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Paper 9
Date: July 30, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

IQAR INC.,
Patent Owner.

IPR2024-00543
Patent 10,882,399 B2

Before JASON W. MELVIN, SEAN P. O'HANLON, and BRENT M. DOUGAL, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Tesla, Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 1–20 ("the challenged claims") of U.S. Patent No. 10,882,399 B2 (Ex. 1001, "the '399 patent"). Paper 2 ("Pet."), 1. iQar Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). With our authorization (*see* Ex. 3001), Petitioner filed a Preliminary Reply (Paper 7, "Prelim. Reply") and Patent Owner filed a Preliminary Sur-reply (Paper 8, "Prelim. Sur-reply").

Institution of an *inter partes* review is authorized by statute only when "the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). A decision to institute may not institute on fewer than all claims challenged in the petition. *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1354, 1359–60 (2018). If the Board institutes a trial, the Board will institute on all challenges raised in the petition. *See* 37 C.F.R. § 42.108(a) ("When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.").

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). For the reasons set forth below, upon considering the parties' briefs and evidence of record, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged

claims. Thus, we institute *inter partes* review of all challenged claims based on all asserted grounds.

B. Real Parties in Interest

Petitioner identifies itself as the sole real party in interest. Pet. 89.

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

The parties are reminded of their continuing obligation to update their mandatory notice information "within 21 days of a change of the information." 37 C.F.R. § 42.8(a)(3).

C. Related Matters

The parties indicate that the '399 patent is the subject of the following district court proceeding:

> *iQar Inc. v. Tesla, Inc.*, No. 1-23-cv-00694 (W.D. Tex. filed June 20, 2023).

Pet. 89; Paper 4, 1. It appears that this proceeding has been transferred to the Northern District of California under the caption:

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

D. The Challenged Patent

The '399 patent discloses methods and systems for controlling power applied to a vehicle engine. Ex. 1001, 1:17–18. The '399 patent purports that, currently, fuel consumption cannot be precisely controlled by a driver, and operational assisting devices typically do not optimize power consumption of the vehicle. *Id.* at 1:22–27, 1:52–55. The '399 patent

purports to improve upon optimization of power consumption of a vehicle via "power management logic that can calculate an applied power for the vehicle engine based on information provided from the external environment of the vehicle, the operational status of the vehicle, one or more command inputs from a driver, and one or more operational parameters of the vehicle." *Id.* at 2:30–39.

The '399 patent describes "steps that may be followed to optimize the energy supplied to an engine so that the vehicle travels at a fuel-efficient speed." Ex. 1001, 11:44–46; *see also id.* at Fig. 2 (illustrating a flowchart of steps to optimize power).

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

Id. at 11:46–56. "The route is determined based on the current position of the vehicle and a final destination position." *Id.* at 11:64–65. The destination may be input by the driver before or during the trip (*id.* at 12:4–6), or the destination may be derived from information about the driver, current location, time of day, and past trips (*id.* at 14:17–47). "In some variations, the route may be broken up into segments that may be used by a power management device to optimize the power needed to travel this segment." *Id.* at 14:10–13. Accuracy of the model increases as the number of segments increases. *Id.* at 14:40–42. "The route may be continuously re-

segmented" as the vehicle moves. *Id.* at 14:31–33. "The power required by the vehicle to travel along a route, or a segment of the route, may be estimated or calculated, and this calculation may be used to determine a calculated speed for the vehicle so that the power usage is optimized or minimized." *Id.* at 14:47–51. The optimal speed for each segment may be calculated by any appropriate method, and may include the use of energy calculating logic. *Id.* at 15:13–18.

E. The Challenged Claims

Petitioner challenges claims 1–20 of the '399 patent. Pet. 1. Claims 1 and 11 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below.

> 1. A method of electric vehicle operation, comprising:
>
> determining a segment of a vehicle route;
>
> determining information about an external environment of a vehicle, information about operational status of the vehicle, information from external command input telemetry in combination with user command inputs to the vehicle including voice command inputs; and
>
> applying calculated electric power to the vehicle to travel along the segment of the vehicle route at a calculated speed.

Ex. 1001, 27:43–52.

F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

Name	Reference	Exhibit
Hongo	English-language translation of JP 2003-276472 (Ex. 1007), which was published September 30, 2003	1005

Name	Reference	Exhibit
Obradovich	US 6,282,464 B1, issued August 28, 2001	1008
Niki	US 7,059,435 B2, issued June 13, 2006	1009
Kudo	US 2005/0251325 A1, published November 10, 2005	1010
Kuroda	US 6,314,347 B1, issued November 6, 2001	1011
Newstrom	US 7,552,008 B2, issued June 23, 2009	1012

Petitioner asserts the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 5, 6, 9–12, 15, 16, 19, 20	103(a)[1]	Hongo, Obradovich, Niki
3, 4, 13, 14	103(a)	Hongo, Obradovich, Niki, Kudo
7, 17	103(a)	Hongo, Obradovich, Niki, Kuroda
8, 18	103(a)	Hongo, Obradovich, Niki, Newstrom

Pet. 1–2. Petitioner submits a declaration of Vassilios Morellas, Ph.D. (Ex. 1003, "Morellas Declaration") in support of its contentions. Patent Owner does not submit any witness testimony with its Preliminary Response.

[1] The application resulting in the '399 patent claims priority to a date prior to the date when the Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA version of section 103.

II. ANALYSIS

A. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) when in evidence, any objective evidence of nonobviousness.[2] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is "a prism or lens" through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including: "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems;

[2] At this stage of the proceeding, the parties have not directed us to any such objective evidence.

(4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Best Med. Int'l, Inc. v. Elekta Inc.*, 46 F.4th 1346, 1353 (Fed. Cir. 2022) (quoting *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007)). "The patent's purpose can also be informative." *Id.*

Petitioner's witness, Dr. Morellas, contends that a person having ordinary skill in the art at the time of the invention ("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." Ex. 1003 ¶ 27; *see also* Pet. 15 n.3 (citing same).

Patent Owner does not contest Dr. Morellas's proposed definition or proffer a definition of its own. *See generally* Prelim. Resp.

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

C. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history

pertaining to the patent. 37 C.F.R. § 42.100(b). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention" and "after reading the entire patent." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

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

Both parties assert that no interpretation of any claim terms is required. *See* Pet. 2 ("no formal claim constructions are required in this proceeding"); Prelim. Resp. 5 ("This discussion should not be taken to mean that formal claim constructions are required. The claims themselves are clear enough."). However, both parties interpret various claim terms in their arguments. *See, e.g.*, Pet. 28 (interpreting "information about an external environment of a vehicle" to "encompass[] 'any information about the environment surrounding or acting on the vehicle'") (citing Ex. 1001, 7:52–65)); Prelim. Resp. 4–7 (interpreting "a segment of a vehicle route").

We address certain ones of these claim interpretations below. No further claim interpretation is needed for this Decision.

D. Asserted Obviousness Based on Hongo, Obradovich, and Niki

Petitioner argues that claims 1, 2, 5, 6, 9–12, 15, 16, 19, and 20 would have been obvious in view of Hongo, Obradovich, and Niki. Pet. 4–62. In support of its showing, Petitioner relies upon the Morellas Declaration. *Id.* (citing Ex. 1003). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that at least one challenged claim would have been obvious in view of the combination of Hongo, Obradovich, and Niki.

1. Overview of the Asserted Prior Art

a. Hongo

Hongo discloses a "target vehicle speed determining device" that "automatically output[s] a suitable target vehicle speed according to weather, sunlight conditions, and the like." Ex. 1005, codes (54), (57), ¶ 1. Hongo's target vehicle speed determining device 100 includes a computer that is connected to DVD 105 that stores computer programs and data such as map information and speed limits, GPS device 170, and environmental information acquisition means 120. *Id.* ¶¶ 22–23, Fig. 1. The target vehicle speed determining device uses information from these sources, as well as information from driving history, to determine a target vehicle speed V0 that it outputs to automatic cruise control (ACC) system 200. *Id.* ¶¶ 24–26, 32.

The target vehicle speed determining device is operable in a trace mode and a playback mode. Ex. 1005 ¶ 25. "The trace mode is a dedicated mode for constructing the driving history DB 10 consisting of driving history data . . . ." *Id.* ¶ 26. Driving history recording means 140 acquires position information from GPS 170 and position of a driving block BKN that is defined by dividing the road being traveled into 20 m sections. *Id.* ¶ 27. The driving history recording means stores this information in driving history database 10 along with other information, such as the legal speed limit Vs, minimum radius of curvature R, road environment real-time information X, and current vehicle speed V. *Id.* ¶¶ 27–30, Fig. 3.

"In the playback mode, the block number BKN and the road environment parameter Y are specified from the current position coordinate r and the road environment real-time information X by a method equivalent to the above-mentioned driving history recording means 140 . . . ." Ex. 1005 ¶ 32. The driving history search means 130 is used to search the driving history DB 10 for driving history data 11 with matching keys (BKN, Y). *Id.* "If there are driving history data 11 in which both keys (BKN, Y) match, the average value u [of the previously recorded vehicle speed data points] can be used as . . . the target vehicle speed." *Id.* ¶ 33. Otherwise, formulas are used to calculate the target vehicle speed. *Id.* ¶¶ 35–36.

b. Obradovich

Obradovich discloses "a multimedia information and control system for use in an automobile" that "facilitates a user's retrieval and/or dissemination of information, and control of vehicle functions." Ex. 1008,

code (57), 1:9–12. Information and control system 100 includes processor 105 connected to "display interfaces 102, input interfaces 104, communications interfaces 106, output control interfaces 108, vehicle computer interfaces 110, vehicle control interfaces 112, self-test interface 114, preferences interface 116, and audio interface 118." *Id.* at 5:16–22, Fig. 1. The input interfaces include touch screen interface 104a and voice command interface 104b. *Id.* at 6:56–62, Fig. 1. "[W]herever the touch screen capability may be used to select or control various options or functions provided by system 100, the voice command is equally applicable." *Id.* at 7:17–21. The output interfaces include cruise control interface 108h. *Id.* at 8:15–18, Fig. 1.

c. Niki

Niki describes "a control apparatus for a hybrid vehicle which is mounted in a hybrid vehicle propulsion driven by jointly using an internal-combustion engine and a motor, and wherein the driving force from at least one of the internal-combustion engine and the motor is transmitted to the driving wheels." Ex. 1007, 1:12–17. More specifically, Niki discloses "a parallel hybrid vehicle" that includes "an internal-combustion engine E, a motor M, and a transmission T [that] are connected directly in series." *Id.* at 5:17–20, Fig. 1. Niki describes that control of the vehicle can be via

> a C/C (cruise control) unit 53 [that] calculates the torque value (C/C required torque) targeted during the travel control satisfying predetermined traveling conditions previously set according to the input operation of the driver, that is cruise control, for example, such as the constant speed travelling control which controls the internal-combustion engine E and the motor M so that the vehicle travelling speed VP detected in a vehicle speed sensor S1 becomes the target vehicle speed

> which is the target value of the travelling speed of the vehicle, and follow travel control for following a preceding vehicle while maintaining a predetermined vehicular gap, and outputs the torque value to the first torque selecting section 52.

Id. at 8:47–59; *see also id.* at Figs. 1–2 (illustrating the control apparatus).

2. Independent Claim 1

Petitioner relies on Hongo to disclose a method of operating a vehicle substantially as recited in claim 1, and relies on Obradovich to teach the use of voice commands and Niki to teach application of the method to a hybrid vehicle. Pet. 14–43.

a. The Preamble

Claim 1 recites "[a] method of electric vehicle operation." Ex. 1001, 27:43. Petitioner argues that "the preamble is not limiting," but nonetheless maps Niki's hybrid vehicle to the recited electric vehicle. Pet. 25–26 (citing Ex. 1009, 5:17–54, 8:47–59;[3] Ex. 2003 ¶¶ 90–91). Petitioner argues that it would have been obvious to an ordinarily skilled artisan to implement Hongo's cruise control device 100 on Niki's hybrid vehicle. *Id.* at 21–25 (citing Ex. 1005 ¶¶ 2, 6–9, 22, 68; Ex. 1009, 1:20–35, 5:17–32, 8:6–24, 8:47–59; Ex. 1003 ¶¶ 84–89).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

[3] Although Petitioner cites to Ex. 1009 "8:47–5" at page 25 of the Petition, we understand Petitioner's intention was to cite to lines 47–59, the full paragraph, as Petitioner cites to those lines elsewhere in the Petition. *See* Pet. 20, 24, 25, 40.

Hongo discloses a target vehicle speed determining device that calculates and outputs to an automatic cruise control system a suitable target vehicle speed. Ex. 1005 ¶¶ 22–26, Fig. 1. Niki discloses a hybrid electric vehicle including cruise control unit 53 that controls both internal combustion engine E and motor M to achieve a target vehicle speed. Ex. 1009, 1:17–20, 8:47–59.

Accordingly, for the foregoing reasons and on this preliminary record, to the extent the preamble is limiting, Hongo and Niki support Petitioner's contentions. We determine that, on this preliminary record, Petitioner sets forth reasoning with rational underpinning as to why a person having ordinary skill in the art would have combined the teachings of Hongo and Niki. *See, e.g.*, Pet. 21–23 (arguing that the modification "would have involved choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success" and "Niki's teachings and/or suggestions improve vehicle control in the Hongo vehicle").

b. The Segment Recitation

Claim 1 recites "determining a segment of a vehicle route." Ex. 1001, 27:44. Petitioner maps Hongo's 20 m section of a route being driven, defined by a driving block BKN, to the recited segment of a vehicle route and argues that Hongo's driving history recording means 140 determines the driving block in which the vehicle is currently traveling based on the vehicle's current position. Pet. 26–29 (citing Ex. 1005 ¶¶ 27, 32, Fig. 2; Ex. 1003 ¶¶ 96–98).

Patent Owner argues that claim 1 "require[s] an ordered, two-step process." Prelim. Resp. 6. Patent Owner argues that claim 1 "first

'determin[es] a segment of a vehicle route,'" then "'calculated electric power' must be 'appl[ied]' 'to the vehicle to travel along the segment of the vehicle route at a calculated speed.'" *Id.* (alterations in original) (quoting Ex. 1001, 27:44, 50–51 (claim 1)). According to Patent Owner, "[t]hese interrelated claim limitations require that the 'segment of a vehicle route' be one that the vehicle has not yet travelled." *Id.*; *see also* Prelim. Sur-reply 1 (advancing similar arguments). Patent Owner characterizes claim 1 as "requir[ing] *prospective* speed/power calculations." Prelim. Resp. 7 (citing Ex. 1001, 3:55–4:10, 5:49–55, Fig. 2).

Patent Owner argues that Hongo fails to disclose such a process. Prelim. Resp. 7–11. Rather, Patent Owner argues, Hongo's "'blocks' have nothing at all to do with any 'route' being traveled by the vehicle" and "Hongo's system is unaware of the vehicle's 'route'" and therefore "does not determine or calculate 'a segment of a vehicle route' as required by" claim 1. *Id.* at 9. Continuing, Patent Owner argues that Hongo's blocks "have no correlation to the actual route the vehicle is traveling" because "the 'block[s]' or 'BKN' of data stored by its ACC system are just historical data." *Id.* at 9–10 (alteration in original). Finally, Patent Owner argues that, "when Hongo's ACC system determines the vehicle's speed, it considers and employs only the *current* vehicle position and condition," but does not "make a *prospective* determination of power needed for the vehicle to travel at speed over a 'segment' of a 'route' that the vehicle *has not yet reached*." *Id.* at 10.

Petitioner replies that Patent Owner's interpretation that claim 1 requires prospective speed and power calculations improperly departs from the plain and ordinary meaning of the claim terms. Prelim. Reply 1–2.

According to Petitioner, the '399 patent uses permissive language and therefore does not require prospective calculations. *Id.* at 1 (citing Ex. 1001, 3:55–58). Petitioner argues that the '399 patent discloses calculating power and speed for a route the vehicle is currently traveling. *Id.* at 2 (citing Ex. 1001, 5:38–55, 14:5–39, 19:33–36, 20:19–25).

Patent Owner replies that, in Figure 2, the '399 patent discloses prospective determinations of power and speed. Prelim. Sur-reply 1–2 (citing Ex. 1001, 3:55–4:10, 5:49–55, 6:61–7:18, 11:44–50, Fig. 2). However, Patent Owner acknowledges that the '399 patent discloses "mak[ing] power/speed determinations for current segments." *Id.* at 2.

We fail to see, and Patent Owner does not identify, any requirement in claim 1 that electric power and speed for a route segment be calculated prior to the vehicle traveling along the segment. Indeed, claim 1 does not specify how or when electric power and speed are calculated. Rather, claim 1 merely recites "applying calculated electric power to the vehicle to travel along the segment of the vehicle route at a calculated speed." Ex. 1001, 27:50–52. The recited *applying* calculated electric power to a vehicle to travel along the segment at a calculated speed at least implies that the vehicle is currently traveling along the segment.

Patent Owner's contentions are also unavailing because they contradict the '399 patent. For example, the '399 patent discloses that the power management device may rely on historical route information to optimize the energy used to travel each segment of a route. Ex. 1001, 17:39–43, 17:64–67. Such reliance on historical data beneficially reduces the amount of required computing power. *Id.* at 18:5–9. Under this approach, "the location of the vehicle is periodically determined" and "used

to determine[] a historical segment *corresponding to the current location*." *Id.* at 18:30–33 (emphasis added). If the vehicle has moved into a new route segment, the historical data is queried to determine the most efficient speed to travel for the current segment. *Id.* at 18:39–56. Thus, the '399 patent explicitly discloses calculating and applying power to a vehicle based on the route segment in which the vehicle is currently traveling. *See id.* at 18:64–67 ("The flowchart shown in FIG. 5 illustrates a continuous process, in which the power management device can determine a probable optimal speed as the current segment changes (e.g., as the vehicle moves)."), Fig. 5. Notably, Patent Owner acknowledges that the '399 patent discloses embodiments that "make power/speed determinations for current segments." Prelim. Sur-reply 2.

Hongo discloses that, when operating in playback mode, the driving history search means searches the driving history database using the current position of the vehicle as a search key. Ex. 1005 ¶ 32. The driving history database includes driving history data for 20 m sections of the road being traveled. *Id.* ¶ 27

Accordingly, for the foregoing reasons and on this preliminary record, Hongo supports Petitioner's contentions.

c. The External Environment Information Recitation

Claim 1 recites "determining information about an external environment of a vehicle." Ex. 1001, 27:45–46. Petitioner maps Hongo's road environment real-time information, specifically road surface temperature, to the recited information about an external environment of a vehicle and argues that, by processing the acquired road environment

information, Hongo's system determines the road environment information. Pet. 28–30 (citing Ex. 1005 ¶ 11, Fig. 2; Ex. 1003 ¶¶ 99–100).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Hongo discloses acquiring road environment real-time information, including road surface temperature. Ex. 1005 ¶¶ 27, 32. This information can be used to determine whether any precipitation is due to rain or snow. *Id.* ¶ 11. The target vehicle speed is determined based in part on this information. *Id.* ¶¶ 30, 32, Fig. 3.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo supports Petitioner's contentions.

d. The Operational Status Information Recitation

Claim 1 recites "determining . . . information about operational status of the vehicle." Ex. 1001, 27:46–47. Petitioner maps Hongo's current vehicle speed to the recited information about operational status of the vehicle and argues that, by processing the acquired vehicle speed in calculating target speed, Hongo's system determines the operational status information. Pet. 30–32 (citing Ex. 1005 ¶¶ 23, 28, Fig. 2; Ex. 1003 ¶ 102).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Hongo discloses that, in the trace mode, Hongo's system obtains and records the current vehicle speed. Ex. 1005 ¶ 28. These recorded vehicle speed data points are used to determine the target vehicle speed when operating in the playback mode. *Id.* ¶¶ 32–33.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo supports Petitioner's contentions.

e. The External Command Input Recitation

Claim 1 recites "determining . . . information from external command input telemetry in combination with user command inputs to the vehicle including voice command inputs." Ex. 1001, 27:47–49. Petitioner presents two mappings for this recitation. Pet. 33–35. First, Petitioner maps traffic information received by Hongo's radio to the recited information from external command input telemetry and argues that, by processing the received radio signals, Hongo's system determines the received information. *Id.* at 33–34 (citing Ex. 1005 ¶ 64; Ex. 1003 ¶¶ 105–107). Second, Petitioner maps Obradovich's navigation functionality including vehicle location information received via GPS to the recited information from external command input telemetry and argues that, by processing the received GPS signals, Obradovich's system determines the received information. *Id.* at 34–35 (citing Ex. 1008, 1:39–54, 1:55–67; Ex. 1003 ¶¶ 108–113). For both of its mappings, Petitioner relies on Obradovich to teach "using voice commands for controlling cruise control functionality via a cruise control interface," arguing that it would have been obvious to an ordinarily skilled artisan to include Obradovich's touch and voice control interfaces with Hongo's cruise control system. *Id.* at 15–18 (citing Ex. 1005 ¶¶ 3–4, 6–7, 24; Ex. 1008, 1:16–28, 3:21–49, 5:33–53; Ex. 1003 ¶¶ 76–83), 35–36 (citing Ex. 1008, 1:39–54, 2:36–47, 2:49–56, 6:57–62, 7:13–24, 8:16–18; Ex. 1003 ¶¶ 115–118).

Patent Owner does not contest this aspect of the Petition. *See generally* Prelim. Resp.

Hongo discloses that its system receives traffic information during driving and that this information is useful in determining weather- and sunlight-based deceleration coefficients that are used to calculate the target vehicle speed when a real-time environmental information search key is not found in a search of the driving history database. *Id.* ¶¶ 35, 64.

Obradovich discloses a navigation system that uses GPS signals to determine the vehicle location, speed, direction, and route to a destination. Ex. 1008, 1:39–67, 7:25–34, 12:60–13:10. Notably, Hongo also employs GPS signals to determine the vehicle location. *See, e.g.*, Ex. 1005 ¶ 23. Obradovich discloses the use of voice commands to operate the control system, including its cruise control system. Ex. 1008, 7:17–21, 8:16–19.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo and Obradovich support Petitioner's contentions. We determine that, on this preliminary record, Petitioner sets forth reasoning with rational underpinning as to why a person having ordinary skill in the art would have combined the teachings of Hongo and Obradovich. *See, e.g.*, Pet. 14–18 (arguing that implementing Obradovich's cruise control selection capabilities into Hongo's cruise control functionality would have "improved vehicle operation in Hongo by allowing a user to use voice to adjust adaptive cruise control," "improved vehicle user interfaces by increasing convenience and flexibility in input choices," and "involved incorporating prior art elements according to known methods in a vehicle to yield predictable results").

f. The Applying Recitation

Claim 1 recites "applying calculated electric power to the vehicle to travel along the segment of the vehicle route at a calculated speed." Ex. 1001, 27:50–52. Petitioner maps Hongo's target vehicle speed to the recited calculated speed. Pet. 37–38 (citing Ex. 1005 ¶¶ 35–36, 55, Fig. 2; Ex. 1003 ¶ 120). Petitioner argues that "controlling vehicle movement using the target vehicle speed itself involves calculating and applying a power corresponding to the target vehicle speed to the vehicle engine." *Id.* at 39 (citing Ex. 1003 ¶ 121). Petitioner argues that, when implementing Hongo's modified cruise control device on Niki's hybrid vehicle, the cruise control system controls and applies the calculated electric power to the electric motor to cause the vehicle to travel along the route. *Id.* at 39–42 (citing Ex. 1005 ¶¶ 17, 29, Fig. 3; Ex. 1009, 5:17–54, 8:47–59; Ex. 1003 ¶¶ 123–128).

Patent Owner contests Petitioner's arguments. Prelim. Resp. 10–13. First, Patent Owner argues that, if we consider Hongo's identifying driving blocks to correspond to the recited determining a segment, "the vehicle would already have passed the beginning of the BKN's position range and would be within the BKN at the time Hongo's system performs the speed calculation" and, thus, "Hongo would still not 'apply[] calculated electric power to the vehicle to travel along the segment of the vehicle route at a calculated speed' as the vehicle would have already traversed at least part of the 'segment.'" Prelim. Resp. 10–11 (alteration in original).

Patent Owner's arguments are unavailing for the reasons explained above regarding the Segment Recitation. As we explained, the '399 patent discloses calculating and applying power to a vehicle based on the route

segment in which the vehicle is currently traveling, and we see no requirement in claim 1 that electric power and speed for a route segment be calculated prior to the vehicle traveling along the segment.

Next, Patent Owner argues that Petitioner's contention that "controlling vehicle movement using the target vehicle speed itself involves calculating and applying a power corresponding to the target vehicle speed to the vehicle engine" (*see* Pet. 39) is improper because "[t]he claims require both a 'calculated speed' and 'calculated electric power.' The mere calculation of speed alone is insufficient." Prelim. Resp. 12. Patent Owner argues that Niki's system "only performs *instantaneous* power and speed calculations." *Id.* (citing Ex. 1009, 8:35–63; 9:1–10:23.)

Patent Owner's arguments are unavailing because they contradict the '399 patent. For example, the '399 patent discloses calculating power as a function of the calculated speed. *See, e.g.*, Ex. 1001, 2:53–55 ("The applied power may also be expressed as an optimized speed or speeds to which the vehicle is controlled."), 2:60–63 ("the devices, systems, and methods described herein may optimize the power consumption of an automotive vehicle by controlling the final speed of the vehicle").

Hongo discloses a target vehicle speed determining device that calculates and outputs to an automatic cruise control system a suitable target vehicle speed. Ex. 1005 ¶¶ 22–26, 32, Fig. 1. The target vehicle speed determining device uses stored information, GPS information, environmental information, and historic driving information to determine the target vehicle speed. *Id.* ¶¶ 22–26, 32, Fig. 1. Niki discloses a hybrid electric vehicle including a cruise control unit that controls both the internal

combustion engine and the motor to achieve a target vehicle speed. Ex. 1009, 1:17–20, 8:47–59.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo and Niki support Petitioner's contentions. We determine that, on this preliminary record, Petitioner sets forth reasoning with rational underpinning as to why a person having ordinary skill in the art would have combined the teachings of Hongo and Niki. *See, e.g.*, Pet. 21–23.

g. Conclusion

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 1 would have been obvious in view of the combination of Hongo, Obradovich, and Niki.

3. Independent Claim 11

Petitioner relies on Hongo to disclose a vehicle substantially as recited in claim 11, and relies on Obradovich to teach a user interface system and Niki to teach a hybrid vehicle. Pet. 14–25, 52–59.

Patent Owner does not advance arguments for the patentability of claim 11 apart from its arguments advanced for claim 1. *See generally* Prelim. Resp.

Independent claim 11 recites an electric vehicle and contains several recitations that are substantially the same as those recited in independent claim 1. *Compare* Ex. 1001, 27:43–52, *with id.* at 28:17–33. Petitioner relies on its showing made for claim 1 regarding the similar recitations. Pet. 52. Our above analysis regarding these similar elements applies to

claim 11, and we focus our analysis below on the distinct recitations of claim 11.

a. The Vehicle Recitation

Claim 11 recites "a vehicle having an electric power source, a communication system, and a user interface system capable of accepting voice command inputs." Ex. 1001, 28:19–21. Petitioner maps Niki's hybrid vehicle to the recited vehicle, Niki's battery 3 to the recited power source, Obradovich's communications interfaces 106 of control system 100 to the recited communication system, and Obradovich's voice command interface 104b of control system 100 to the recited user interface system. Pet. 53–55 (citing Ex. 1008, 1:39–54, 6:57–7:7; Ex. 1009, 5:17–54, Fig. 1; Ex. 1003 ¶¶ 152–155).

Niki discloses a hybrid electric vehicle including cruise control unit 53 that controls both internal combustion engine E and motor M, powered by nickel-hydrogen battery 3, to achieve a target vehicle speed. Ex. 1009, 1:17–20, 5:17–54, 8:47–59. Obradovich discloses a navigation system that uses GPS signals to determine the vehicle location, speed, direction, and route to a destination. Ex. 1008, 1:39–67, 7:25–34, 12:60–13:10. Obradovich discloses the use of voice commands input via voice command interface 104b to operate the control system, including its cruise control system. *Id.* at 6:56–62, 7:17–21, 8:16–19.

Accordingly, for the foregoing reasons and on this preliminary record, Niki and Obradovich support Petitioner's contentions. We determine that, on this preliminary record, Petitioner sets forth reasoning with rational underpinning as to why a person having ordinary skill in the art would have

combined the teachings of Hongo, Niki, and Obradovich. *See, e.g.*, Pet. 14–18, 21–23.

b. The Power Management System Recitation

Claim 11 recites "a power management system for the electric power source." Ex. 1001, 28:22. Petitioner maps Hongo's target speed determining device 100 to the recited power management system and argues that "Hongo teaches calculating and applying a target speed (and a corresponding power) to a vehicle in providing adaptive cruise control." Pet. 55 (citing Ex. 1005 ¶¶ 29, 35–36, 45, 55, Fig. 1; Ex. 1003 ¶ 156). Petitioner argues that "it would have been obvious that applying a target speed to a vehicle involves applying a corresponding power to the vehicle because vehicle power output and vehicle speed are directly correlated." *Id.* at 56 (citing Ex. 1003 ¶ 157). Petitioner argues that, when implemented on Niki's hybrid vehicle, the modified system would control power output by Niki's battery. *Id.* at 56–57 (citing Ex. 1009, 5:17–54, Fig. 1; Ex. 1003 ¶¶ 157–158).

Hongo discloses a target vehicle speed determining device that calculates and outputs to an automatic cruise control system a suitable target vehicle speed. Ex. 1005 ¶¶ 22–26, 32, Fig. 1. Niki discloses a hybrid electric vehicle including motor M powered by nickel-hydrogen battery 3. Ex. 1009, 5:17–54.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo and Niki support Petitioner's contentions. We determine that, on this preliminary record, Petitioner sets forth reasoning with rational underpinning

as to why a person having ordinary skill in the art would have combined the teachings of Hongo and Niki. *See, e.g.*, Pet. 22–23.

c. The Operational Parameters Recitation

Claim 11 recites the "power management system . . . able to determine . . . one or more operational parameters of the vehicle." Ex. 1001, 28:28–29. Petitioner maps Hongo's tire information to the recited operational parameters and argues that the tire information has "a strong influence on braking force, cornering power, etc." and "affects how vehicle speed is calculated." Pet. 57–58 (quoting Ex. 1005 ¶ 64) (citing Ex. 1005 ¶¶ 35–39, 64; Ex. 1003 ¶ 160).

Hongo discloses that information "related to the tires of the vehicle in motion," such as "the type of tires installed (summer/winter, etc.) and the presence or absence of chains," has "a strong influence on braking force, cornering power, etc., [and] this tire information is very useful in calculating the coefficients" used to calculate the target vehicle speed. Ex. 1005 ¶ 64.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo supports Petitioner's contentions.

d. The Calculate Recitation

Claim 11 recites "the power management system set to calculate electric power and speed over a segment of a vehicle route." Ex. 1001, 28:29–31. Petitioner maps Hongo's target speed to the recited speed and argues that "[i]t would have been obvious that applying the target speed to adjust cruise control involves calculat[ing] . . . power." Pet. 58 (second and third alterations in original) (emphasis omitted) (citing Ex. 1003 ¶ 161).

Hongo discloses a target vehicle speed determining device that calculates and outputs to an automatic cruise control system a suitable target vehicle speed. Ex. 1005 ¶¶ 22–26, 32, Fig. 1. The '399 patent discloses calculating power as a function of the calculated speed. *See, e.g.*, Ex. 1001, 2:53–55, 2:60–63.

Accordingly, for the foregoing reasons and on this preliminary record, Hongo supports Petitioner's contentions.

e. Conclusion

Accordingly, at this stage of the proceeding, we determine that Petitioner has established a reasonable likelihood of prevailing on its assertion that claim 11 would have been obvious in view of the combination of Hongo, Obradovich, and Niki.

E. Petitioner's Other Assertions of Obviousness

Petitioner argues that: claims 3, 4, 13, and 14 would have been obvious in view of Hongo, Obradovich, Niki, and Kudo (Pet. 62–71); claims 7 and 17 would have been obvious in view of Hongo, Obradovich, Niki, and Kuroda (*id.* at 71–77); and claims 8 and 18 would have been obvious in view of Hongo, Obradovich, Niki, and Newstrom (*id.* at 77–83). Because we have determined that Petitioner has set forth a reasonable likelihood of prevailing on its challenges to the independent claims from which these challenged claims depend, we need not and do not separately address these challenges.

III. CONCLUSION

For the foregoing reasons, we determine that the information presented establishes a reasonable likelihood that Petitioner would prevail in showing that at least one of the challenged claims is unpatentable. At this preliminary stage, we have not made a final determination with respect to the patentability of the challenged claims or any underlying factual and legal issues. *See TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016) (noting that "there is a significant difference between a petitioner's burden to establish a 'reasonable likelihood of success' at institution, and actually proving invalidity by a preponderance of the evidence at trial").

Accordingly, *inter partes* review is instituted as to all challenged claims and all proposed grounds of unpatentability. *See* 37 C.F.R. § 42.108(a).

IV. ORDER

Accordingly, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–20 of the '399 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial, which commences on the entry date of this decision.

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