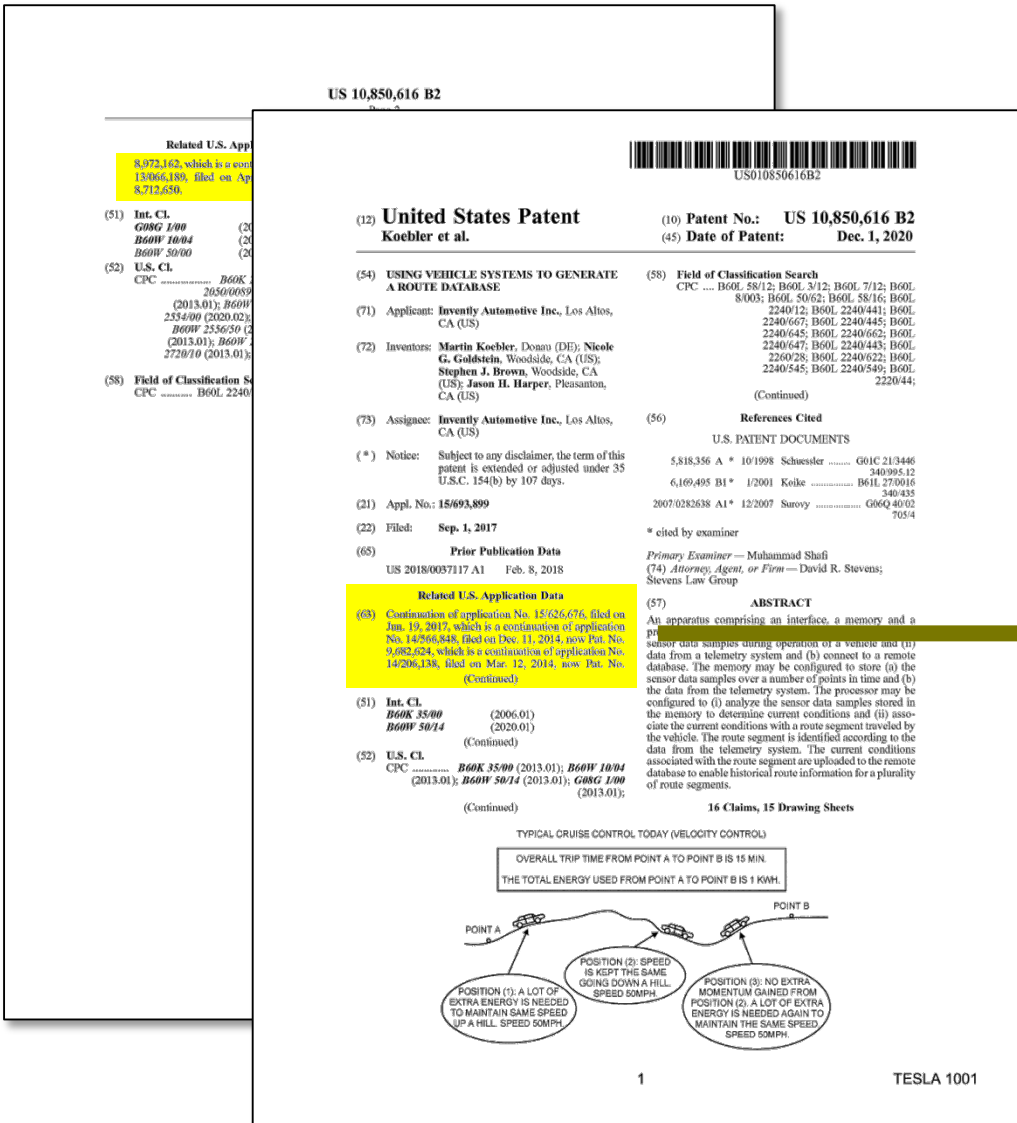
**iQAR INC.,
Patent Owner**

U.S. Patent No. 10,850,616 B2

Case No. IPR2024-00630

**PATENT OWNER'S HEARING DEMONSTRATIVES
July 1, 2025**

The '616 Patent is a Continuation of Koebler 650



Related U.S. Application Data

(63) Continuation of application No. 15/626,676, filed on Jun. 19, 2017, which is a continuation of application No. 14/566,848, filed on Dec. 11, 2014, now Pat. No. 9,682,624, which is a continuation of application No. 14/206,138, filed on Mar. 12, 2014, now Pat. No. 8,972,162, which is a continuation of application No. 13/066,189, filed on Apr. 8, 2011, now Pat. No. 8,712,650.

*Ex. 1001, '616 Patent at Cover
(see also Paper 12, Response at 1)*

The '616 Patent – Claim 1

1. An apparatus comprising:

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;

a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system; and

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

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

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

*Ex. 1001, '616 Patent at Claim 1,
(see also Paper 7, Institution Decision at 5-6)*

The Limitations-at-Issue Were Added via Examiner's Amendment

Application/Control Number: 15/693,899
Art Unit: 3663

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ALLOWANCE

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Atty. Paul Johnson (Reg. # 59,375) on 07/17/2020. The application has been amended as follows:

As per Claim 1, the entire claim 1 has been replaced by the following amended claim 1 :

--1. An apparatus comprising:

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;

a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system; and

a processor configured to (i) analyze said sensor data samples stored in said memory to determine current conditions and (ii) associate said current conditions with said route segment, wherein (a) said route segment is identified according to said data

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from said telemetry system and (b) said current conditions associated with said route segment are uploaded to said remote database to create historical route information for a plurality of route segments;

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

wherein said current conditions comprise at least one of: drag, wind resistance, tire resistance, a location relative to a destination, traffic patterns, an amount of light energy, a position of the sun, geographical information, an elevation of said vehicle, a grade of a road, a location of stoplights, a timing of stoplights, weather, a wind direction, a wind velocity, a temperature, air pressure, moisture, visibility, an amount of vibration, and traction.—

As per Claim 18, the entire claim 18 has been replaced by the following amended claim 18 :

--18. A vehicle comprising:

a power train;

a drive train;

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;

*Ex. 1002, File History at 28-29,
(see also Paper 15, Sur-Reply at 3)*

Koebler 650 Admittedly Provides Support for All the Claimed “Sensors” and Most of the Claimed “Conditions”

Admittedly supported “sensor[s]”

1. An apparatus comprising:

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;

a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system; and

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

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

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

Admittedly supported “conditions”

Paper 2, Petition at 14-20

Petitioner's Briefing is Replete With Legal Errors

- ✗ Petitioner improperly faults Koebler 650 for not including a verbatim recitation of the claims.
- ✗ Petitioner ignores that a specification must only “reasonably convey” possession.
- ✗ Petitioner improperly faults Koebler 650 for not describing every conceivable way to determine the claimed conditions.
- ✗ Petitioner improperly assumes that the mere fact that the claimed sensors also measure conditions other than those claimed somehow negates written description.
- ✗ Petitioner improperly considers only discrete Koebler 650 passages in isolation while ignoring what Koebler 650 describes when read as a whole.

*See Paper 12, Response at 2-3;
Paper 15, Sur-Reply at 1-2*

Koebler 650 Broadly Describes the Use of Sensors to Detect Current Conditions

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

The examples of operational status information inputs are only intended to illustrate the kinds of operational 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. 1004, Koebler 650, 21:29-31, 8:65-9:4
(see also Paper 12, Response at 13-14)*

Koebler 650 Provides Adequate Written Description Support

- ✓ Koebler 650 describes determining “***weather,***” “***temperature,***” “***wind velocity,***” “***wind direction,***” “***air pressure,***” “***timing of stoplights,***” and “***location of stoplights***” conditions
- ✓ Koebler 650 describes determining a “***traction***” condition
- ✓ Koebler 650 describes determining a “***vibration***” condition
- ✓ Koebler 650 describes determining a “***moisture***” condition

The Claims Allow the Use of Other, Unclaimed Data Along with “Sensor Data Samples” When Determining “Conditions”

1. An apparatus comprising:

an interface configured to (a) receive (i) sensor data samples during operation of a vehicle and (ii) data from a telemetry system and (b) connect to a remote database;

a memory configured to store (a) said sensor data samples for different points in time along a route segment travelled by said vehicle and (b) said data from said telemetry system; and

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

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

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

*Ex. 1001, ‘616 Patent at Claim 1,
(see also Paper 12, Response at 6-7)*

When Instituting, the Board Correctly Found that Other, Non-Enumerated Sensors Are Permitted

As noted above, on this preliminary record we interpret “at least one of . . . and” in the disjunctive, requiring only one of the Enumerated Sensors and only one of the Enumerated Current Conditions. Although claim 1 uses the open-ended “comprising” transitional phrase, which allows for the presence of additional non-recited sensors, such sensors are not required by the claim. Rather, claim 1 only requires one of the Enumerated Sensors to be present and one of the Enumerated Current Conditions to be determined. Thus, the recited “analyze said sensor data samples . . . to determine current conditions” requires data samples from one Enumerated Sensor be analyzed to determine one Enumerated Current Condition. Thus, on this preliminary record, we agree with Petitioner that the claims require the Enumerated Current Conditions to be determined by analyzing data from the Enumerated Sensors.

Paper 7, Institution Decision at 14

Koebler 650 Describes the Use of a Position Sensor to Determine the Claimed “Conditions” Around the Vehicle

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.,

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).

*Ex. 1004, Koebler 650, 21:29-37, 3:41-67, 7:45-62,
(see also Paper 12, Response at 16-17; Paper 15,
Sur-Reply at 13)*

Patent Owner Submitted Comprehensive Expert Testimony Explaining How a POSITA Would Interpret Koebler 650

80. Thus, a POSITA would have readily appreciated that in Koebler650, one way that weather information (such as temperature, wind, and air pressure) and traffic information (such as stoplight location and timing) is obtained is by using the determined vehicle location/position to query a “weather service, a map service, a traffic service, etc.” for location specific weather and traffic information. Koebler650, 8:22-24; *see also id.*, Fig. 9 (referencing the provision of weather and traffic information from an “external” source). As of the filing date of Koebler650, it was known that such services provided these conditions. 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.”).

*Ex. 2001, Bevely Dec., ¶ 80,
(see also Paper 12, Response at 17-18)*

Koebler 650 Provides Adequate Written Description Support

- ✓ Koebler 650 describes determining “*weather*,” “*temperature*,” “*wind velocity*,” “*wind direction*,” “*air pressure*,” “*timing of stoplights*,” and “*location of stoplights*” conditions
- ✓ Koebler 650 describes determining a “***traction***” condition
- ✓ Koebler 650 describes determining a “***vibration***” condition
- ✓ Koebler 650 describes determining a “***moisture***” condition

In Reply, Petitioner Premises its Arguments on a New—and Extremely Narrow—Understanding of “Traction”

The POR narrowly defines “traction” as “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.” POR, 27 (citing Ex-2001, ¶129). This definition departs from plain meaning and iQar fails to justify such departure based on the intrinsic record. Its expert also admitted that the definition is not found within the written description. TESLA-1055, 40:12-41:1. The POR also fails to support the alleged definition with credible evidence, since the expert testimony it cites is uncorroborated and largely repeats the same analysis. *Compare* POR, 27 and Ex-2001, ¶129.

iQar’s definition focuses only on power transfer. Dr. Morellas identifies a more appropriate definition, where “traction is ‘defined as a physical process in which a tangential force is transmitted across the interface between two bodies through dry friction or an intervening fluid film, resulting in motion, stoppage, or the transmission of power.’” *Id.*, ¶29 (citing TESLA-1057, 5). He also explains

Paper 14, Petitioner Reply at 10

The Claims Only Require a Determination of a “Traction” “Condition,” Not a Traction Calculation

129. 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. Thus, when a vehicle’s wheels have “traction,” the wheel rotation acts to propel the vehicle along the roadway. When the vehicle’s wheels lose “traction,” they spin and thus are no longer acting to propel the vehicle along the roadway.

*Ex. 2001, Bevly Dec., ¶ 129
(see also Paper 12, Response at 27; Paper 15, Sur-Reply at 6-7)*

Patent Owner Submitted Comprehensive Expert Testimony Explaining How a POSITA Would Interpret Koebler 650

130. Thus, 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 also be describing the determination of “traction.” When “tire resistance” or “rolling resistance” is zero or low, the vehicle has lost traction. When “tire resistance” and “rolling resistance” are not zero, the vehicle has traction. *See, e.g.*, Ex. 2002, ¶ [0052] (noting that “traction control systems” “detect events relating to the frictional interaction between the tires and the roadway”).

131. When Koebler650 was filed, it was well-known and common to measure traction for purposes of, for example, anti-lock braking systems. Moreover, at that time, a POSITA would have recognized that wheel RPM sensors—one of the types of sensors not only employed by Koebler650 but listed by claims 1, 15, and 16 of the '616 patent—were the key component of traction control and anti-lock braking systems.

132. The primary purpose of this type of sensor is to determine differences in wheel rotation indicative of losses of traction. *See, e.g.*, 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 (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”)

*Ex. 2001, Bevly Dec., ¶¶ 130-132
(see also Paper 12, Response at 27-29)*

Koebler 650 Provides Adequate Written Description Support

- ✓ Koebler 650 describes determining “*weather*,” “*temperature*,” “*wind velocity*,” “*wind direction*,” “*air pressure*,” “*timing of stoplights*,” and “*location of stoplights*” conditions
- ✓ Koebler 650 describes determining a “*traction*” condition
- ✓ Koebler 650 describes determining a “*vibration*” condition
- ✓ Koebler 650 describes determining a “*moisture*” condition

Koebler 650 Determines Information About the Terrain, Road Condition, and the Impact of These on the Vehicle

106. Although Koebler650 doesn't expressly disclose determining the amount of vibrations, it does discuss using information about the "terrain" and the "condition of the road," and a POSITA would have known this can be assessed using vibration measurements. Specifically, Koebler650 repeatedly explains that its system is intended to determine "information" regarding both the "external environment of the vehicle" and the "operational status of the vehicle." Koebler650, 2:21-27; *see also id.*, 3:30-40 (similarly referencing "information about the external environment" and "operational status of the vehicle"); 6:7-11 (referencing both "environmental conditions" and "the current ... operational state of the vehicle"); 7:18-23 (similar)

107. This can entail a determination of "external factors (e.g., forces and conditions that act on the vehicle)" and "internal conditions (e.g., the current status of the vehicle and [its] component parts)[.]" *Id.*, 1:53-56; *see also id.*, 7:36-38 (similarly noting that "forces acting on the vehicle" are determined).

108. Koebler650 also includes numerous examples of the conditions that can be determined. This can include determining that the vehicle is moving "across different terrain (e.g., roads having different elevation)." *Id.*, 6:47-49. Similarly, the system can determine the "current slope/grade of road" (*id.*, 7:51) and "present road conditions" (*id.*, 7:60). Vehicle "operational status" information can include the "manner in which the vehicle is traveling (e.g., velocity, acceleration, etc.)" and other information such as "the vehicle's current orientation," "drag force due to rolling resistance," and the perceived "weight of vehicle." *Id.*, 8:32-51; *see also id.*, 7:1-4 (similarly noting that Koebler650 detects changes in conditions such as the "rolling resistance of the vehicle.")

*Ex. 2001, Bevly Dec., ¶¶ 106-108
(see also Paper 12, Response at 31-32)*

Koebler 650 Determines Information About Rolling Resistance

109. Vehicle “rolling resistance” is the force resisting the motion of a rolling body (*i.e.*, the vehicle’s wheel). *See, e.g.*, Ex. 2009, 1:14-15; Ex. 2010 at 141 (“rolling resistance” is “the force resisting ... motion when a body ... rolls on a surface”); Ex. 2011 at 7 (“rolling resistance is the force required to keep an object such as a wheel or tire moving”)

110. There are multiple factors that impact rolling resistance: (1) tire deformation (which results in energy loss) and (2) the interaction between the tire and the roadway (which impacts both the amount of deformation and the frictional forces imposed on the tire). *See* Ex. 2009, 1:23-31; Ex. 2010 at 141-142 (referencing the impact of hysteresis losses, plastic deformation, and slippage on rolling resistance); Ex. 1011 at 7 (similarly explaining that “hysteretic losses from deformation” as the tire flexes and strains and “comes in and out of contact” of the road, along with tire “deformation” resulting from the road surface, impacts rolling resistance).

111. Generally, “[s]moother roads create less rolling resistance than rougher roads.” Ex. 2009, 1:31-34; Ex. 2010 at 146-146 (“smooth surfaces produce lower rolling resistance than soft and rough surfaces”); Ex. 2011 at 8-11 (noting that “roughness of ... the road” impacts rolling resistance.)

*Ex. 2001, Bevely Dec., ¶¶ 109-111
(see also Paper 12, Response at 30-31)*

Patent Owner's Expert Explained That Koebler 650 Calculates Rolling Resistance (and Thus Also Determines a Vibration Amount)

113. Per Koebler650, while “rolling resistance” coefficients employed in its system’s energy calculations can be “supplied by [a] tire manufacturer,” they may also be “measured values.” Koebler650, 16:25-36. Moreover, Koebler650 explains that in its system “rolling resistance” can “vary for different road surfaces.” *Id.* Koebler650 also discloses that the system may use “road conditions” as a current condition. *See* Ex. 1004, 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”).

114. Taken together, a POSITA would have understood that one of the conditions Koebler650 intended its system to detect is whether the vehicle is traveling over a smooth road/terrain (and thus is not subject to substantial vibrations leading to lower rolling resistance) or traveling over a rough road/terrain (and thus is subject to substantial vibrations leading to increased rolling resistance).

115. The relative amount of rolling resistance is important because a higher rolling resistance will result in increased energy usage, while a lower rolling resistance will result in lower energy usage. And again, there is a correlation between rolling resistance and vibration: increased vibration resulting from a rough road surface leads to increased rolling resistance.

*Ex. 2001, Bevly Dec., ¶¶ 113-115
(see also Paper 12, Response at 30-32)*

Koebler 650 Employs Sensors that Measure Vibration

117. For example, when measuring “rolling resistance,” rather than simply employing values supplied by the tire manufacturer, “tire pressure” sensor measurements can be employed. *Id.*, 21:49-51. Tire pressure sensors are one of the types of sensors referenced by claims 1, 15, and 16.

118. Consistent with Koebler650’s own description of the use of tire pressure sensors when making rolling resistance determinations, when Koebler650 was filed, it was known that “tire pressure sensor[s]” can be employed to detect “[t]ire pressure changes caused by ground vibration excitation from the interaction between the tire and pavement.” Ex. 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).

*Ex. 2001, Bevely Dec., ¶¶ 117-118
(see also Paper 12, Response at 33, 35-36)*

Koebler 650 Employs Sensors that Measure Vibration

122. In my opinion, because Koebler650 references the collection of “gyroscope information,” a POSITA would have understood Koebler650 to be describing—and its inventors to have contemplated use of—the types of gyroscopes commonly available at the time. This of course, included IMUs which were known to measure various type of vibrations using accelerometers and gyroscopic sensors.

123. As of the filing date of Koebler650, it was also known that IMUs could be used to determine vibrations as a measurement of road conditions. It was known, for example, that accelerometers could be used to measure vibrations from relatively smooth roads characterized by minor vibrations. Ex. 2026, 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 to determine larger vibrations (i.e., fluctuations in angular movement) such as those a car would experience when traveling rougher and bumpier route segments, i.e., segments that may have a material effect on efficiency (e.g. unpaved roads, pot holes, speedbumps, etc.). Ex. 2026, 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).

*Ex. 2001, Bevly Dec., ¶¶ 122-123
(see also Paper 12, Response at 34)*

Koebler 650 Employs Sensors that Measure Vibration

124. As another example, a POSITA would have understood that position sensors could be used to determine certain types of vibrations. Specifically, as of the filing date of Koebler650, it was known that such sensors could be used to measure movement and vibrations along a particular axis (e.g., vertical movement). 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”). It was known, for example, that potentiometers and displacements sensors (which are types of positions sensors) could be used to measure suspension displacement, which can reflect vibrations depending on the terrain. See, e.g., Ex. 2030, 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.”). Given the wide use of these systems and the broad non-limiting disclosures of Koebler650, a POSITA would have understood that the inventors were in possession of the claimed invention, including implementations that determine the amount of certain types of vibrations in a vehicle using, for example, tire pressure sensors, gyroscopic sensors, or position sensors.

Ex. 2001, Bevly Dec., ¶ 124 (see also Paper 12, Response at 35-36)

Koebler 650 Provides Adequate Written Description Support

- ✓ Koebler 650 describes determining “*weather*,” “*temperature*,” “*wind velocity*,” “*wind direction*,” “*air pressure*,” “*timing of stoplights*,” and “*location of stoplights*” conditions
- ✓ Koebler 650 describes determining a “*traction*” condition
- ✓ Koebler 650 describes determining a “*vibration*” condition
- ✓ Koebler 650 describes determining a “***moisture***” condition

Koebler 650 Unambiguously Describes Determining a “Moisture” Condition Around the Vehicle

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

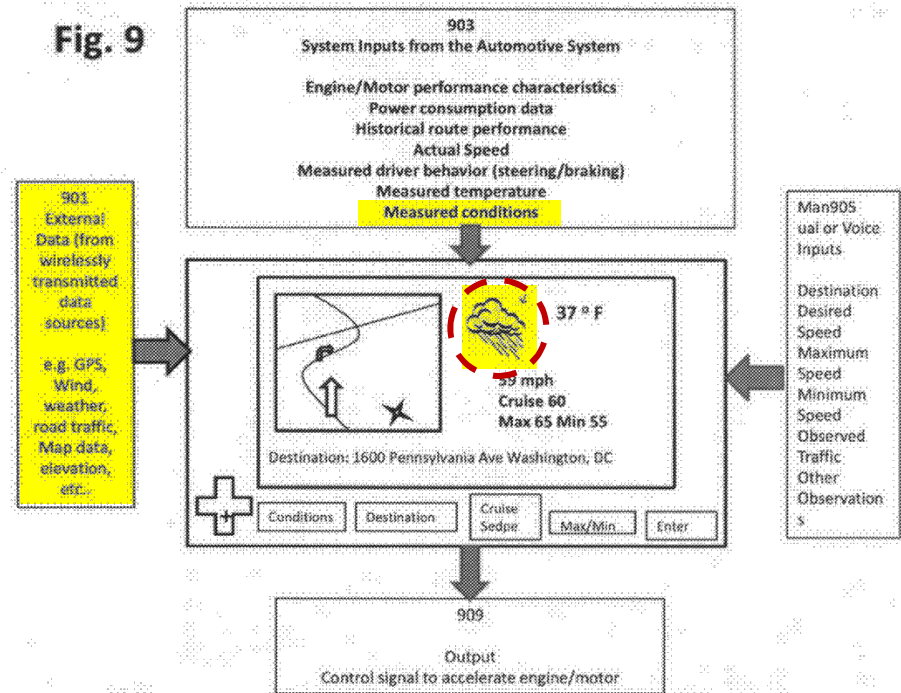
...

detect latitude, longitude, time of day, date), weather (e.g., wind direction and velocity, rain, sun, snow, etc.), battery

...

For example, information may be available only when a telecommunications network (e.g., satellite, cellular, etc.) is available.

Fig. 9



Ex. 1004, Koebler 650, 21:29-63, Fig. 9,
(see also Paper 12, Response at 20-21; Paper 15, Sur-Reply at 11-12)

Patent Owner Submitted Comprehensive Expert Testimony Explaining How a POSITA Would Interpret Koebler 650

92. A POSITA would have understood that by determining that it is precipitating (i.e., raining or snowing), Koebler650 is in fact making a “moisture” determination. When it is raining or snowing, the vehicle is of course subjected to moisture conditions that are not present when it is not raining or snowing. For instance, there will be more moisture on the road surface and the vehicle’s windshield. *See* Ex. 2020, 1:50-51 (describing various “moisture variants” including “water film, drops, mist, fog, snow, ice, etc.”)

*Ex. 2001, Bevly Dec., ¶ 92
(see also Paper 12, Response at 21-22)*

Dr. Bevly Confirmed that Koebler 650 Determines a Moisture Condition at His Deposition

Q So here Koebler650 describes rain as an example of weather information, correct?

A Yes.

Q Rain is not the same thing as moisture, right?

MR. HERMAN: Objection; form.

A Well, rain is moisture, I guess, so rain is moisture falling from the sky.

Q (BY MR. CHOWDHURY) A measurement of rain is not the same thing as a measurement of moisture, correct?

MR. HERMAN: Objection; form.

A It gives an indication that there is moisture around.

Q (BY MR. CHOWDHURY) And what is your understanding of moisture?

A Moisture is information that the windshield or car or road is wet, which happens when it's raining.

Q So just to confirm, your understanding of moisture is information that a surface is wet?

A Or that there's water present.

*Ex. 1055, Bevly Depo., 19:3-21
(see also Paper 15, Sur-Reply at 12)*