

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Martin Koebler, et al.
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Title: ELECTRIC VEHICLE POWER MANAGEMENT SYSTEM

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PETITION FOR *INTER PARTES* REVIEW OF UNITED STATES

PATENT NO. 10,882,399 PURSUANT TO 35 U.S.C. §§ 311–319,

37 C.F.R. § 42

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EXHIBITS

TESLA-1001	U.S. Patent No. 10,882,399 to Koebler, et al. (“the ’399 Patent”)
TESLA-1002	Excerpts from the Prosecution History of the ’399 Patent (“the Prosecution History”)
TESLA-1003	Declaration and Curriculum Vitae of Dr. Vassilios Morellas
TESLA-1004	Complaint, <i>iQar Inc. v. Tesla, Inc.</i> , 1:23-cv-00694, W.D. Tex., June 20, 2023
TESLA-1005	Certified Translation of Japanese Pat. Pub. No. JP 2003-276472 (“Hongo”)
TESLA-1006	Translation Certification for TESLA-1005
TESLA-1007	Japanese Pat. Pub. No. JP 2003-276472 (“Hongo2”)
TESLA-1008	U.S. Pat. No. 6,282,464 (“Obradovich”)
TESLA-1009	U.S. Pat. No. 7,059,435 (“Niki”)
TESLA-1010	U.S. Pat. App. Pub. No. US 2005/0251325 (“Kudo”)
TESLA-1011	U.S. Pat. No. 6,314,347 (“Kuroda”)
TESLA-1012	U.S. Pat. No. 7,552,008 (“Newstrom”)
TESLA-1013	U.S. Pat. No. 8,229,644 (“Boecker”)
TESLA-1014	U.S. Pat. No. 6,420,975 (“DeLine”)
TESLA-1015	Trach, Walter, Jr. et al., “Driver Assistive Systems for Rural Applications: Digital Mapping of Roads for Lane Departure Warnings (“Trach”)

TESLA-1016	Mukhachev P. A. et al., “Modern Machine Learning Methods for Telemetry-Based Spacecraft Health Monitoring,” Automation and Remote Control, 2021, Vol. 82, No. 8, pp. 1293–1320 (2021)
TESLA-1017	Gorjestani A. et al., “Radar Based Longitudinal Virtual Bumper Collision Avoidance System Implemented on a Truck” (Feb. 1999)
TESLA-1018	Walker, Jearl, “Fundamentals of Physics,” 10th Edition, Halliday & Resnick, ISBN 978-1-118-23072-5 (“Walker”)
TESLA-1019	U.S. Pat. App. No. 2004/0180670 (“Pande”)
TESLA-1020	U.S. Pat. No. 7,860,647 (“Amano”)
TESLA-1021	U.S. Pat. No. 7,460,946 (“Shima”)
TESLA-1022	U.S. Pat. No. 6,675,085 (“Straub”)
TESLA-1023-1049 RESERVED	
TESLA-1050	Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (USPTO June 21, 2022) (“Director’s Guidance”)
TESLA-1051	Defendant Tesla, Inc.’s Opposed Motion to Transfer Venue to the Northern District of California Under 28 U.S.C. § 1404(a), <i>iQar Inc. v. Tesla, Inc.</i> , 1:23-cv-00694, W.D. Tex., October 31, 2023
TESLA-1052	District Court Trial Statistics (12-Month Period Ending June 30, 2023 June 30, 2023)

LISTING OF CHALLENGED CLAIMS

Claim 1	
[1.pre]	A method of electric vehicle operation, comprising:
[1.a]	determining a segment of a vehicle route;
[1.b.1]	determining information about an external environment of a vehicle,
[1.b.2]	information about operational status of the vehicle,
[1.b.3]	information from external command input telemetry
[1.b.4]	in combination with user command inputs to the vehicle including voice command inputs; and
[1.c]	applying calculated electric power to the vehicle to travel along the segment of the vehicle route at a calculated speed.
Claim 2	
[2]	The method of claim 1, wherein electric power can be derived from operation of an internal combustion engine.
Claim 3	
[3]	The method of claim 1, further comprising the step of selecting a destination using historical data associated with a driver.
Claim 4	

[4]	The method of claim 1, further comprising the step of selecting a destination using statistical destination logic.
Claim 5	
[5]	The method of claim 1, further comprising the step of selecting a destination by at least one of a driver and a passenger.
Claim 6	
[6.1]	The method of claim 1, wherein vehicle route segment determination further comprises determining multiple route segments,
[6.2]	each route segment having a separate calculated speed and selected drive train parameters.
Claim 7	
[7]	The method of claim 1, wherein the step of determining information about an external environment of a vehicle further comprises the step of communicating with a remote database.
Claim 8	
[8]	The method of claim 1, wherein the step of determining information about operational status of a vehicle further comprises the step of communicating with a remote database.

Claim 9	
[9]	The method of claim 1, wherein voice command inputs are provided to the vehicle by a separate source.
Claim 10	
[10]	The method of claim 1, wherein voice command inputs are provided to the vehicle by a device having GPS functionality.
Claim 11	
[11.pre]	An electric vehicle, comprising:
[11.a.1]	a vehicle having an electric power source,
[11.a.2]	a communication system, and
[11.a.3]	a user interface system capable of accepting vehicle command inputs; and
[11.b.1]	a power management system for the electric power source able to
[11.b.2]	determine information about an external environment of a vehicle,
[11.b.3]	information about operational status of the vehicle,
[11.b.4]	information from external command input telemetry
[11.b.5]	combinable with user command inputs to the vehicle including voice command inputs provided by the user interface system,
[11.b.6]	and one or more operational parameters of the vehicle,

[11.c.1]	with the power management system set to calculated electric power and speed over a segment of a vehicle route and
[11.c.2]	act to apply calculated electric power to the vehicle to travel along the segment of the vehicle route at the calculated speed.
Claim 12	
[12]	The apparatus of claim 11, wherein electric power from the electric power source can be derived from operation of an internal combustion engine.
Claim 13	
[13]	The apparatus of claim 11, wherein vehicle route is set based on a destination determined at least in part using historical data associated with a driver.
Claim 14	
[14]	The apparatus of claim 11, wherein vehicle route is set based on a destination determined at least in part using statistical destination logic.
Claim 15	

[15]	The apparatus of claim 11, wherein vehicle route is set based on a destination determined by at least one of a driver and a passenger via the user interface system.
Claim 16	
[16]	The apparatus of claim 11, wherein vehicle route segment determination is based at least in part on determining multiple route segments, each route segment having a separate calculated speed.
Claim 17	
[17]	The apparatus of claim 11, wherein determining information about an external environment of a vehicle further comprises communicating with a remote database.
Claim 18	
[18]	The apparatus of claim 11, wherein determining information about operational status of a vehicle further comprises communicating with a remote database.
Claim 19	
[19]	The apparatus of claim 11, wherein calculated speed is based at least in part on a determined probable optimal speed using historical route information.

Claim 20

[20]	The apparatus of claim 11, wherein target speed is presented as a range of target speeds.
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Tesla, Inc. (“Petitioner,” “Tesla”) petitions for *Inter Partes* Review (“IPR”) of claims 1-20 (“Challenged Claims”) of U.S. Patent No. 10,882,399 (“’399 patent”). Compelling evidence presented in this Petition demonstrates at least a reasonable likelihood that Tesla will prevail with respect to at least one of the Challenged Claims.

I. REQUIREMENTS FOR IPR

A. Grounds for Standing

Tesla certifies that the ’399 patent is available for IPR. This petition is being filed within one year of service of a complaint against Tesla. TESLA-1004. Tesla is not barred or estopped from requesting review of the Challenged Claims on the below-identified grounds.

B. Challenge and Relief Requested

Tesla requests an IPR of the Challenged Claims on the below grounds. Dr. Vassilios Morellas provides supporting testimony in his Declaration. TESLA-1003, ¶¶26.

Ground	Claim(s)	35 U.S.C. § 103
1	1, 2, 5, 6, 9-12, 15, 16, 19, 20	Hongo, Obradovich, Niki
2	3, 4, 13, 14	Hongo, Obradovich, Niki, Kudo
3	7, 17	Hongo, Obradovich, Niki Kuroda
4	8, 18	Hongo, Obradovich, Niki,

Ground	Claim(s)	35 U.S.C. § 103
		Newstrom

The '399 patent claims priority to a number of applications, the earliest of which was U.S. App. No. 11/283,137, filed 11/17/2005. TESLA-1001. While Tesla does not concede 11/17/2005 is the priority date that should be afforded to the '399 patent, for the purposes of this proceeding, each of the references below qualifies as prior art under 35 USC §§ 102(b), 102(a) and/or 102(e) even if 11/17/2005 is used as the priority date.

Reference	Filing Date	Publication Date
Hongo	3/26/2002	9/30/2003
Obradovich	1/5/1998 (PCT)	8/28/2001
Niki	6/30/2004	1/6/2005
Kudo	10/10/2003	10/10/2005
Kuroda	5/16/2000	11/6/2001
Newstrom	7/17/2002	1/30/2003

C. Claim Construction

Because the Challenged Claims are obvious under any reasonable interpretation, no formal claim constructions are required in this proceeding.

Wellman, Inc. v. Eastman Chem. Co., 642 F.3d 1355, 1361 (Fed. Cir. 2011). Tesla reserves the right to respond to any constructions offered by iQar or adopted by the Board. Tesla is not conceding that each challenged claim satisfies all statutory requirements, nor is Tesla waiving any arguments concerning claim scope or

grounds that can only be raised in district court. For this petition, Tesla applies prior art in a manner consistent with iQar's infringement allegations.

II. THE '399 PATENT

A. Specification

The '399 patent identifies its field of invention as “devices, methods and systems for controlling power applied to a vehicle engine.” TESLA-1001, 1:16-17. While the Background of the '399 patent generally discusses fuel efficiency (*see id.*, 1:22-2:17), the '399 patent that make clear that its purported invention is not limited to improving fuel efficiency. *See id.*, 6:46-49 (“The power supplied to the engine may alternatively be optimized based on other criterion[,]” e.g., “power supplied to the engine may be optimized with respect to speed or travel time”). Further, power optimization techniques described in the '399 patent are not limited to fuel efficiency, and therefore encompasses, for example, power optimization based on vehicle speed. *See id.*, 3:2-4 (a fuel efficient speed is merely an example of “an optimal speed”), 6:58-60; TESLA-1003, ¶¶29-31.

B. Relevant Prosecution

The '399 patent issued with without any Office Action, and thus, the Examiner did not substantively apply any of Hongo, Obradovich, Niki, Kudo, Kuroda, and Newstrom. *See* TESLA-1002; *See infra* §IV.A. Nor were any of these references cited in original examination, and thus, considered by the Examiner. The Notice of Allowance also did not include any Examiner's

Statement of Reasons for Allowance or otherwise identify any claim language that the Examiner found was not disclosed or suggested in the prior art considered during prosecution. *Id.*; TESLA-1003, ¶32.

III. THE CHALLENGED CLAIMS ARE UNPATENTABLE

A. [GROUND 1] – Claims 1, 2, 5, 6, 9-12, 15, 16, 19, And 20 Are Obvious Over Hongo-Obradovich-Niki

1. Hongo-Obradovich-Niki

(i) Hongo¹

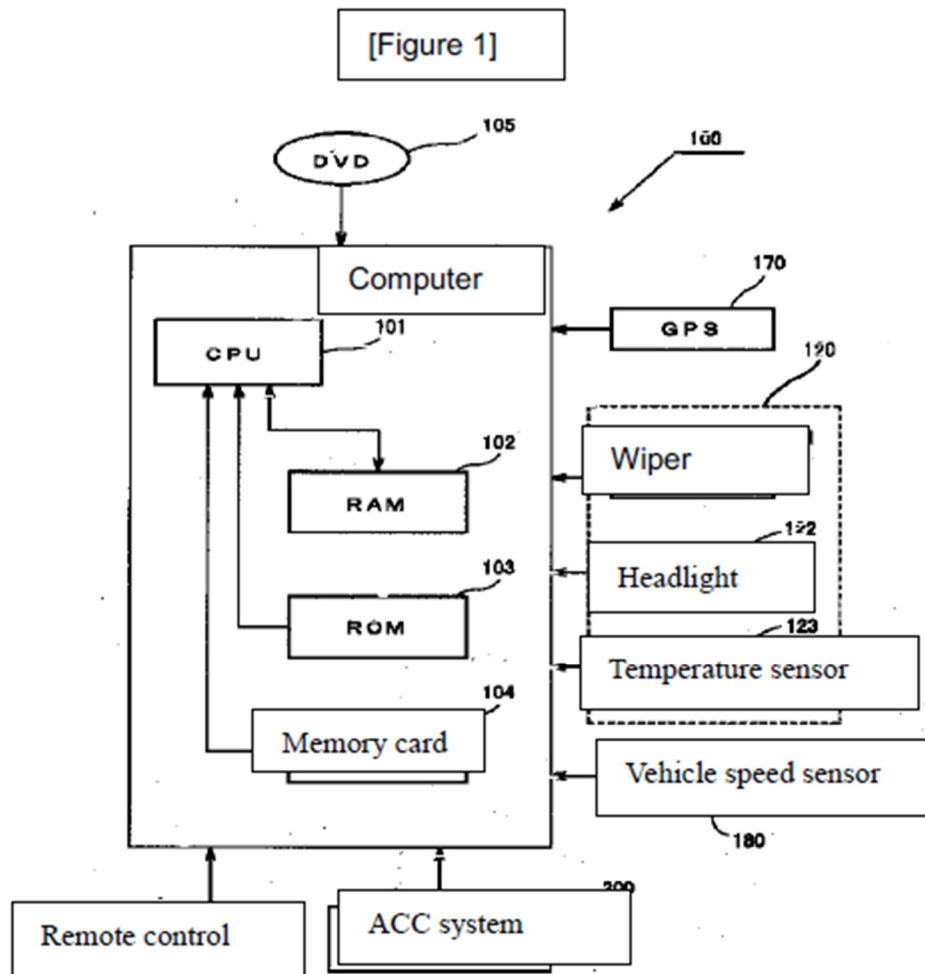
Hongo is based on a Japanese patent publication² focused on adaptive cruise control techniques that involve adjusting a traveling speed of a vehicle based on external road conditions. This is accomplished using an “on-vehicle target vehicle speed determining device,” which “determines a target speed of a moving vehicle based on its current location” and then “automatically controls the speed of a

¹ Descriptions of the references and combinations thereof are incorporated into each mapping that includes citations to these references. All emphasis is added unless otherwise indicated.

² This Petition cites to TESLA-1005, which is a certified translation of JP 2003-276472 (TESLA-1007). *See* TESLA-1006 (translation certification). The disclosure in TESLA-1007 is incorporated by reference via citations to TESLA-1005.

vehicle.” TESLA-1005, [0001]. Through calculation and output of a “target vehicle speed” to an adaptive cruise control system, Hongo teaches calculating and applying power, where “[t]he applied power ... [is] expressed as an optimized speed or speed to which the vehicle is controlled.” TESLA-1001, 2:53-55; TESLA-1003, ¶33.

Hongo proposes systems and techniques that “automatically output[] an optimized or optimized target vehicle speed according to weather, sunlight conditions, etc., which can change naturally and over time...” TESLA-1005, [0007]. Hongo’s system is shown in Figure 1:

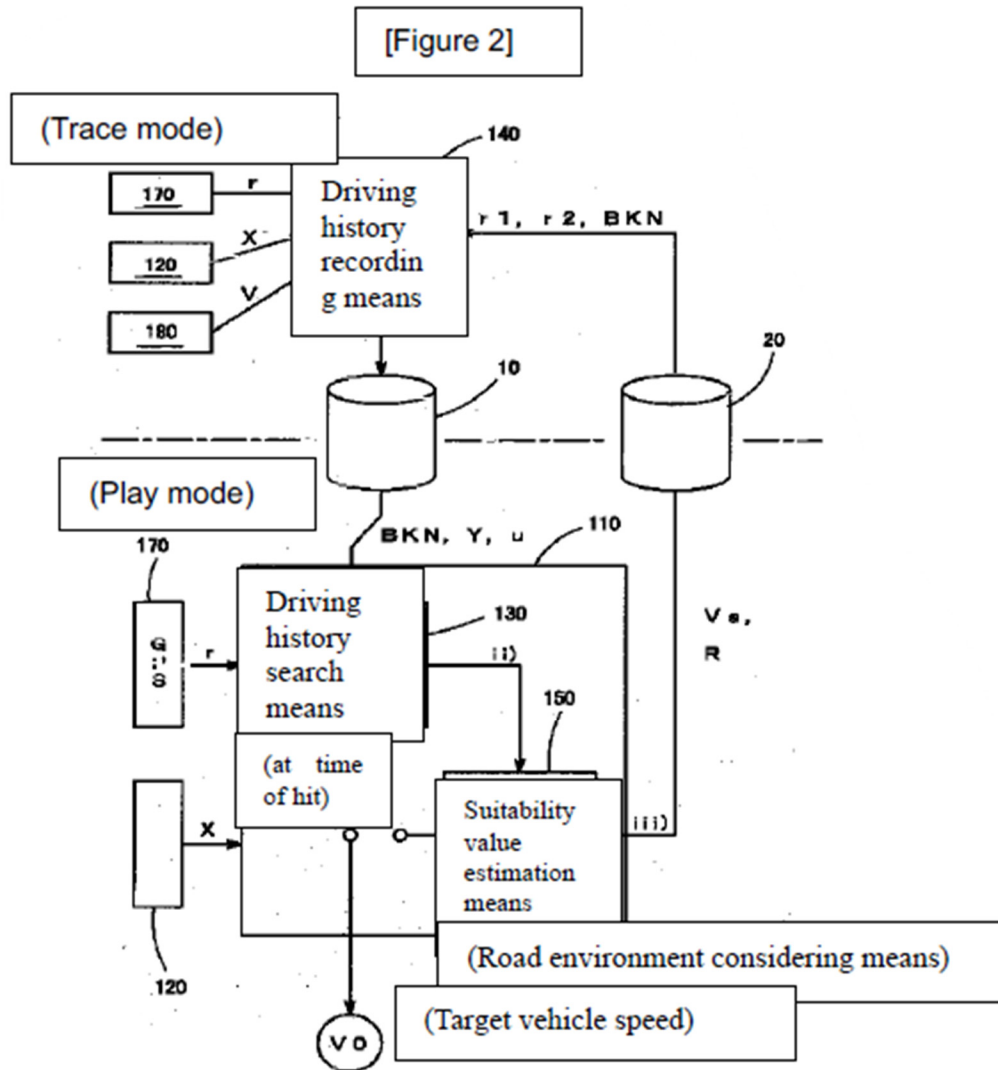


TESLA-1005, FIG. 1

The system includes a “target speed determining device 100” (“device 100”), including computing elements, such as CPU 101, RAM 102, ROM 103, and memory card 104. TESLA-1005, [0022]. The system also includes DVD 105, which “stores data such as map information and legal speed limits, as well as programs.” *Id.*; TESLA-1003, ¶¶34-37.

Device 100 is connected to an automatic cruise control (ACC) system 200, and device 100 “outputs [a] target vehicle speed V0 to the ACC system 200.” TESLA-1005, [0024]. By disclosing the calculation and output of a “target vehicle speed” to a cruise control system, Hongo teaches calculating and applying power, where “[t]he applied power ... [is] expressed as an optimized speed or speed to which the vehicle is controlled.” TESLA-1001, 2:53-55; TESLA-1003, ¶38.

FIG. 2 shows a “data flow” relating to device 100:



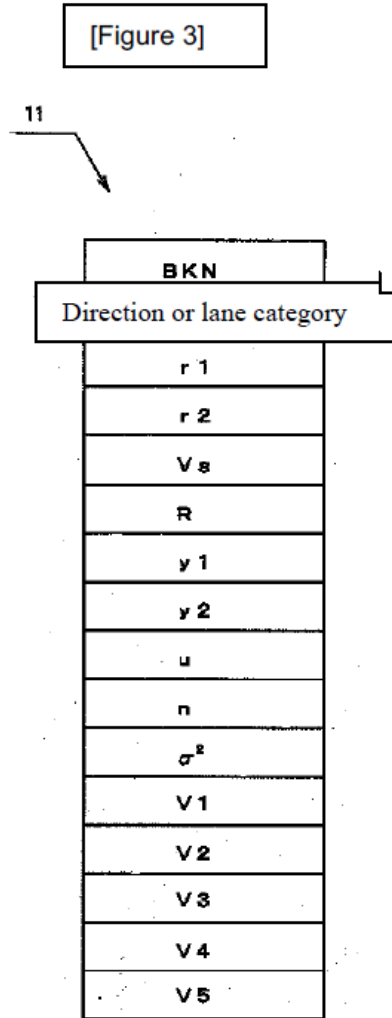
TESLA-1005, FIG. 2

The Hongo system further includes a “driving history recording means 140” (“means 140”) and a “road environment considering means 110” (“means 110”), “each [of which is] realized by software running on [a] computer.” TESLA-1005, [0026]. Means 110 includes “driving history search means 130, and preferred value estimating means 150.” *Id.*; TESLA-1003, ¶¶39-40.

Means 140 generally serves two functions in the data flow shown in FIG. 2.

First, in a “trace mode,” means 140 generates data for storage in “driving block DB 20” (“DB 20”). TESLA-1005, [0027]. This is accomplished by “acquir[ing] position information (current position coordinates r) from the GPS 170” and “dividing it into sections approximately every 20m in the driving direction on the road being driven...” *Id.* The information is stored in driving block DB 20, which “specif[ies] the block number BKN of [a] driving block,” along with associated information, such as “block range coordinates (r_1 , r_2) of each driving block,” “legal speed limit V_s of the driving block,” and “the minimum radius of curvature R .” *Id.*; TESLA-1003, ¶41.

FIG. 3 is a table illustrating the “record format of the driving history data 11 recorded in the driving history DB 10.” TESLA-1005, [0029].



TESLA-1005, FIG. 3

The block number BKN of a driving block is stored with associated information, such as “‘Direction or Lane Classification’,” which is for “classifying the current direction of travel (up/down, etc.) on the road being driven on.”

TESLA-1005, [0029]. Other information associated with a “driver block” includes “block range coordinates (r1, r2),” “legal speed limit Vs,” “minimum radius of curvature R,” and “weather code y1 and sunshine code y2.” *Id.*, [0027], [0030].

Further, “the natural number n ” represents “the number of valid vehicle speed data,” e.g., v_1, v_2, v_3, v_4, v_5 . *Id.*, [0031]. Additionally, “ u is the average value of valid vehicle speed data,” which, in some instances, “can be used as is, as the target vehicle speed V_0 in the later reproduction mode.” *Id.* Finally, “ σ^2 is the variance of n pieces of vehicle speed data, and can be used when performing various well-known statistical operations such as evaluating the reliability of vehicle speed data.” *Id.*; TESLA-1003, ¶¶42-43.

Means 140 processes “road environment real-time information X ,” which is “obtained from the environment information acquisition means 120.” TESLA-1005, [0028]. Further, the “current vehicle speed V ” is obtained from the “vehicle speed sensor 180.” *Id.* The “road environment real time information X ” is used to derive a “road environment parameter Y ” to identify external weather conditions (e.g., “weather code y_1 ,” “sunshine code y_2 ”). *Id.*, [0030]; TESLA-1003, ¶44.

As shown in Figure 2, in the “playback mode” (also referred to as the “reproduction mode”), means 110 then processes information derived by means 140 (e.g., road environment parameter Y , block number BKN) to calculate the “target vehicle speed V_0 .” TESLA-1005, [0032]; TESLA-1003, ¶45.

Hongo is analogous art to the ’399 patent. Hongo is from the same field of endeavor (e.g., vehicle speed control) and is reasonably pertinent to a problem the ’399 patent was trying to solve (e.g., inefficiencies associated with the speed or

travel time of a vehicle). TESLA-1003, ¶46; *see* TESLA-1001, 1:22-2:17, 3:2-4, 6:58-50, 19:65-20:2.

(ii) Hongo-Obradovich

a. Obradovich

Obradovich discloses a “multimedia information and control system for use in an automobile.” TESLA-1008, Abstract. Obradovich’s broad motivation is to “design an information and control system for use inside an automobile with the user in mind.” *Id.*, 3:21-31. Such control may be accomplished through “voice command[s]” to “select or control various options or functions provided by [the system]...” *Id.*, 7:17-21. For example, a “voice command interface 104b” with “standard voice command circuitry” is used for “processing voice commands by the user through [a] microphone to control or modify selected functions” of the system. *Id.*, 6:56-62; TESLA-1003, ¶47.

Figure 1 shows a block diagram of an automobile information and control system 100 (“system 100”):

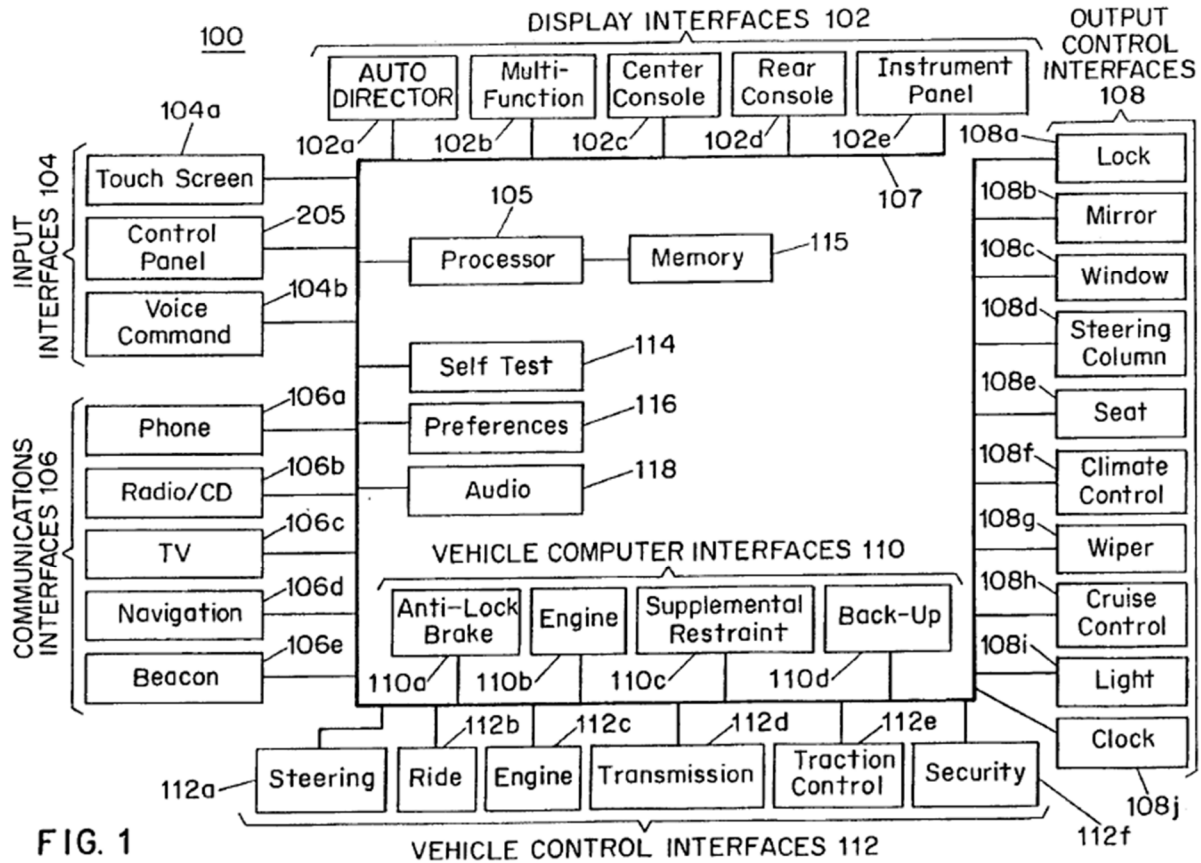


FIG. 1

TESLA-1008, FIG. 1

System 100 is referred to as an “‘AUTO DIRECTOR’ system” that is “user-friendly and designed with the automobile user in mind.” TESLA-1008, 4:66-5:15. System 100 includes several types of componentry, including processor 105, memory 115, data bus 107, display interfaces 102, input interfaces 105, 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.*, 5:16-22; TESLA-1003, ¶¶48-49.

In describing operation of its “‘AUTO DIRECTOR interface,” Obradovich

states “[w]ith such touch-screen and displayed option selection capabilities, through AUTO DIRECTOR interface 102a, the user is able to obtain information and control selectable functions of the automobile,” including “cruise control.” *Id.*, 5:45-52; TESLA-1003, ¶50.

System 100 includes a “[c]ruise control interface 108h” including “output control logic controllable by processor 105 to (1) turn the cruise control on or off, (2) set the vehicle speed, and (3) cancel or resume the set speed.” TESLA-1008, 8:15-19. Further, “wherever 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.*, 7:17-21. Obradovich therefore teaches that a user can use voice commands (e.g., via the voice command interface 104b) to adjust output control logic relating to cruise control functionality (e.g., via cruise control interface 118). TESLA-1003, ¶51.

Obradovich is analogous art to the ’399 patent. Obradovich is from the same field of endeavor (e.g., vehicle management and control) and is reasonably pertinent to the problem the ’399 patent was trying to solve (e.g., overly complicated user interfaces of vehicle operation). TESLA-1003, ¶52; *see* TESLA-1001, 22:60-23:22.

b. Combination

As combined, Hongo-Obradovich would have provided a vehicle configured to receive voice command inputs to adaptive control cruise control functionality. TESLA-1003, ¶76. A person of ordinary skill in the art (“POSITA”)³ would have recognized that Hongo lacks specific disclosure regarding vehicle-user interactions, and thereby sought well-known configurations in implementing its teachings relating to cruise control systems. TESLA-1003, ¶76; TESLA-1005, [0003], [0004], [0024].

This would have led the POSITA to Obradovich, which offers disclosure of input and output interfaces for controlling various vehicle functions, including cruise control functionality. Obradovich’s system 100 (which provides a standardized vehicle control through use of touch and voice interfaces) exists in a vehicle independently of Hongo’s device 100 (which calculates a target vehicle speed for adaptive cruise control). Thus, in implementing the combination, a POSITA would have incorporated the teachings of each of Hongo’s device 100 and Obradovich’s system 100 into a vehicle to provide the advantages of each. This would have provided new types of advantages that further ease vehicle operation, such as enabling the user to use voice commands to adjust cruise control. TESLA-1003, ¶77.

³ TESLA-1003, ¶¶27-28 (defining “POSITA”).

Specifically, Obradovich's "voice command interface 104b" enables a type of vehicle control that improves Hongo's contemplated use of adaptive cruise control. Because drivers may become "distracted or overburdened by irrelevant information in the course of an information retrieval..." the Obradovich system enables a "safe driving environment" by enabling information access that is "intuitive and direct." TESLA-1008, 3:32-49. For example, Obradovich's use of voice commands would have improved vehicle operation in Hongo by allowing a user to use voice to adjust adaptive cruise control. Obradovich motivates this configuration since preventing a user from being "distracted or overburdened by irrelevant information" is "[a]dvantageous[]" since it is "conducive to a safe driving environment." *Id.*; TESLA-1003, ¶¶78-79.

Hongo-Obradovich would have also improved vehicle user interfaces by increasing convenience and flexibility in input choices. TESLA-1003, ¶80. Hongo recognizes a problem that "it is not always possible to ensure sufficient convenience" (TESLA-1005, [0006]) to which Obradovich offers a possible solution through "touch-screen and displayed option capabilities," which enable a user to "obtain information on and control selectable functions of the automobile," including "cruise control" (TESLA-1008, 5:33-53). A vehicle incorporating Hongo-Obradovich would have thereby leveraged Obradovich's touch screen and

selection capabilities to provide improved user control over Hongo's adaptive cruise control functionality. TESLA-1003, ¶80.

Such a combination would have involved incorporating prior art elements according to known methods in a vehicle to yield predictable results. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); MPEP 2143; TESLA-1003, ¶81. Each of Hongo's system 100 and Obradovich's system 100 were well-known by the Critical Date, and thus, their incorporation in a vehicle would have predictably improved user convenience while interacting with adaptive cruise control functionality. TESLA-1003, ¶81; TESLA-1005, [0006]; TESLA-1006, 3:21-31. Further, the combination would have involved use of known techniques of improving user convenience during vehicle operation to improve similar vehicles with cruise control functionality in the same way. TESLA-1003, ¶81; *see* TESLA-1005, [0006]-[0007] (describing techniques that "ensure sufficient convenience" when using adaptive cruise control); TESLA-1008, 5:33-53 (describing techniques that enable a user to "obtain information on and control selectable functions of the automobile," including "cruise control").

Finally, a POSITA would have reasonably expected to succeed in combining the teachings of Hongo and Obradovich. TESLA-1003, ¶82. Implementation of the combination would have required only routine knowledge because the addition of Obradovich's interfaces to a vehicle with Hongo's adaptive cruise control would

have involved small modifications of software that were well within the POSITA's skill. *Id.* Indeed, Obradovich recognized the ubiquitousness of vehicle systems that offering similar functionality. TESLA-1008, 1:16-28 (citing U.S. Pat. Nos. 5,404,443, 5,214,707).

Further, Hongo and Obradovich focus on a different well-known aspect of vehicle operation such that, in a vehicle incorporating the combination, corresponding elements would have merely performed the functions disclosed in each reference. Specifically, elements of Hongo's device 100 would have provided adaptive cruise control functionality, while elements of Obradovich's system 100 would have improved a user's interaction with vehicle control systems to thereby enable more user-friendly vehicle operation. TESLA-1003, ¶83.

(iii) Hongo-Niki

a. Niki

Niki discloses a control apparatus for a hybrid vehicle that is "driven by jointly using an internal-combustion engine and a motor..." TESLA-1009, 1:13-17. Niki's hybrid vehicle is an example of "any appropriate vehicle" described in '399 patent as incorporating the disclosed "devices and systems." TESLA-1001, 4:64-5:3 ("hybrid internal combustion/electric vehicles"); *see id.*, 6:39-60, 25:18-32; TESLA-1003, ¶53.

The diagram illustrates a vehicle control system architecture. On the left, the engine (11) and transmission (12) are shown with various sensors (13, 14, 15, 16a, 16b, 17a, 17b) and actuators (18, 19). The engine is connected to a PDU (20) and a DC/DC converter (21). The transmission is connected to a PDU (22) and a DC/DC converter (23). The PDU (20) is connected to a DC/DC converter (21) and a Ni-MH BATT (24). The DC/DC converter (21) is connected to a 12V BATT (25). The Ni-MH BATT (24) is connected to a DC/DC converter (26) and a 12V BATT (27). The DC/DC converter (26) is connected to a 12V BATT (28). The 12V BATT (28) is connected to a VSA ECU (29), HVECU (30), MOTE ECU (31), ACMECU (32), and FI/AT/MGE ECU (33). The VSA ECU (29) is connected to a VSA (34). The HVECU (30) is connected to a HVE (35). The MOTE ECU (31) is connected to a MOTE (36). The ACMECU (32) is connected to an ACM (37). The FI/AT/MGE ECU (33) is connected to a FI/AT/MGE (38). The VSA (34) is connected to a VSA (39). The HVE (35) is connected to a HVE (40). The MOTE (36) is connected to a MOTE (41). The ACM (37) is connected to an ACM (42). The FI/AT/MGE (38) is connected to a FI/AT/MGE (43). The VSA (39) is connected to a VSA (44). The HVE (40) is connected to a HVE (45). The MOTE (41) is connected to a MOTE (46). The ACM (42) is connected to an ACM (47). The FI/AT/MGE (43) is connected to a FI/AT/MGE (48). The VSA (44) is connected to a VSA (49). The HVE (45) is connected to a HVE (50). The MOTE (46) is connected to a MOTE (51). The ACM (47) is connected to an ACM (52). The FI/AT/MGE (48) is connected to a FI/AT/MGE (53). The VSA (49) is connected to a VSA (54). The HVE (50) is connected to a HVE (55). The MOTE (51) is connected to a MOTE (56). The ACM (52) is connected to an ACM (57). The FI/AT/MGE (53) is connected to a FI/AT/MGE (58). The VSA (54) is connected to a VSA (59). The HVE (55) is connected to a HVE (60). The MOTE (56) is connected to a MOTE (61). The ACM (57) is connected to an ACM (62). The FI/AT/MGE (58) is connected to a FI/AT/MGE (63). The VSA (59) is connected to a VSA (64). The HVE (60) is connected to a HVE (65). The MOTE (61) is connected to a MOTE (66). The ACM (62) is connected to an ACM (67). The FI/AT/MGE (63) is connected to a FI/AT/MGE (68). The VSA (64) is connected to a VSA (69). The HVE (65) is connected to a HVE (70). The MOTE (66) is connected to a MOTE (71). The ACM (67) is connected to an ACM (72). The FI/AT/MGE (68) is connected to a FI/AT/MGE (73). The VSA (69) is connected to a VSA (74). The HVE (70) is connected to a HVE (75). The MOTE (71) is connected to a MOTE (76). The ACM (72) is connected to an ACM (77). The FI/AT/MGE (73) is connected to a FI/AT/MGE (78). The VSA (74) is connected to a VSA (79). The HVE (75) is connected to a HVE (80). The MOTE (76) is connected to a MOTE (81). The ACM (77) is connected to an ACM (82). The FI/AT/MGE (78) is connected to a FI/AT/MGE (83). The VSA (79) is connected to a VSA (84). The HVE (80) is connected to a HVE (85). The MOTE (81) is connected to a MOTE (86). The ACM (82) is connected to an ACM (87). The FI/AT/MGE (83) is connected to a FI/AT/MGE (88). The VSA (84) is connected to a VSA (89). The HVE (85) is connected to a HVE (90). The MOTE (86) is connected to a MOTE (91). The ACM (87) is connected to an ACM (92). The FI/AT/MGE (88) is connected to a FI/AT/MGE (93). The VSA (89) is connected to a VSA (94). The HVE (90) is connected to a HVE (95). The MOTE (91) is connected to a MOTE (96). The ACM (92) is connected to an ACM (97). The FI/AT/MGE (93) is connected to a FI/AT/MGE (98). The VSA (94) is connected to a VSA (99). The HVE (95) is connected to a HVE (100). The MOTE (96) is connected to a MOTE (101). The ACM (97) is connected to an ACM (102). The FI/AT/MGE (98) is connected to a FI/AT/MGE (103). The VSA (99) is connected to a VSA (104). The HVE (100) is connected to a HVE (105). The MOTE (101) is connected to a MOTE (106). The ACM (102) is connected to an ACM (107). The FI/AT/MGE (103) is connected to a FI/AT/MGE (108). The VSA (104) is connected to a VSA (109). The HVE (105) is connected to a HVE (110). The MOTE (106) is connected to a MOTE (111). The ACM (107) is connected to an ACM (112). The FI/AT/MGE (108) is connected to a FI/AT/MGE (113). The VSA (109) is connected to a VSA (114). The HVE (110) is connected to a HVE (115). The MOTE (111) is connected to a MOTE (116). The ACM (112) is connected to an ACM (117). The FI/AT/MGE (113) is connected to a FI/AT/MGE (118). The VSA (114) is connected to a VSA (119). The HVE (115) is connected to a HVE (120). The MOTE (116) is connected to a MOTE (121). The ACM (117) is connected to an ACM (122). The FI/AT/MGE (118) is connected to a FI/AT/MGE (123). The VSA (119) is connected to a VSA (124). The HVE (120) is connected to a HVE (125). The MOTE (121) is connected to a MOTE (126). The ACM (122) is connected to an ACM (127). The FI/AT/MGE (123) is connected to a FI/AT/MGE (128). The VSA (124) is connected to a VSA (129). The HVE (125) is connected to a HVE (130). The MOTE (126) is connected to a MOTE (131). The ACM (127) is connected to an ACM (132). The FI/AT/MGE (128) is connected to a FI/AT/MGE (133). The VSA (129) is connected to a VSA (134). The HVE (130) is connected to a HVE (135). The MOTE (131) is connected to a MOTE (136). The ACM (132) is connected to an ACM (137). The FI/AT/MGE (133) is connected to a FI/AT/MGE (138). The VSA (134) is connected to a VSA (139). The HVE (135) is connected to a HVE (140). The MOTE (136) is connected to a MOTE (141). The ACM (137) is connected to an ACM (142). The FI/AT/MGE (138) is connected to a FI/AT/MGE (143). The VSA (139) is connected to a VSA (144). The HVE (140) is connected to a HVE (145). The MOTE (141) is connected to a MOTE (146). The ACM (142) is connected to an ACM (147). The FI/AT/MGE (143) is connected to a FI/AT/MGE (148). The VSA (144) is connected to a VSA (149). The HVE (145) is connected to a HVE (150). The MOTE (146) is connected to a MOTE (151). The ACM (147) is connected to an ACM (152). The FI/AT/MGE (148) is connected to a FI/AT/MGE (153). The VSA (149) is connected to a VSA (154). The HVE (150) is connected to a HVE (155). The MOTE (151) is connected to a MOTE (156). The ACM (152) is connected to an ACM (157). The FI/AT/MGE (153) is connected to a FI/AT/MGE (158). The VSA (154) is connected to a VSA (159). The HVE (155) is connected to a HVE (160). The MOTE (156) is connected to a MOTE (161). The ACM (157) is connected to an ACM (162). The FI/AT/MGE (158) is connected to a FI/AT/MGE (163). The VSA (159) is connected to a VSA (164). The HVE (160) is connected to a HVE (165). The MOTE (161) is connected to a MOTE (166). The ACM (162) is connected to an ACM (167). The FI/AT/MGE (163) is connected to a FI/AT/MGE (168). The VSA (164) is connected to a VSA (169). The HVE (165) is connected to a HVE (170). The MOTE (166) is connected to a MOTE (171). The ACM (167) is connected to an ACM (172). The FI/AT/MGE (168) is connected to a FI/AT/MGE (173). The VSA (169) is connected to a VSA (174). The HVE (170) is connected to a HVE (175). The MOTE (171) is connected to a MOTE (176). The ACM (172) is connected to an ACM (177). The FI/AT/MGE (173) is connected to a FI/AT/MGE (178). The VSA (174) is connected to a VSA (179). The HVE (175) is connected to a HVE (180). The MOTE (176) is connected to a MOTE (181). The ACM (177) is connected to an ACM (182). The FI/AT/MGE (178) is connected to a FI/AT/MGE (183). The VSA (179) is connected to a VSA (184). The HVE (180) is connected to a HVE (185). The MOTE (181) is connected to a MOTE (186). The ACM (182) is connected to an ACM (187). The FI/AT/MGE (183) is connected to a FI/AT/MGE (188). The VSA (184) is connected to a VSA (189). The HVE (185) is connected to a HVE (190). The MOTE (186) is connected to a MOTE (191). The ACM (187) is connected to an ACM (192). The FI/AT/MGE (188) is connected to a FI/AT/MGE (193). The VSA (189) is connected to a VSA (194). The HVE (190) is connected to a HVE (195). The MOTE (191) is connected to a MOTE (196). The ACM (192) is connected to an ACM (197). The FI/AT/MGE (193) is connected to a FI/AT/MGE (198). The VSA (194) is connected to a VSA (199). The HVE (195) is connected to a HVE (200). The MOTE (196) is connected to a MOTE (201). The ACM (197) is connected to an ACM (202). The FI/AT/MGE (198) is connected to a FI/AT/MGE (203). The VSA (199) is connected to a VSA (204). The HVE (200) is connected to a HVE (205). The MOTE (201) is connected to a MOTE (206). The ACM (202) is connected to an ACM (207). The FI/AT/MGE (203) is connected to a FI/AT/MGE (208). The VSA (204) is connected to a VSA (209). The HVE (205) is connected to a HVE (210). The MOTE (206) is connected to a MOTE (211). The ACM (207) is connected to an ACM (212). The FI/AT/MGE (208) is connected to a FI/AT/MGE (213). The VSA (209) is connected to a VSA (214). The HVE (210) is connected to a HVE (215). The MOTE (211) is connected to a MOTE (216). The ACM (212) is connected to an ACM (217). The FI/AT/MGE (213) is connected to a FI/AT/MGE (218). The VSA (214) is connected to a VSA (219). The HVE (215) is connected to a HVE (220). The MOTE (216) is connected to a MOTE (221). The ACM (217) is connected to an ACM (222). The FI/AT/MGE (218) is connected to a FI/AT/MGE (223). The VSA (219) is connected to a VSA (224). The HVE (220) is connected to a HVE (225). The MOTE (221) is connected to a MOTE (226). The ACM (222) is connected to an ACM (227). The FI/AT/MGE (223) is connected to a FI/AT/MGE (228). The VSA (224) is

TESLA-1009, FIG. 1

The hybrid vehicle includes an “internal-combustion engine E, a motor M, and a transmission T [1] connected directly in series.” TESLA-1009, 5:17-32. The hybrid vehicle also includes “auxiliary battery 4 of 12 volts” for “driving various accessories,” along with a “battery 3 in parallel via a downverter 5[1] which is a DC-DC converter.” *Id.*, 5:55-60. The downverter 5 is “controlled by the control unit 1 and charges the auxiliary battery 4 by lowering the voltage of the power drive unit 2 or the battery 3.” *Id.* The power drive unit 2 operates “under the

involves “control[ing] 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...” *Id.* The “target vehicle speed” is “the target value of the traveling speed of the vehicle.” *Id.*; TESLA-1003, ¶¶56-57.

Niki is analogous art to the ’399 patent. Niki is from the same field of endeavor (e.g., electric and hybrid vehicles) and is reasonably pertinent to the problem the ’399 patent was trying to solve (e.g., challenges associated with controlling the power supplied to electric or hybrid vehicles). TESLA-1003, ¶58; *see* TESLA-1001, 2:13-17, 4:64-5:3, 6:39-60, 25:18-32.

b. Combination

Hongo generally describes systems and techniques relating to adaptive cruise control, where a target speed of a vehicle is adjusted based on external road conditions. TESLA-1003, ¶84. When combined with Niki, which describes a specific implementation of a hybrid vehicle with cruise control functionality, a vehicle incorporating the teachings of Hongo and Niki renders obvious an electric vehicle with a power management system configured to apply a calculated electric power to the vehicle. *Id.*

As discussed in §III.A.1.(i), Hongo’s invention relates to “a means for automatically outputting an optimized or optimized target vehicle speed according to weather, sunlight conditions, etc....in a target vehicle speed determining

device.” TESLA-1005, [0007]. Further, “according to the present invention, it is possible to more easily (automatically) adapt the target vehicle speed to the road environment than before.” *Id.*, [0009]. These disclosures are not limited to a particular vehicle type, and absent any limiting disclosure in Hongo, a POSITA would have recognized that Hongo’s invention (e.g., “target vehicle speed determining device” or device 100) is applicable to any vehicle type. TESLA-1003, ¶85. Such an interpretation would have advanced Hongo’s broader motivation of using adaptive cruise control to “ensure sufficient convenience.” TESLA-1005, [0006]. Consistent with Hongo’s broader teachings, device 100 may be implemented in different types of vehicles, including those with an internal combustion engines (ICEs), a hybrid engine (e.g., ICE, electric engine), and a fully electric engine. TESLA-1003, ¶85.

A POSITA would have been motivated to implement Hongo’s teachings in a hybrid vehicle (e.g., Niki’s parallel hybrid vehicle) in the manner discussed above because the implementation would have involved choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success. *See KSR*, 550 U.S. at 415-421; MPEP 2143; TESLA-1003, ¶86. As discussed above, each of Hongo and Niki disclose using a calculated target speed in regulating a vehicle’s traveling speed, which is a finite and predictable solution for enabling cruise control functionality. TESLA-1003, ¶86; TESLA-1005, [0008] (describing

a “means for determining a target speed of the vehicle”); TESLA-1009, 8:47-67 (describing techniques relating to “the target value of the travelling speed of the vehicle”). Because each reference describes similar mechanisms of enabling cruise control using a target vehicle speed, a POSITA would have found it predictable to implement, for example, Hongo’s cruise control device 100 into the type of hybrid vehicle disclosed in Niki. TESLA-1003, ¶86.

A POSITA would have also been motivated to combine the teachings of Hongo and Niki because Niki’s teachings and/or suggestions improve vehicle control in the Hongo vehicle. *See KSR*, 550 U.S. at 415-421; MPEP 2143; TESLA-1003, ¶87. Specifically, Niki’s control unit 1 includes “a VSA (Vehicle Stability Assist) ECU 31 which drive controls the brake device 24 to stabilize the behavior of the vehicle,” and “an ACMECU 32 which drive controls the damping device 19 to suppress the generation of car body vibration...” TESLA-1009, 8:6-24. These teachings enable improved vehicle stability to be reasonably pertinent to Hongo’s adaptive cruise control given Hongo’s recognition that users may have different “preferences regarding the degree of stability related to lateral G and the like.” TESLA-1003, ¶87; TESLA-1005, [0022]. Aspects of Niki’s control apparatus (e.g., vehicle stability assist) would have thereby improved Hongo’s adaptive cruise control by reducing variability due to “individual differences” in driver-specific behaviors, such as “individual skill in steering wheel operation.”

TESLA-1005, [0022].

Further, functionality provided by Niki's cruise control unit 53 is reasonably pertinent to and/or compatible with that provided by Hongo's device 100 since Hongo and Niki each focus on similar types of vehicle speed control using a target vehicle speed. TESLA-1003, ¶88; TESLA-1005, [0008]; TESLA-1009, 8:47-59. In Niki, a "target vehicle speed" represents the "target value of the traveling speed of the vehicle" in a hybrid vehicle. TESLA-1009, 8:47-59. Hongo likewise focuses on using a "target vehicle speed V0" to achieve "accurate speed control." TESLA-1005, [0068]. Hongo also identifies prior art cruise control systems capable of "determin[ing] the target speed of a running vehicle." TESLA-1005, [0002] (citing U.S. Pat. No. 6,161,072 and J.P. Pat. Pub. No. H820728 as examples). Thus, a POSITA would have found it obvious to implement Hongo's device 100 in a hybrid vehicle and have reasonably expected to succeed in achieving such an implementation. TESLA-1003, ¶88. Indeed, this expectation is further bolstered by the cruise control functionality in Niki having the same input (e.g., vehicle speed) and the same output (e.g., target vehicle speed) as the cruise control functionality of Hongo. *Id.*

Finally, a POSITA would have reasonably expected to succeed in combining the teachings of Hongo and Niki within a vehicle. TESLA-1003, ¶89. Such a combination would have required only routine knowledge since, as described in

Niki, control apparatuses for hybrid vehicles applied “conventional technique[s]” for regulating aspects of an internal combustion engine and an electric motor.

TESLA-1009, 1:20-35. Further, in Niki, a control apparatus of a “parallel hybrid vehicle” includes “cruise control unit 53,” demonstrating that cruise control functionality in a hybrid vehicle was also well-known by the Critical Date.

TESLA-1009, 5:17-32, 8:47-59.

2. Analysis

(i) Claim 1

[1.pre]

Hongo discloses [1.pre] because the preamble is not limiting. Nothing in [1.pre] limits any of the subsequently-recited features of claim 1, and none of its features rely on the *electric vehicle operation* of [1.pre] for antecedent basis.

Regardless, Hongo-Obradovich-Niki renders [1.pre] obvious even if the preamble were limiting. As discussed in §III.A.(iii), a POSITA would have implemented Hongo’s device 100 to enable cruise control operation (*operation*) in a hybrid vehicle (*electric vehicle*). TESLA-1009, 5:17-32, 8:47-5; TESLA-1003, ¶90. Methods of hybrid vehicle operation are examples of a *method of electric vehicle operation* because hybrid vehicles are examples of electric vehicles.

TESLA-1003, ¶91. Hybrid vehicles utilize an electric motor for vehicle operation, e.g., to propel the vehicle. *Id.* Niki’s hybrid vehicle includes an electric motor (“motor M”) configured to receive power “during [a] power running operation

(driving or assisting) of the motor M,” which is an example of a vehicle operation of an electric vehicle. TESLA-1009, 5:33-54.

Notably, the ‘399 patent makes clear that the *electric vehicle operation* is not strictly limited to power-based fuel optimization. See TESLA-1001, 6:46-49 (“power supplied to the engine may be optimized with respect to speed or travel time.”). See also *id.*, 3:2-4, 6:58-60, 19:65 to 20:2. As discussed below, because Hongo’s adaptive cruise control techniques adapt vehicle *speed*, Hongo-Obradovich-Niki falls within the scope of both the claim language and the specification’s characterization of the purported invention. TESLA-1003, ¶¶92-95.

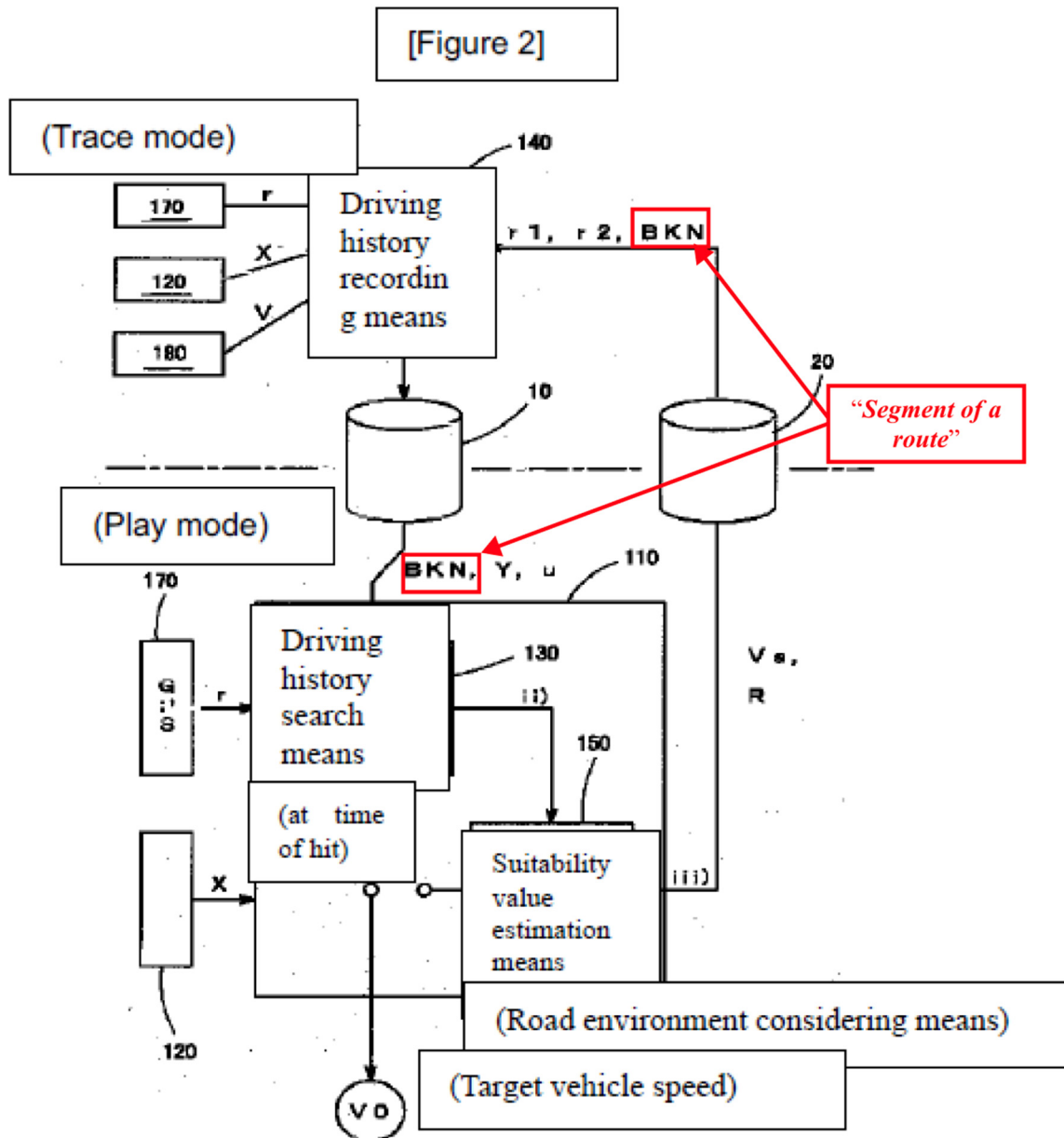
[1.a]

Hongo’s means 140 “acquires position information (current position coordinates r) from the GPS 170, and the position of a driving block (block number) that is defined by dividing [a route being driven on] into sections approximately every 20m in the driving direction on the road being driven on.” TESLA-1005, [0027].⁴ Thus, Hongo’s “driving block” discloses a *segment* of a travel direction on a road being traveled (*vehicle route*). TESLA-1003, ¶96.

⁴ Hongo discloses embodiments with both “trace” and “playback” modes that render claim 1 obvious in combination with the teachings of Obradovich and Niki. TESLA-1003, ¶96 (fn 3) (citing TESLA-1005, [0025]).

Hongo's system identifies each block using a block number (BKN), as

shown below:



Specifically, “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.” TESLA-1005, [0032]. Thus, since a “block” is identified using information gathered by a travelling vehicle (“current position coordinate r,” “road environmental real-time information X”), Hongo discloses *determining* the block based on the gathered information. TESLA-1003, ¶¶97-98.

[1.b.1]

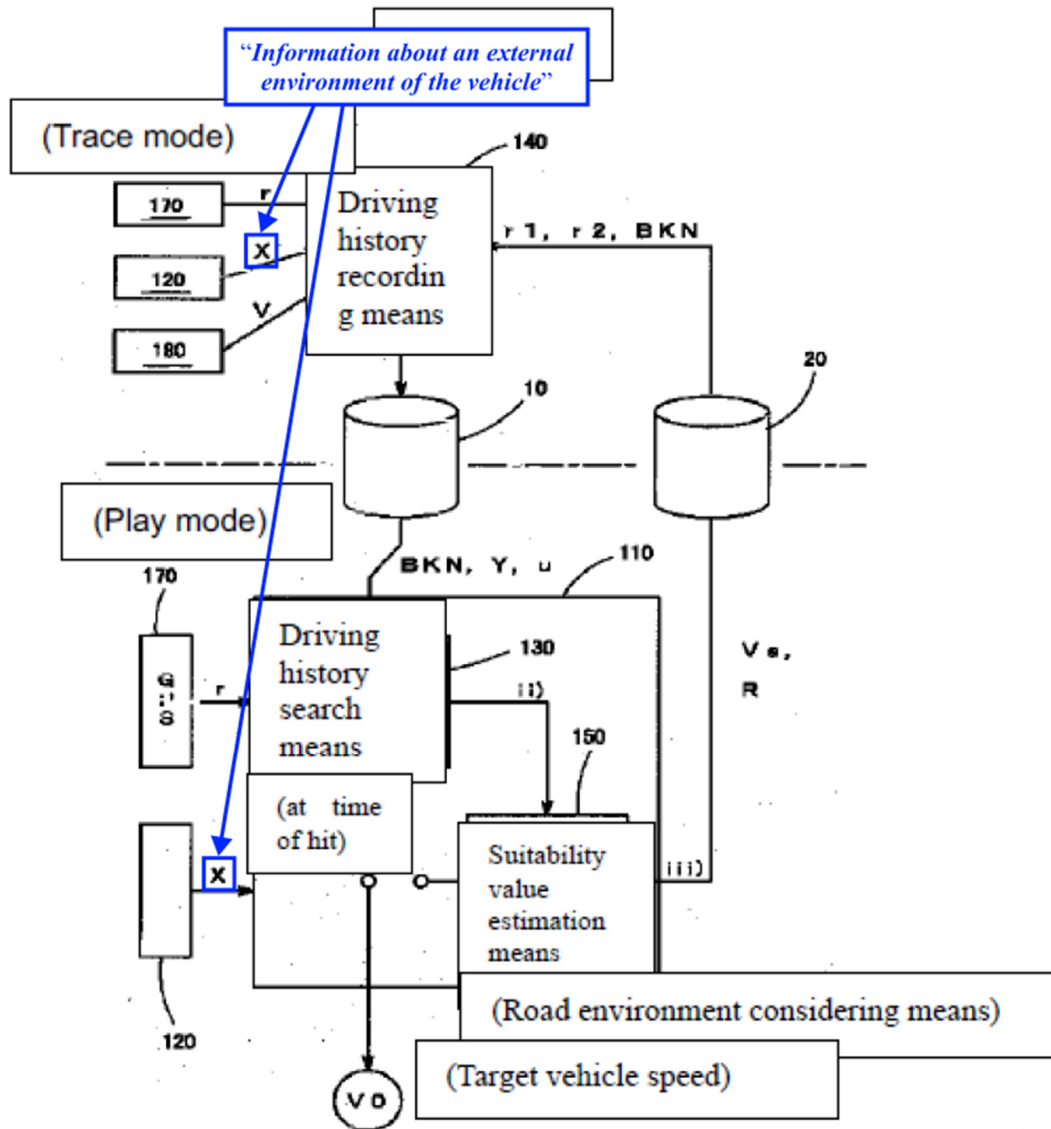
According to the '399 patent, the feature recited in this element (*information about an external environment of a vehicle*) encompasses “any information about the environment surrounding or acting on the vehicle.” TESLA-1001, 7:52-65.

Hongo teaches that “various signals” may be monitored and used for

⁵ Reference to prior art combinations throughout this Petition refer to a combination of teachings or combined teachings, and should not be understood to require a bodily physical incorporation of component or components disclosed in the prior art references. *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

⁶ Annotations to figures are shown in color.

“observing or estimating weather, sunlight conditions, etc.” and further to determine “road surface conditions” and “visibility conditions” from at least some of these signals. TESLA-1005, [0011]. In the data flow shown in Figure 2, means 140 obtains “road environment real-time information X” (*information about an external environment of a vehicle*), including “road surface temperature.” Further, by processing the “road environment real time information X” after reception by environmental acquisition means 120, means 140 *determine[s]* the road environment real time information X. TESLA-1003, ¶¶99-100.



TESLA-1005, FIG. 2

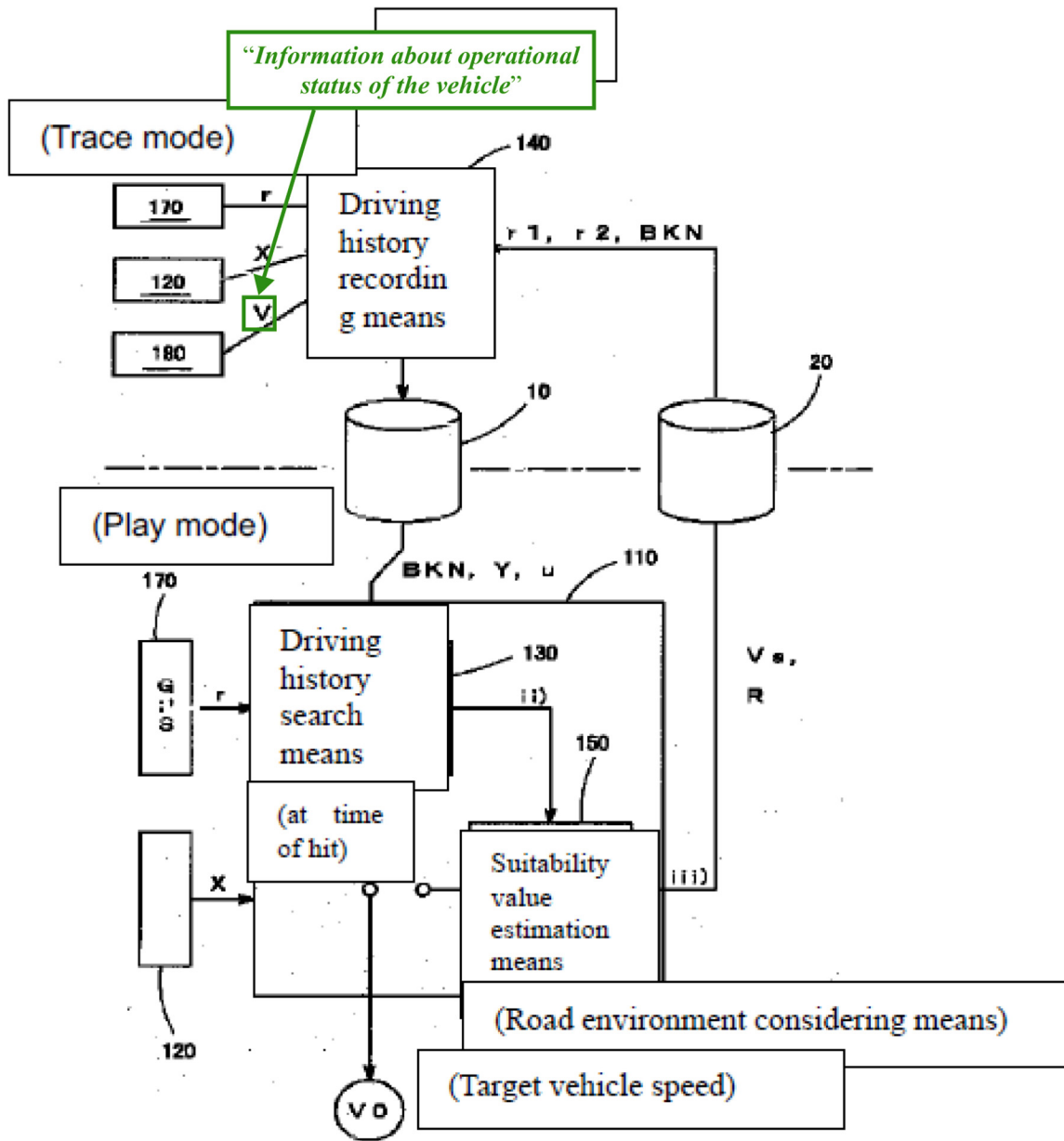
[1.b.2]

According to the '399 patent, the feature recited in this element (*information about operational status of a vehicle*) encompasses "any information about the current operational status of the vehicle itself," such as information "used to determine the current condition of the vehicle's engine and component parts

(e.g., motor, powertrain, battery, tires, etc.), the current fuel supply, the manner in which the vehicle is traveling (e.g., velocity, acceleration, etc.), and the like.”

TESLA-1001, 8:53-61; TESLA-1003, ¶101.

Hongo teaches that a vehicle includes a “vehicle speed sensor [180] that outputs a vehicle speed signal.” TESLA-1005, [0023]. Further, in the data flow depicted in FIG. 2, the means 140 obtains “current vehicle speed V” (*information about operational status of the vehicle*) from the vehicle speed sensor 180. *Id.*, [0028]. Further, by processing the “current vehicle speed V” in calculating the target speed, means 140 *determine[s]* the current vehicle speed. *Id.*; TESLA-1003, ¶102.



TESLA-1005, FIG. 2 (annotated)

[1.b.3]

The '399 patent lacks reference to *external command input telemetry*, but does provide examples of *telemetry*. TESLA-1001, 3:55-4:57, 8:33-35, 24:39-59.

As to *external command input*, the '399 patent uses permissive language in

disclosing examples of “command input.” *Id.*, 9:27-40, 10:17-22; TESLA-1003, ¶103. The ’399 patent further contemplates “command input” being “commands [provided] directly to the power management” and/or being “derived from other information including the environmental information and the operational status information.” TESLA-1001, 9:59-64. Consistent with these examples, *external command input telemetry* is at least broad enough to encompass telemetry instructions or telemetry used to derive instructions about a vehicle’s operation and is obtained from an external source. TESLA-1003, ¶¶104-106.

Hongo-Obradovich-Niki renders *external command input telemetry* obvious through disclosures consistent with the examples of “command input” and “telemetry” described in the ’399 patent. As one example, a vehicle incorporating implementations of the combination would have included Hongo’s “radio,” which receives information that “relates to road conditions,” e.g., “traffic jams, traffic regulations, etc. during driving.” TESLA-1005, [0064]. Traffic information received by the “radio” corresponds to *telemetry* because the received information represents, for example, measurement data relating to traffic jams and traffic accidents, where the measurement is communicated wirelessly to a vehicle. TESLA-1003, ¶107; TESLA-1005, [0064]. The traffic information also corresponds to *external command input telemetry* because it relates to “environmental information” received from an external source and used to derive a “preferred

speed,” which the ’399 patent identifies as an example of a “command input.”

TESLA-1001, 9:33-40, 9:61-64, 7:66-8:16; TESLA-1005, [0064]. Further, by processing signals received by the radio, Hongo-Obradovich-Niki *determine[s]* traffic information from the received signals (*information from external command input telemetry*). TESLA-1003, ¶¶105-107.

As another example, a vehicle incorporating implementations of the combination would have included navigation functionality described in Obradovich, including “find[ing] the best route from [] digitized maps and guid[ing] the driver therethrough via the voice interface.” TESLA-1008, 1:39-54. This involves “receiv[ing] signals from a constellation of satellites which is part of the [global position system (GPS)]” and “verbally and visually communicating to the user instructions for reaching the destination.” *Id.*, 1:55-67. These received GPS signals correspond to *telemetry* because, for example, they correspond to measurement data used to determine a current location of a vehicle, where the measurement data is communicated wirelessly to the vehicle. TESLA-1003, ¶¶108-109 (citing TESLA-1016, 3); TESLA-1001, 3:55-4:15, 9:59-64.

The received GPS signals further correspond to *external command input telemetry* because they are used by the navigation system to derive, for example, “the vehicle’s known or predicted final destination” or “the vehicle’s known or predicted interim destination,” which the ’399 patent identifies as examples of

command inputs. TESLA-1001, 9:33-39; *id.*, 1:55-67. Moreover, the received GPS signals are related to “environmental information” received from an external source because they enable identification of “the current location of the vehicle,” which is then used by the navigation system to estimate “the destination (either a final or an intermediate destination)” of the vehicle. *Id.*, 9:61-66; *see id.*, 7:66-8:16. Further, by processing the received GPS signals, Hongo-Obradovich-Niki **determine[s]** a vehicle location from the received GPS signals (***information from external command input telemetry***). TESLA-1003, ¶¶110-113.

[1.b.4]

As discussed for [1.b.3], the ’399 patent uses permissive language in disclosing examples of “command input.” TESLA-1001, 9:27-40, 10:17-22. The ’399 patent also states that “voice commands” are one example of “command inputs.” *Id.*, 4:34-45, 23:49-24:4. TESLA-1003, ¶114.

Hongo does not address ***user command inputs*** or ***voice command inputs***, but these features were well-known by the Critical Date. TESLA-1003, ¶115. Indeed, Obradovich identifies examples of conventional voice interfaces for control vehicle functions by the Critical Date. TESLA-1008, 1:39-54 (citing U.S. pat. No. 5,274,560); 2:36-47 (citing U.S. Pat. No. 4,827,520”); 2:49-56 (“[v]oice command and touch screen techniques are frequently in prior art references in controlling accessories.”). In Obradovich, “[i]nput interfaces 104,” include a

“touch screen interface 104a” and a “voice command interface 104b.” TESLA-1008, 6:57-62. Voice command interface 104b is “connected a microphone...for processing voice commands by the user through the microphone to control or modify selected functions of system 100.” *Id.*; TESLA-1003, ¶116.

Obradovich also describes a “[c]ruise control interface 108h” with “output control logic controllable by processor 105 to (1) turn the cruise control on or off, (2) set the vehicle speed, and (3) cancel or resume the set speed.” TESLA-1008, 8:16-18. Further, “wherever 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.*, 7:13-24. Thus, Obradovich contemplates using voice commands for controlling cruise control functionality via a cruise control interface (*user command inputs to the vehicle including voice command inputs*), such as toggling cruise control on/off, setting a preferred vehicle speed, or cancelling/resuming the set vehicle speed. TESA-1003, ¶117; *see id.*, ¶118 (citing TESLA-1014, 10:54-11:14, 43:45-61).

[1.c]⁷

The operation in [1.c] (*applying calculated electric power...*) is recited in isolation from the four types of information recited in the preceding limitations

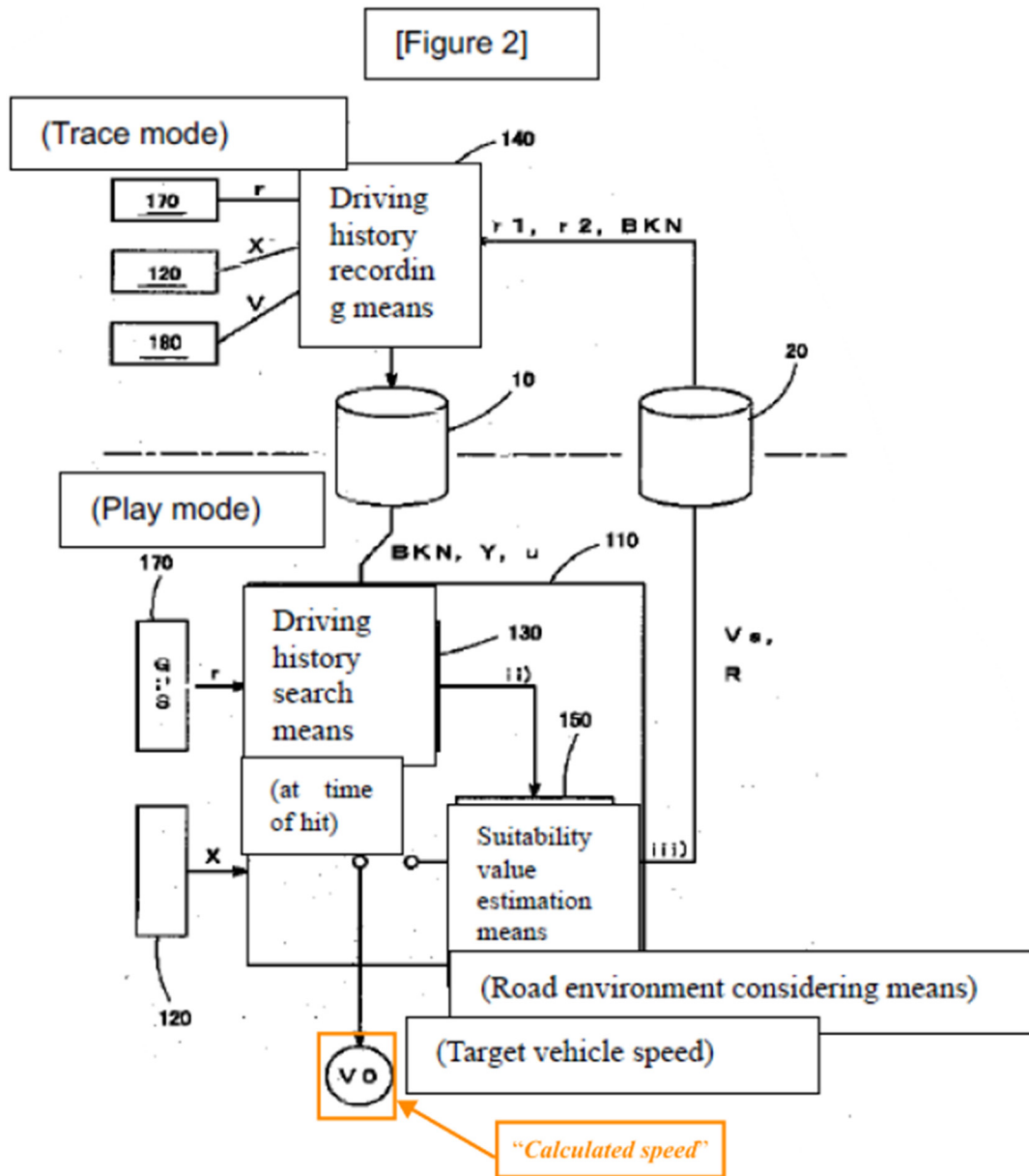
⁷ Reference to *electric power* in [1.c] does not limit the scope of claim 1 to fully-

([1.b.1]-[1.b.4])). Absent claim language to the contrary, under plain meaning, this operation encompasses an operation the performance of which is not tethered to, or otherwise limited by, the four types of information recited in [1.b.1]-[1.b.4].

TESLA-1003, ¶119. As discussed below, Hongo-Obradovich-Niki discloses each of the elements of [1.c] under plain meaning. To the extent that the prior art teachings are deemed insufficient, the combined disclosures of Hongo-Obradovich-Niki renders them obvious. *Id.*

As to *calculated speed*, the data flow depicted in Hongo's Figure 2 (below), means 140 and unit 110 operate in conjunction to calculate a "target vehicle speed V0."

electric vehicles. *See* TESLA-1003, ¶¶93-94 (discussing electric vehicle operations).



TESLA-1005, FIG. 2

The value of the "target vehicle speed V_0 " is calculated, for example, using one of the equations/formulas taught in Hongo. TESLA-1005, [0035], [0036], [0055].

The target speed value V_0 is used for adaptive cruise by outputting the calculated value to "ACC system 200." TESLA-1005, [0024], [0054]; TESLA-1003, ¶120.

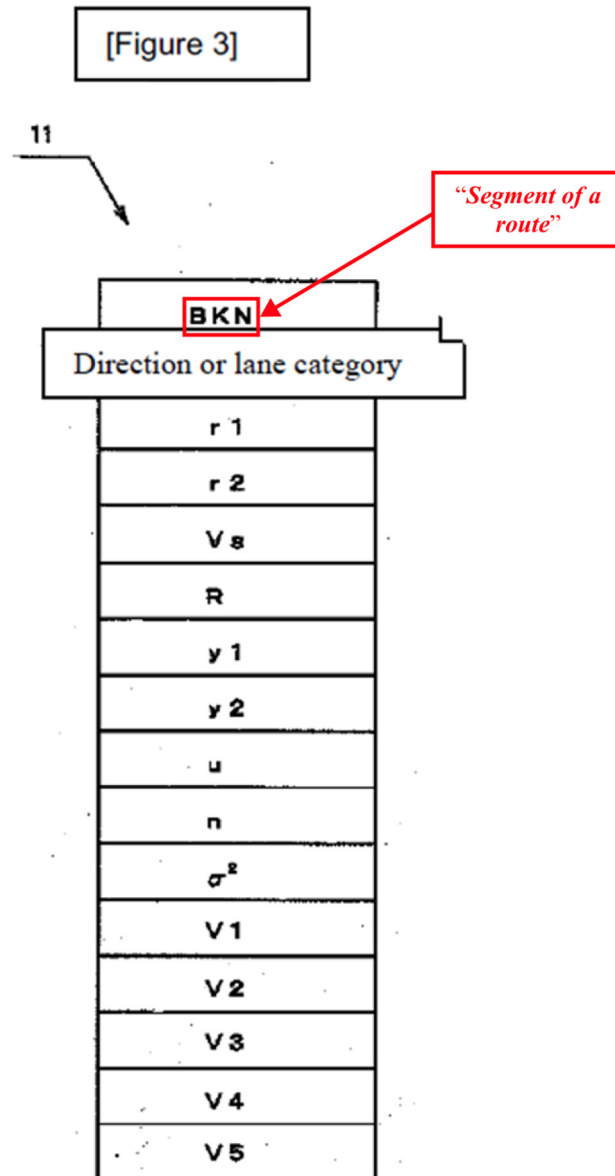
As to *applying calculated electric power to the vehicle*, Hongo-Obradovich-Niki satisfies this element by using a target vehicle speed to adapt cruise control in a hybrid vehicle. TESLA-1003, ¶121. For example, controlling vehicle movement using the target vehicle speed itself involves calculating and applying a power corresponding to the target vehicle speed to the vehicle engine. *Id.* The '399 patent supports this since applying an “optimally efficient speed” is one way of applying “optimal power” to the engine. TESLA-1001, 2:30-63.

As another example, based on the '399 patent, power is derived from a target vehicle speed applied to a vehicle. TESLA-1003, ¶122. As shown in Figure 2, step 205 involves calculating a “model optimal speed (or power),” prior to “the overall efficient applied power [being] provided to the engine.” TESLA-1001, 11:44-62. This indicates that an “optimal speed” can be used to derive “optimal power,” and thereby apply the derived optimal power to the vehicle. TESLA-1003, ¶122.

As to the power being a *calculated electric power*, Hongo-Obradovich-Niki would have provided adaptive cruise control in a hybrid vehicle, which involves adapting the power of an electric engine. TESLA-1003, ¶123. In Niki, “cruise control” enables “constant traveling control” by “control[ling] 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...”

TESLA-1009, 8:47-59; *see id.*, 5:17-54. Thus, adaptive cruise control in Hongo-Obradovich-Niki would have enabled applying a power to an *electric* motor of a hybrid vehicle (applying a *calculated electric power*). TESLA-1003, ¶¶123-124.

As to the application of power to enable the vehicle *to travel along the segment of the vehicle route*, Hongo-Obradovich-Niki would have provided adaptive cruise control as a vehicle is traveling along a route. TESLA-1003, ¶125. In Hongo, the “target speed” is “determined based on the past driving history in which both the position and the road environment real-time road information match.” TESLA-1005, [0017]. Since the “target speed” is calculated based on means 140 determining a block number BKN identifying a driving block in the driving block DB 20, the “target speed” is calculated for the driving block (*segment of the vehicle route*), as shown below.



TESLA-1005, FIG. 3

The stored information above is also used to calculate a value of the target vehicle speed. Specifically, “Direction or Lane Classification” is used for “classifying the current direction of travel (up/down, etc.) on the road being driven on.” TESLA-1005, [0029]. Further, the “block range coordinates (r1, r2),” are compared against

a “current position r” of a vehicle in relation to adaptive cruise control. *Id.*, [0045].

Additionally, “weather code y1 and sunshine code y2” are used to derive the “road environment parameter Y” shown in FIG. 2, and “u is the average value of valid vehicle speed data,” which, in some instances, “can be used as is, as the target vehicle speed V0 in the later reproduction mode.” *Id.*, [0029]. Thus, Hongo's adaptive cruise control involves adjusting power output of the vehicle *to travel along the segment of the vehicle route at a calculated speed*. TESLA-1003, ¶126.

As explained above, Hongo-Obradovich-Niki discloses each of the elements of [1.c] under plain meaning. However, to the extent that the prior art teachings are deemed insufficient, the overall disclosures of the prior art render those elements obvious. TESLA-1003, ¶127. It would have been obvious that implementing adaptive cruise control in a hybrid vehicle involves regulating power to a vehicle engine in order to maintain a target vehicle speed (or velocity) of the vehicle because vehicle power output and vehicle speed are directly correlated. *Id.* (citing TESLA-1018, 157, 167-68). Further, the '399 patent treats controlling a vehicle to a target speed as largely equivalent to applying a corresponding power, corroborating the obviousness of applying a target speed to a vehicle involves applying a corresponding power to the vehicle, or that the power may be derived from a value of target speed. *Id.*; TESLA-1001, 2:30-63, 11:44-62; TESLA-1003, ¶128.

Moreover, to the extent that the operation recited in [1.c] (*applying calculated electric power*) is deemed limited by some or all of the information [1.b.1]- [1.b.4], Hongo-Obradovich-Niki also discloses and renders these narrowing interpretations obvious. As noted for [1.b.1], [1.b.2], and [1.b.3], the target speed is calculated based on the information in these limitations, and thus, a corresponding power applied based on the target speed is similarly based on this information. TESLA-1005, [0017], [0029], [0045]; TESLA-1003, ¶129. As for [1.b.4], a vehicle incorporating Hongo-Obradovich-Niki would have included Hongo's adaptive cruise control and Obradovich's vehicle componentry, and thus, would have enabled scenarios in which a user provides a voice command to enable adaptive cruise control. TESLA-1003, ¶130. In such scenarios, the target speed is calculated based on each of the information recited in [1.b.1]-[1.b.4]. *Id.*

(ii) Claims 2, 5, 6, 9, 10

[2]

As discussed for [1.pre], Hongo's disclosure is non-limiting as to vehicle type. TESLA-1003, ¶131. Thus, in at least some implementations where Hongo's device 100 is implemented in a hybrid vehicle with an internal combustion engine, adjusting power control to enable adaptive cruise control satisfies [2] under plain meaning, e.g., through use of regenerative braking to recharge a battery associated with an electric engine. TESLA-1003, ¶132; TESLA-1009, 5:17-54

[5]

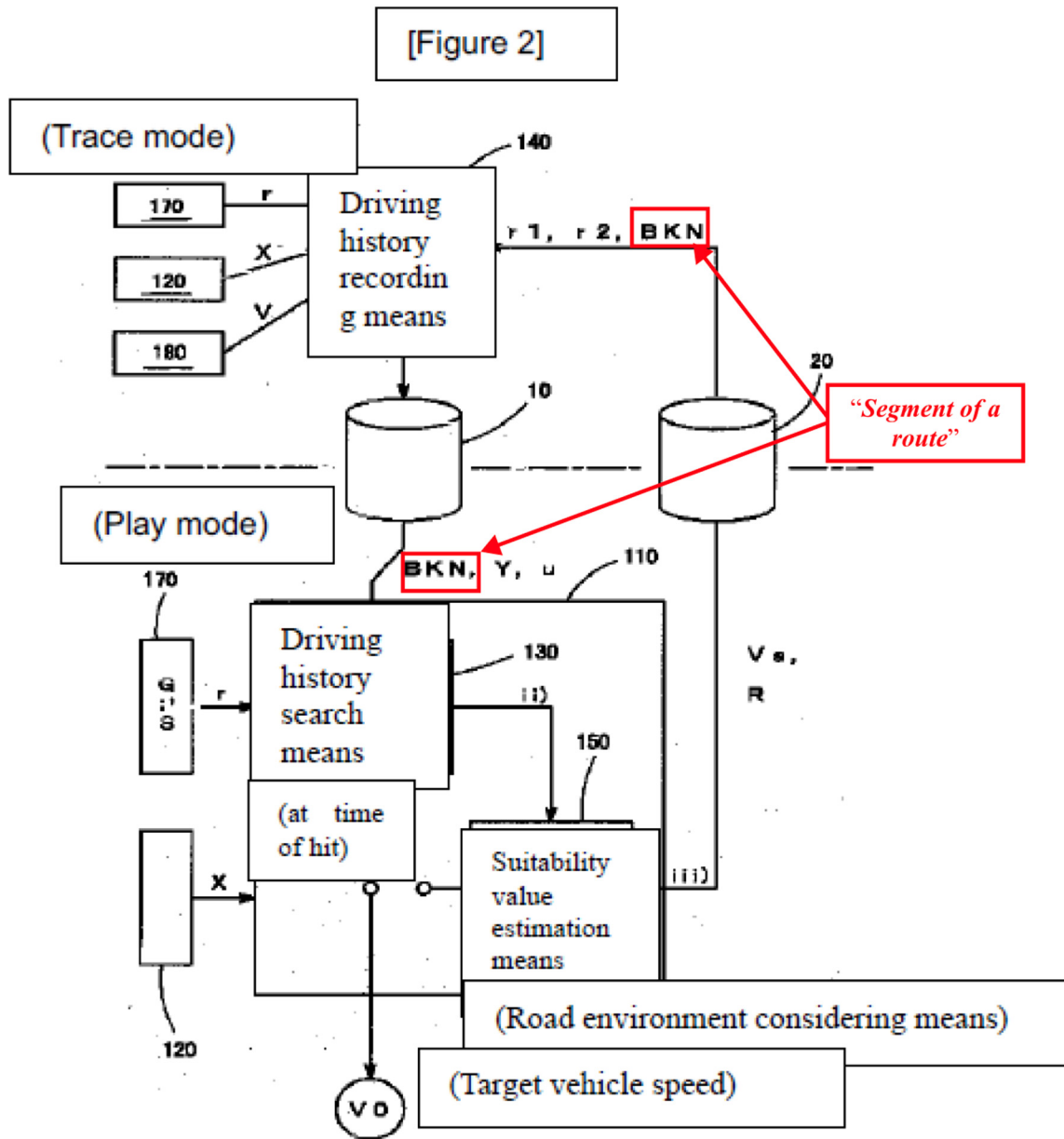
Hongo-Obradovich-Niki would have included Obradovich's teachings of using conventional navigation systems in vehicles, rendering this claim obvious. TESLA-1008, 1:39-54 (citing U.S. Pat. No. 5,274,560). Further, in Obradovich, "communications interfaces 106" includes a "navigation interface 106d" (*id.*, 6:63-7:7) that is "connected to a standard inertial guidance system...capable of providing gyros information, and deriving the vehicle location based on GPS information" (*id.*, 7:26-35). TESLA-1003, ¶¶133-134.

In one example, a "NAVIGATION option 401" is shown on a user interface and upon activation of option 401 by a user, system 100 "enter[s] into a navigation mode" where "processor 105 causes navigational instructions to be displayed on screen 209 in a conventional manner." TESLA-1008, 12:60-13:10. Further, in this mode, "the system is capable of visually and verbally providing the user with directions to a given destination through AUTO DIRECTOR display interface 102a and audio interface 118, respectively." *Id.* Thus, in this example, Hongo-Obradovich-Niki would have identified a given destination associated with route guidance (*selecting a destination*) where the identification is based on a user activating the navigation mode (*by at least one of a driver and a passenger*). TESLA-1003, ¶135.

[6.1]

As discussed for [1.a], Hongo's means 140 "acquires position information (current position coordinates r) from the GPS 170, and the position of a driving block (block number) that is defined by dividing it into sections approximately every 20m in the driving direction on the road being driven on is identified." TESLA-1005, [0027]. Thus, Hongo's "block" discloses a *segment* of a travel direction on a road being traveled (*vehicle route*). Given that each block is a 20m portion, a route longer than 20m includes multiple driving blocks (*determining multiple route segments*). TESLA-1003, ¶136.

Hongo's system identifies each block using a block number (BKN), as shown in the annotated FIG. 2 below:



TESLA-1005, FIG. 2

A “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.” TESLA-1005, [0032]. Thus, since the Hongo system

identifies a particular “block” amongst multiple blocks identified in a database using information gathered by a traveling vehicle (“current position coordinates r ,” “road environmental real-time information X ”), Hongo discloses **determining** multiple blocks based on the gathered information. TESLA-1003, ¶¶137-138.

[6.2]

As noted above, Hongo’s means 140 “acquires position information (current position coordinates r) from the GPS 170, and the position of a driving block (block number) that is defined by dividing it into sections approximately every 20m in the driving direction on the road being driven on is identified.” TESLA-1005, [0027]. Thus, Hongo’s “driving block” discloses a **route segment**. TESLA-1003, ¶139.

A POSITA would have found it obvious that, in circumstances where a vehicle travels on a curved path, Hongo-Obradovich-Niki would have computed a target speed for each driving block of the curved path (**each route segment having a separate calculated speed**). TESLA-1003, ¶¶140-141. In Hongo, “[i]f block number BKN misses,” the target vehicle speed V_0 is calculated using equation “ $V_0 = (V_s \times \gamma) \times \alpha_2 \times \beta_2$,” where “ $\gamma = f(R, V_s) \dots (2)$.” TESLA-1005, [0036]. In this example, “the value of γ is given by a predetermined function f based on (the minimum value of) the radius of curvature R of the corresponding driving block.” *Id.*, [0037]. Additionally, “when $R = \infty$ (when the road is straight), $\gamma = 1$, and the

value of γ monotonically increases and decreases with R.” *Id.* Further, as discussed above for [1.c], “driving block DB 20” is a database that stores “block number BKN” along with “block range coordinates (r1, r2) of each driving block, the legal speed limit V_s of the driving block, the **minimum radius of curvature R** of the driving block, and the like...” *Id.*, [0027].

Further, Hongo recognizes that “the radius of curvature R is a parameter that can change suddenly as the vehicle advances, so it is desirable to look ahead at the required number of cases and determine the argument (independent variable R) of the function f by aiming at the smallest value among them.” TESLA-1005, [0039]. It would have therefore been advantageous to compute a target vehicle speed for each road segment (driving block) to account for any sudden changes to the curvature R along the travel path. TESLA-1003, ¶141. Thus, in these scenarios, the target vehicle speed V_0 is calculated using equation “ $V_0 = (V_s \times \gamma) \times \alpha_2 \times \beta_2$,” where “ $\gamma = f(R, V_s) \dots (2)$.” *Id.*, [0036]. Moreover, a change in the radius of curvature R between road segments produces a different value of coefficient, γ , for each road segment, which then produces a different calculated target speed for each road segment.

Further, it would have been obvious that adaptive cruise control in Hongo-Obradovich-Niki involves adjusting vehicle speed using parameters associated with the target speed, for example, a vehicle speed parameter or an engine power

management parameter (*selected drive train parameters*). TESLA-1003, ¶142 (citing TESLA-1017, 15). Another example is through the adjustment of throttle position parameters (*selected drive train parameters*), which influences engine power output, because throttle management is a key aspect of drivetrain functionality. *Id.*

[9]

As recited, *separate source* is a relative term, but the claim language in claims 1 and 9 does not identify another element from which this element is *separate*, and thereby encompasses configurations of sources considered to be physically or logically separate. TESLA-1003, ¶143. A POSITA would have therefore looked to claim language recited in other claims, and in doing so, recognized that independent claim 11 recites each of a *user interface system* that is *capable of accepting voice command inputs* and a *power management system* set to *calculate electric power and speed over a segment of a vehicle route*. *Id.* This configuration is an example satisfying the requirement in [9] that *voice command inputs are provided to the vehicle by a separate source* in that the *voice commands inputs* (recited in [1.b.4] and [9]) are provided to a vehicle by a first component that is different from a second component that *appl[ies] calculated electric power to the vehicle* (recited in [1.c]).

As discussed above, adaptive control in Hongo-Obradovich-Niki involves

leveraging aspects of Hongo's device 100 and Obradovich's system 100.

Specifically, Hongo's device 100 (means 140, unit 110) uses target speed to adapt cruise control (which involves *applying calculated electric power to the vehicle to travel...at a calculated speed*) and Obradovich's system 100 (voice command interface 104b) receives voice commands for controlling cruise control functionality (*user command inputs to the vehicle including voice command inputs*). Thus, since different devices and/or components of Hongo-Obradovich-Niki are involved in adaptive cruise control and voice command processing, the voice commands *are provided to the vehicle by a separate source*. TESLA-1003, ¶¶144-145. A POSITA would have also found obvious that, in Hongo-Obradovich-Niki, a user (or a microphone) providing a command input is an example of a *source* of *voice command inputs* such that the user (or the microphone) is a *separate source* relative to device 100 (which *applies/ calculated electric power to the vehicle*). TESLA-1008, 6:56-62; TESLA-1003, ¶146.

[10]

As discussed above, adaptive control in Hongo-Obradovich-Niki would have involved leveraging aspects of Hongo's device 100 and Obradovich's system 100 (*device*). In Obradovich, system 100 includes a "navigation interface 106d" that is "connected to a standard inertial guidance system (not shown) capable of providing

gyros information, and deriving the vehicle location based on GPS information.”

TESLA-1008, 7:26-35. Additionally, “[b]esides the locational information, local and national emergency information may be derived from the GPS information using additional standard decoding circuitry in interface 106d.” *Id.* Thus, Obradovich’s system 100 is configured to have functionality to derive vehicle location based on GPS information (***GPS functionality***). TESLA-1003, ¶¶147-148.

As discussed for [1.b.4], Obradovich’s system 100 also includes a voice command interface 104b to receive voice commands that control a cruise control interface 108h (***user command inputs to the vehicle including voice command inputs***), such as toggling cruise control on/off, setting a vehicle speed, or cancelling/resuming the set vehicle speed. Further, Obradovich’s system 100 includes “[o]utput control interfaces 108” with “output control logic” to control various vehicle interfaces, including cruise control interface 108h. TESLA-1008, 7:39-43; *see id.*, 8:16-19. Thus, in processing voice commands to control cruise control, Obradovich’s system 100 (***device***) is configured to ***provide[]*** the voice commands to the automatic cruise control system 200 (***to the vehicle***) via cruise control interface 108h. TESLA-1003, ¶149.

Moreover, in Obradovich, a “phone interface 106a” enables connectivity between a vehicle and “standard phone equipment.” TESLA-1008, 6:63-7:7.

Further, “the user may operate the phone equipment via voice command, thereby realizing hands-free operation of the equipment.” *Id.* A POSITA would have found obvious that, in Hongo-Obradovich-Niki, a standard phone equipment connected to a vehicle through a phone interface 106a is an example of **a *device having GPS functionality*** since GPS functionality was a well-known feature of phones by the Critical Date. TESLA-1003, ¶150 (citing TESLA-1019, [0014], [0017]).

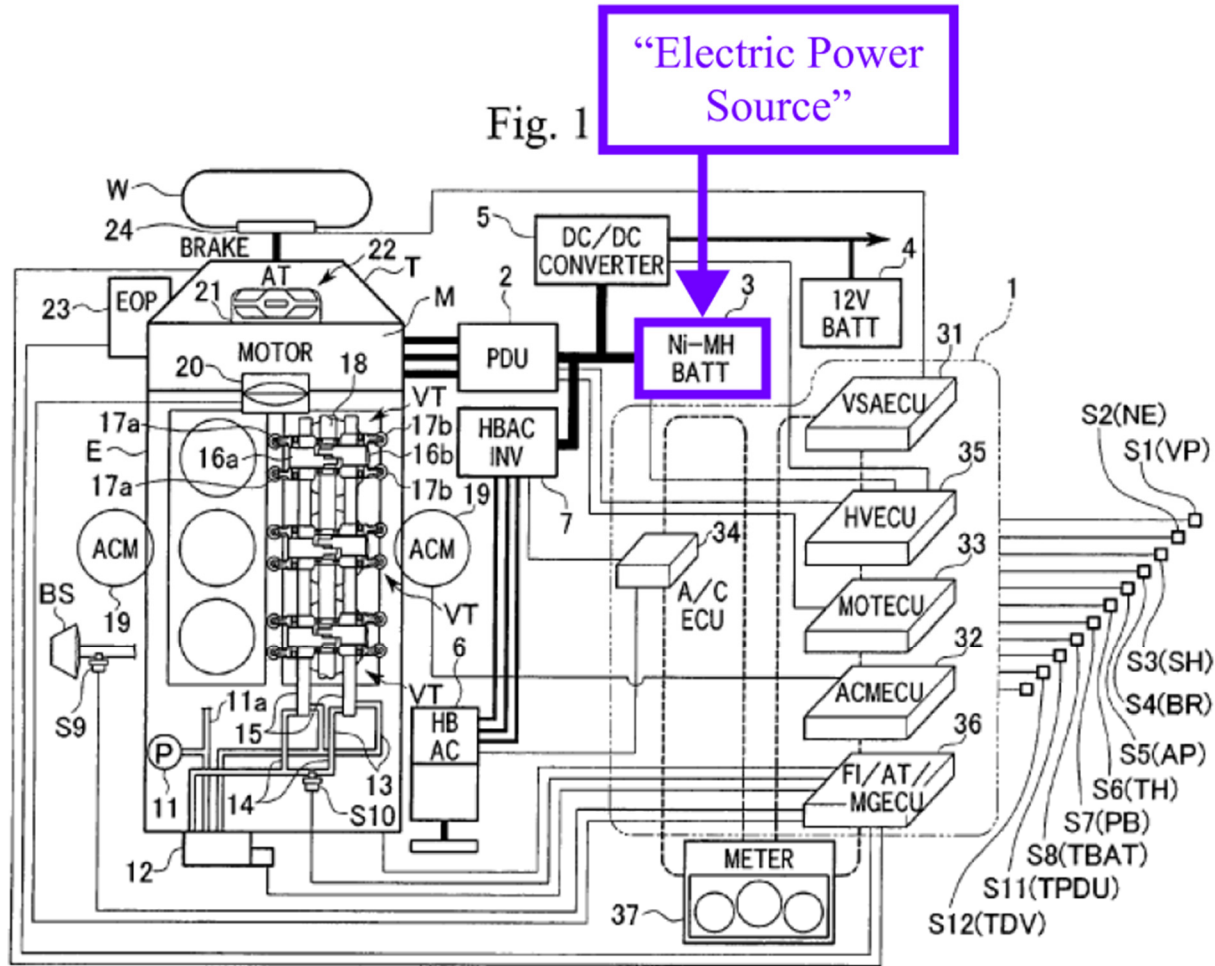
(iii) Claim 11

Hongo-Obradovich-Niki renders claim 11 obvious in the same manner as explained above for the corresponding claim 1 limitations below and based on the same corresponding evidence. TESLA-1003, ¶151.

Claim 11 Limitation	Corresponding Limitation
[11.pre]	[1.pre]
[11.b.2]	[1.b.1]
[11.b.3]	[1.b.2]
[11.b.4]	[1.b.3]
[11.b.5]	[1.b.4]
[11.c.2]	[1.c]

[11.a.1]

As discussed in §III.A.1(iii), a POSITA would have implemented in Hongo-Obradovich in Niki's hybrid vehicle, which includes a "internal-combustion engine E, a motor M, and a transmission T [] connected directly in series." TESLA-1009, 5:17-32. Further, "motor M" may be a "three-phase brushless DC motor" that is "connected to a power drive unit (PDU) 2," which is further connected to a "nick-hydrogen battery (battery) 3 of a high voltage system which transfer the power for the motor M (the power supply which is supplied to the motor M during [a] power running operation (driving or assisting) of the motor M..." *Id.*, 5:33-54. Thus, as shown below, Hongo-Obradovich-Niki would have included battery 3 (*electric power source*) for supplying power to motor M (i.e., an electric motor). TESLA-1003, ¶152.



TESLA-1009, FIG. 1 (annotated)

[11.a.2]

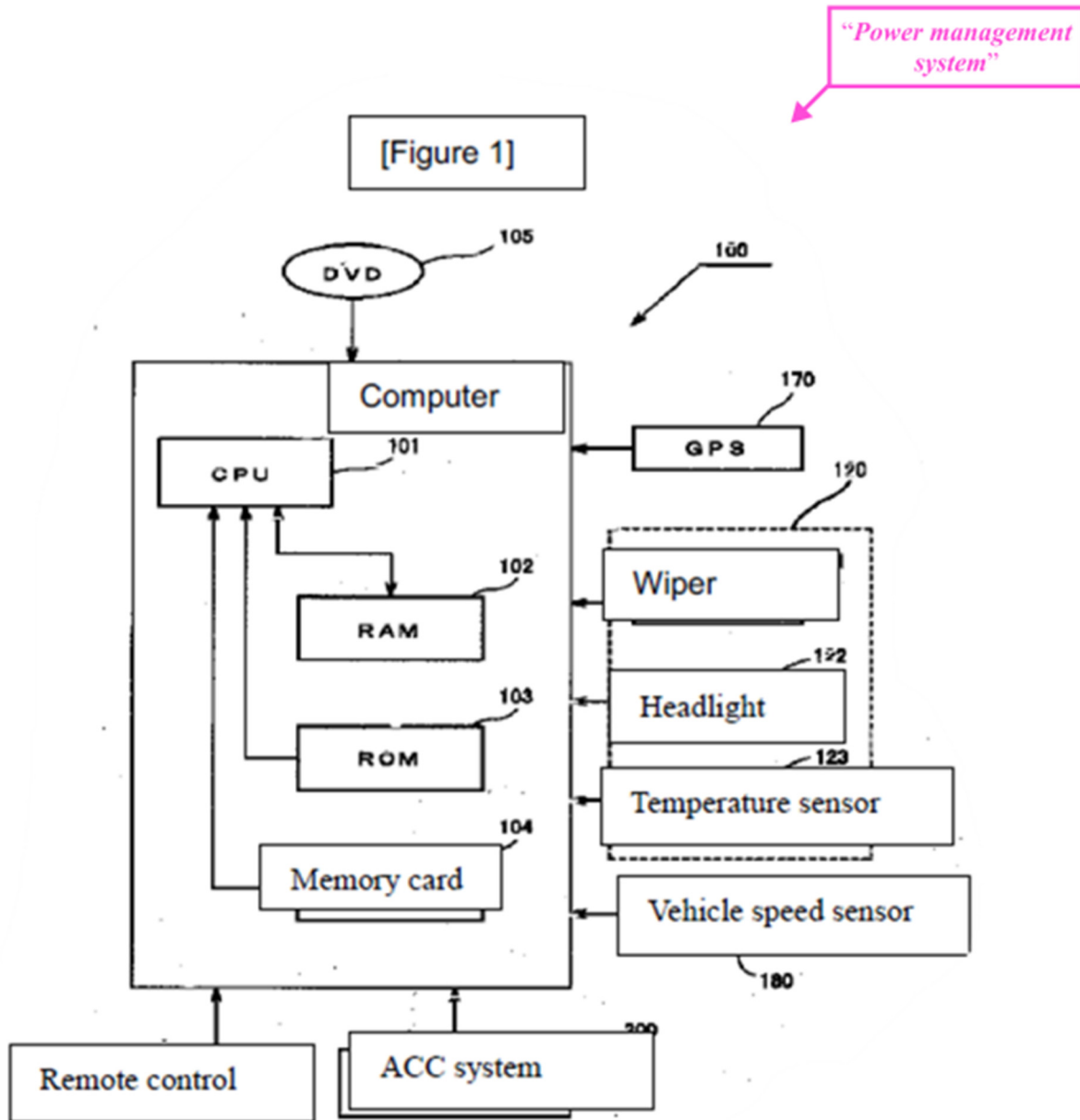
As discussed above, adaptive cruise control in Hongo-Obradovich-Niki would have involved leveraging aspects of Hongo’s device 100 and Obradovich’s system 100. In Obradovich, system 100 includes “[c]ommunications interfaces 106” (*communication system*), such as “phone interface 106a, radio/CD interface 106b, television (TV) interface 106c, navigation interface 106d, and beacon interface 106e.” TESLA-1008, 6:63-7:7; TESLA-1003, ¶¶153-154.

[11.a.3]

In Obradovich, system 100 includes “[i]nput interfaces 104” (*user interface system*), which further includes “touch screen interface 104Aa” and “voice command interface 104b.” TESLA-1008, 6:57-62. Voice command interface 104b is “connected a microphone...for processing voice commands by the user through the microphone to control or modify selected functions of system 100.” TESLA-1008, 6:57-62; TESLA-1003, ¶155. Further, the input interfaces 104 are *capable of accepting vehicle command inputs* because, as discussed for [1.b.4], ’399 patent describes that “voice commands” are an example of “command inputs.” TESLA-1001, 4:34-45, 23:49-24:4; TESLA-1008, 1:39-54, 6:57-62.

[11.b.1]

In Hongo, device 100 is a *power management system* because Hongo teaches calculating and applying a target speed (and a corresponding power) to a vehicle in providing adaptive cruise control. TESLA-1005, [0029], [0035], [0036], [0045], [0055]; TESLA-1003, ¶156.



TESLA-1005, FIG. 1

As discussed for [1.c], 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. TESLA-1003, ¶157 (citing TESLA-1018, 157, 167-68); TESLA-1001, 2:30-63, 11:44-62.

Further, as discussed for [11.a.1], Hongo-Obradovich-Niki would have provided a hybrid vehicle with battery 3 (*electric power source*) for supplying power to motor M (i.e., an electric motor), and thus, adaptive cruise control provided by Hongo's device 100 relates to power associated with the battery 3. TESLA-1003, ¶158; TESLA-1009, 5:17-54, FIG. 1.

[11.b.6]

As described in the '399 patent, examples of "operational parameters" generally include "characteristics that are specific to the vehicle (e.g., characteristics of component parts of the vehicle, including battery, the engine, the powertrain, the tires, etc.)." TESLA-1001, 10:25-29 (emphasis added); *see id.*, 4:46-57; TESLA-1003, ¶159.

In some embodiments of Hongo-Obradovich-Niki, environment information acquisition unit 120 receives "tire information" that is "related to the tires of the vehicle in motion" and which Hongo indicates is "very useful in calculating the coefficients α and γ ," which are used for calculating a target speed. TESLA-1005, [0064]; *see id.*, [0035]-[0039]. It would have been obvious that "tire information" (e.g., "the type of tires installed," "presence or absence of chains") includes *one or more operational parameters of the vehicle* since the information has "a strong influence on braking force, cornering power, etc." *Id.*, [0064]; TESLA-1003, ¶160. The type of tires installed on a vehicle (e.g., tire size, rolling circumference)

affects how vehicle speed is calculated, and thus, the adaptive cruise control provided by Hongo-Obradovich-Niki would have relied upon this information relating to the tire type for appropriate calibration to ensure accurate calculation of speed measurements. *Id.* Indeed, the examples of tire information described in Hongo are also examples of “characteristics of component parts of the vehicle,” such as “tires,” which the ’399 patent describes as examples of *operational parameters*. TESLA-1001, 10:25-29.

[11.c.1]

As discussed for [1.c], in the data flow depicted in FIG. 2, means 140 and unit 110 operate in conjunction to calculate a “target speed” (*calculate...speed*). It would have been obvious that applying the target speed to adjust cruise control involves *calculat[ing]...power*. TESLA-1003, ¶161. Controlling a vehicle’s movement using a target speed through cruise control involves calculating and applying a corresponding power to the vehicle engine because it was well-known that speed and power output of a vehicle are directly correlated such that adjustments to one parameter involves adjustments to the other. *Id.* (citing TESLA-1018, 157, 167-68). Thus, since adaptive cruise control in Hongo-Obradovich-Niki would have enabled controlling an electric motor of a hybrid vehicle, use of the calculated target vehicle speed in providing adaptive cruise control would have similarly involved applying a *calculated electric power*. *Id.*

(iv) Claims 12, 15, 16

Hongo-Obradovich-Niki renders these claims obvious for the same reasons discussed above in the corresponding claim addressed in §III.2(ii) and based on the same corresponding evidence. TESLA-1003, ¶162.

Claim Limitation	Corresponding Claim Limitation
[12]	[2]
[15]	[5]
[16.1], [16.2]	[6.1], [6.2]

(v) Claims 19, 20

[19]

Under plain meaning, *probable optimal speed* is a vehicle speed (*speed*) that is determined using *historical route information* and is most likely (*probable*) to be optimized (*optimal*) relative to a parameter. TESLA-1003, ¶163. This is consistent with the '399 patent, which describes one example of a “probable optimal speed” as being “the most efficient speed (e.g., the speed having the lowest energy requirement) used by the vehicle when traversing the segment.” TESLA-1001, 18:57-67. In Hongo, adaptive cruise control functionality is used to “automatically output[] an optimized or optimized target vehicle speed according to weather, sunlight conditions, etc.” TESLA-1005, [0007]. Further, the target vehicle speed is calculated based on information stored in driving history

DB 10 and driving block DB 20. TESLA-1005, [0029], [0044], [0045], FIG. 3.

Thus, Hongo's target vehicle speed is a *speed* that is determined using information stored in driving history DB 10 and driving block DB 20 (*historical route information*) and is most likely (*probable*) to be optimized (*optimal*) relative to one or more parameters, e.g., weather, sunlight conditions. TESLA-1003, ¶163.

[20]

It would have been obvious that certain implementations of Hongo-Obradovich-Niki are configured to enable cruise control functionality only when a vehicle travels over a minimum speed. TESLA-1003, ¶164. Use of minimum speeds were well-known techniques for enabling the types of cruise control disclosed in Hongo. TESLA-1021, 3:64-4:16 (describing a “adaptive cruise control (ACC) mode” with a “lower speed limit,” “e.g., 35 km/h”); TESLA-1013, 1:30-33 (“ACC systems...can only be activated above a certain minimum speed of 30 km/h”). This ensures adaptive cruise control is used when a vehicle is traveling on highways and open roads, where maintaining a consistent cruising speed is practical and safe. TESLA-1003, ¶164.

With these implementations of Hongo-Obradovich-Niki, a user may attempt to turn on cruise control in scenarios where a vehicle's speed is below the minimum speed. TESLA-1003, ¶165. In such scenarios, it would have been obvious to configure the vehicle to notify the user that cruise control functionality

cannot be used since such a POSITA would have known of well-known configurations where monitored vehicle speed information is used to “control the speed of the automobile as part of a cruise control operation” and to further “provide the motor vehicle operator with warnings...” TESLA-1022, Abstract. Indeed, cruise control in such scenarios can be dangerous when a vehicle cannot be driven safely at a steady speed (e.g., while traveling along a route with frequent traffic stops). TESLA-1003, ¶165. To improve vehicle safety, a POSITA would have configured elements in Hongo-Obradovich-Niki (e.g., Obradovich’s display interfaces 102) to provide warnings relating to cruise control availability based on a current traveling speed and a minimum speed. *Id.* This includes “information about the vehicle” that is “readily available literally at the fingertips of the user,” such as “operational instructions, maintenance procedures, safety measures....” TESLA-1005, 4:66-5:15. Because display interfaces 102 may display “information about virtually every capability of the automobile,” it would have been obvious that a user is provided with information regarding the minimum speed required for cruise control. TESLA-1003, ¶165.

The implementations of Hongo-Obradovich-Niki discussed above renders claim 20 obvious. TESLA-1003, ¶166. Specifically, warnings *present[]* information relating a target vehicle speed used for adaptive cruise control (*target speed*) based on whether a value of a current traveling speed (and used to specify

the target vehicle speed) is within a range defined by the minimum speed (*range of target speeds*). *Id.* Because the minimum speed is used to maintain vehicle safety, it would have been obvious that values of target vehicle speeds applied by adaptive cruise control (when available) are above the minimum speed value. TESLA-1003, ¶166. For example, when a driver attempts to engage cruise control while traveling at a 25 km/h (below the minimum speed of 35 km/h), a display in a vehicle may present a warning with the notification “cruise control is only available at speeds greater than 35 km/h.” *Id.* In this example, presentation of the warning would have informed the driver of the constraints under which cruise control is available, and without such a warning, the driver would have no knowledge of speed limit constraints on cruise control functionality, and may instead think that cruise control is simply broken on the vehicle. *Id.* Thus, presentation, by implementations of Hongo-Obradovich-Niki, of a range of speeds defined by the minimum value corresponds to presentation of *target speed as a range of target speeds*. *Id.*; TESLA-1022, Abstract; TESLA-1003, ¶167.

B. [GROUND 2] – Claims 3, 4, 13 And 14 Are Obvious Over Hongo-Obradovich-Niki-Kudo

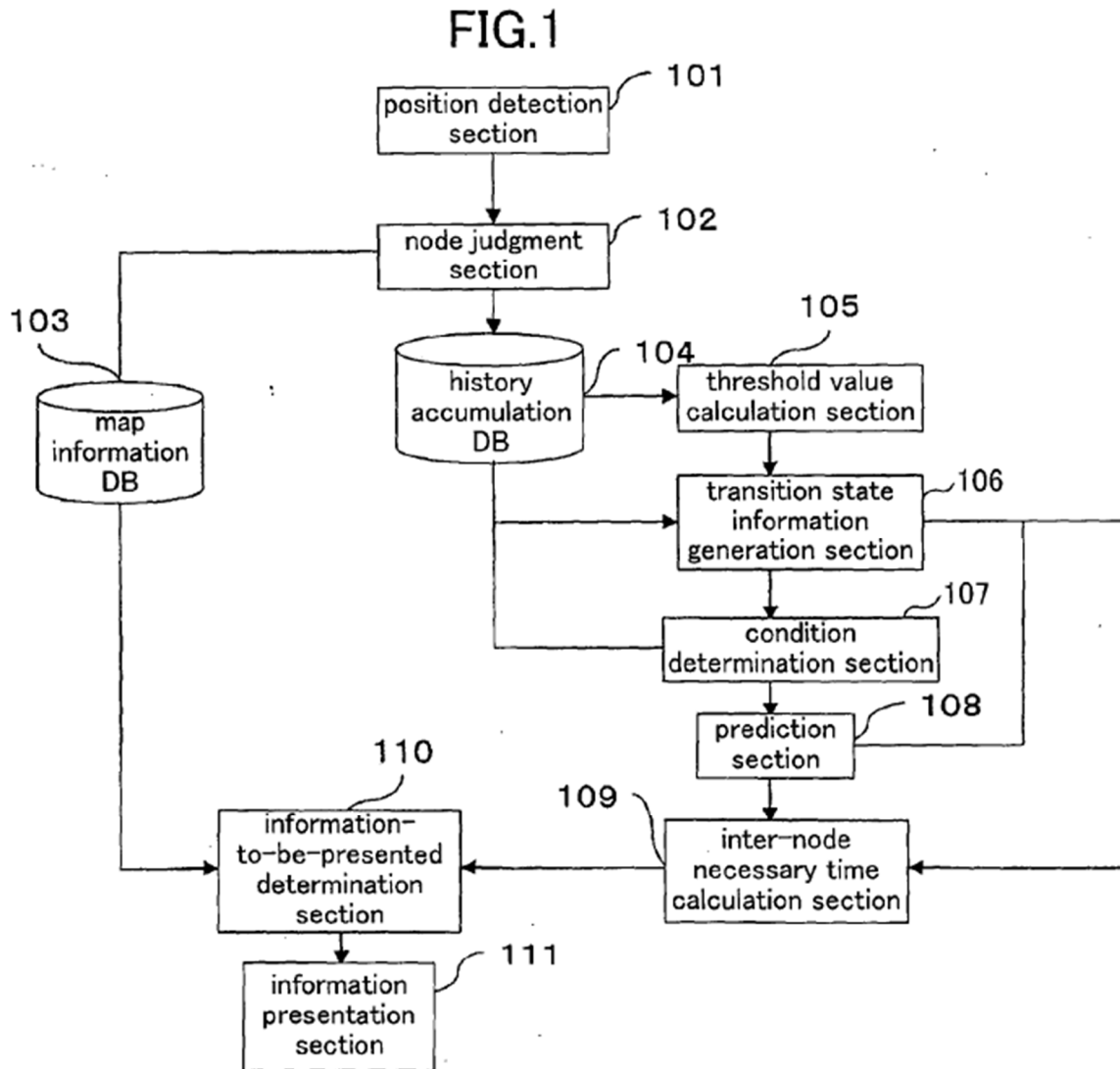
1. Hongo-Obradovich-Niki-Kudo

(i) Kudo

Kudo discloses “a technology for predicting a travel destination” of a vehicle. TESLA-1010, [0001]. The prediction involves “accumulating, as a travel

history, a travel route obtained from the history of position information of the mobile body,” e.g., the vehicle. *Id.*, [0013]. This travel history is used to “predict[] one or more travel destinations where the mobile body will advance,” considering factors such as “time, date, weather, driver, a fellow passenger, and the like.” *Id.*, [0013], [0014]; TESLA-1003, ¶59. Kudo’s travel destination prediction thereby is an example of the destination selection techniques described in the ’399 patent. TESLA-1001, 20:54-67 (describing “statistical destination logic” for “infer[ing] one or more likely destinations based on [] information inputs,” e.g., “current location and direction of the vehicle, and the date and time of day”).

Figure 1 shows an example of Kudo’s information acquisition system for predicting a destination of a vehicle:



TESLA-1010, FIG. 1

A position detection section 101 “detects information on the current position of the car navigation system (the current position of an automobile as a mobile body on which the car navigation system is boarded.” TESLA-1008, [0077]. A node judgment section 102 “judges whether or not the current position detected by the position detection section 101 corresponds to a node...” *Id.* A map

information database 103 “stores map information to be used for car navigation.”

Id. Further, a history accumulation database (DB) 104 “accumulates a travel route obtained from a history of the position information of the automobile as a travel history.” *Id.*, [0078]; TESLA-1003, ¶¶60-64.

Kudo is analogous art to the ’399 patent. Kudo is from the same field of endeavor (e.g., vehicle navigation) and is reasonably pertinent to the problem the ’399 patent was trying to solve (e.g., challenges associated with destination prediction while a vehicle is travelling along a route). TESLA-1003, ¶65; TESLA-1001, 1:22-2:17, 20:54-67.

(ii) Combination

As discussed in §III.A.1, a POSITA would have been motivated to combine Hongo and Obradovich given the distinct advantages provided by each reference to vehicle operation. Such advantages include adaptive cruise control functionality provided by Hongo’s device 100, and user-friendly vehicle control and operation provided by Obradovich’s system 100. TESLA-1003, ¶168. A POSITA would have therefore found it predictable that a vehicle incorporating Hongo-Obradovich-Niki would have included adaptive cruise control capabilities (per Hongo) and navigation capabilities (per Obradovich). For example, Obradovich’s system 100 includes various types of vehicle interfaces, including a navigation interface 106d (TESLA-1008, 6:63-7:7) and a cruise control interface (*id.* at 8:15-18). TESLA-

1003, ¶168.

In implementing Hongo-Obradovich-Niki, a POSITA would have been motivated to further improve well-known vehicle capabilities given Obradovich's broad objective to "design an information and control system for use inside an automobile with the user in mind." TESLA-1003, ¶169; TESLA-1008, 3:21-30. One example discussed in Obradovich is navigation. *Id.*, 1:39-67 (discussing prior art vehicle navigation systems). A POSITA would have therefore been motivated to improve a user's access to information during vehicle navigation to allow Hongo-Obradovich-Niki to be more "intuitive and direct so that the user can obtain the relevant information in a few self-explanatory steps." *Id.*, 3:32-63.

Like Obradovich, a POSITA would have perceived Kudo to be similarly concerned with improving a user's overall access to information. TESLA-1003, ¶170. Kudo recognized "[i]t is much arduous for users to input [information] by themselves," and in particular, that "setting a car navigation system on the move by means of an automobile are taxing and may be dangerous operation under certain circumstances." TESLA-1010, [0002]. From Kudo, a POSITA would have recognized that this is why "many users of car navigation systems drive without setting any destination." *Id.* A POSITA looking to increase user convenience while driving would have thereby found it advantageous to incorporate Kudo's destination prediction technique into the navigation system present within Hongo-

Obradovich-Niki (e.g., Obradovich's navigation interface 106d). TESLA-1003, ¶170.

As discussed in §III.B.1(ii), Kudo's destination prediction technique involves "accumulating, as a travel history, a travel route obtained from the history of position information of the mobile body," e.g., the vehicle. *Id.*, [0013]. This travel history is used to "predict[] one or more travel destinations where the mobile body will advance," considering factors such as "time, date, weather, driver, a fellow passenger, and the like." *Id.*, [0013]-[0014]. As combined, the combination would have used Kudo's travel history information by, for example, leveraging the same or similar data to that stored in Hongo's "driving history DB 10" and "driving block DB 20," to predict a destination of a vehicle (as taught in Kudo). TESLA-1003, ¶171.

A POSITA would have been motivated to combine the teachings of Hongo-Obradovich-Niki and Kudo since the combination involves use of known techniques to improve similar devices in the same way. *KSR*, 550 U.S. at 415-421; MPEP 2143; TESLA-1003, ¶172. Kudo's technique to predict a destination was a known vehicle navigation technique, which would have improved the control/operation capabilities of a vehicle incorporating Hongo-Obradovich-Niki in the same way as disclosed in Kudo. TESLA-1003, ¶172; TESLA-1010, [0013], [0014].

A POSITA would have expected success in implementing Hongo-Obradovich-Niki-Kudo. As discussed above, the implementation involves incorporating well-known techniques and elements (e.g., Kudo's destination prediction technique) with well-known systems (e.g., a hybrid vehicle incorporating componentry enabling Hongo's adaptive cruise control system and Obradovich's information and control system) without invention. TESLA-1003, ¶173.

2. Analysis

(i) Claims 3, 4

[3]

In Kudo, "prediction section 108" "performs prediction of a future travel destination" using information collected by Kudo's car navigation system. TESLA-1010, [0079]; *see id.*, [0001], [0104]. Thus, prediction of a travel destination in Hongo-Obradovich-Niki-Kudo involves *selecting a destination*. TESLA-1003, ¶174.

The "travel history" is stored in "a history accumulation database (DB) [104] that accumulates a travel route obtained from a history of the position information of the automobile as a travel history," as shown below. TESLA-1010, [0078].

FIG.3

104

node number	time
L6	8:05 a.m. on July 31
C8	8:06 a.m. on July 31
C12	8:08 a.m. on July 31
C9	8:09 a.m. on July 31
C34	8:11 a.m. on July 31
.	.
.	.
L128	8:53 a.m. on July 31

(a)

node number	time
L128	12:25 p.m. on July 31
C140	12:29 p.m. on July 31
C125	12:36 p.m. on July 31
.	.
.	.
L68	1:33 p.m. on July 31

(b)

node number	time
L6	8:05 a.m. on July 31
C8	8:06 a.m. on July 31
C20	8:08 a.m. on July 31
L12	8:10 a.m. on July 31
L12	1:40 p.m. on July 31
C34	1:50 p.m. on July 31
.	.
.	.
L6	9:20 p.m. on July 31

TESLA-1010, FIG. 3

Thus, in Hongo-Obradovich-Niki-Kudo, prediction section 108 predicts a destination using travel history information (*historical data associated with a driver*). TESLA-1003, ¶¶174-175.

Moreover, techniques for automatically determining a destination for a vehicle through use of a navigation were conventional by the Critical Date. For example, Kuroda teaches a process during which “the destination is set by the navigation system 34” using an “optimum route to the destination,” which is retrieved by a “route retrieving unit 34a of the navigation system 34.” TESLA-1010, 6:46-58. Further, “even when the occupant does not set the destination, the destination and the route to the destination can be automatically set.” *Id.*; TESLA-1003, ¶176.

Kuroda also offers an example of an “optimum route” as “a frequently used

route such as a commuting road on which the vehicle repeatedly drives...”

TESLA-1010, 6:46-58. As another example, “[w]hen the vehicle drives at almost the same time as the recorded time on the recorded route, the designation is estimated from the recorded route.” *Id.* In these examples, the destination is identified based on a user’s prior driver activity (*historical data associated with a driver*). TESLA-1003, ¶177.

[4]

See [3], *supra* (Kudo’s prediction section 108 in Hongo-Obradovich-Niki-Kudo would have predicted a future travel destination and thereby *select[] a destination*).

The ’399 patent describes an example of “[s]tatistical destination logic” as “infer[ing] one or more likely destinations based on the information inputs[,] e.g., “based on the current location and the direction of the vehicle, and the date and time of day.” TESLA-1001, 20:54-67. Thus, the *statistical destination logic* encompasses logic configured to use a statistical technique to infer a destination. TESLA-1003, ¶¶178-179.

Kudo’s prediction section 108 predicts a future travel destination by selecting a “future transition destination node,” which, in some examples, is “the node having the highest prediction probability...” TESLA-1010, [0104]. Thus, because prediction section 108 uses probabilities in selecting a “future transition

destination node,” Hongo-Obradovich-Niki-Kudo would have included logic configured to use a statistical technique to infer a location (*statistical destination logic*). TESLA-1003, ¶180. Indeed, Hongo’s device 100 stores “the variance of n pieces of vehicle speed data,” and uses this information “when performing various well-known statistical operations such as evaluating the reliability of vehicle speed data.” TESLA-1005, [0031].

(ii) Claims 13, 14

Hongo-Obradovich-Niki-Kudo renders these claims obvious for the same reasons discussed above in the corresponding claim addressed in §III.2(ii) and the same corresponding evidence. TESLA-1003, ¶181.

Claim Limitation	Corresponding Claim Limitation
[13]	[3]
[14]	[4]

C. [GROUND 3] – Claims 7 and 17 Are Obvious Over Hongo-Obradovich-Niki-Kuroda

1. Hongo-Obradovich-Niki-Kuroda

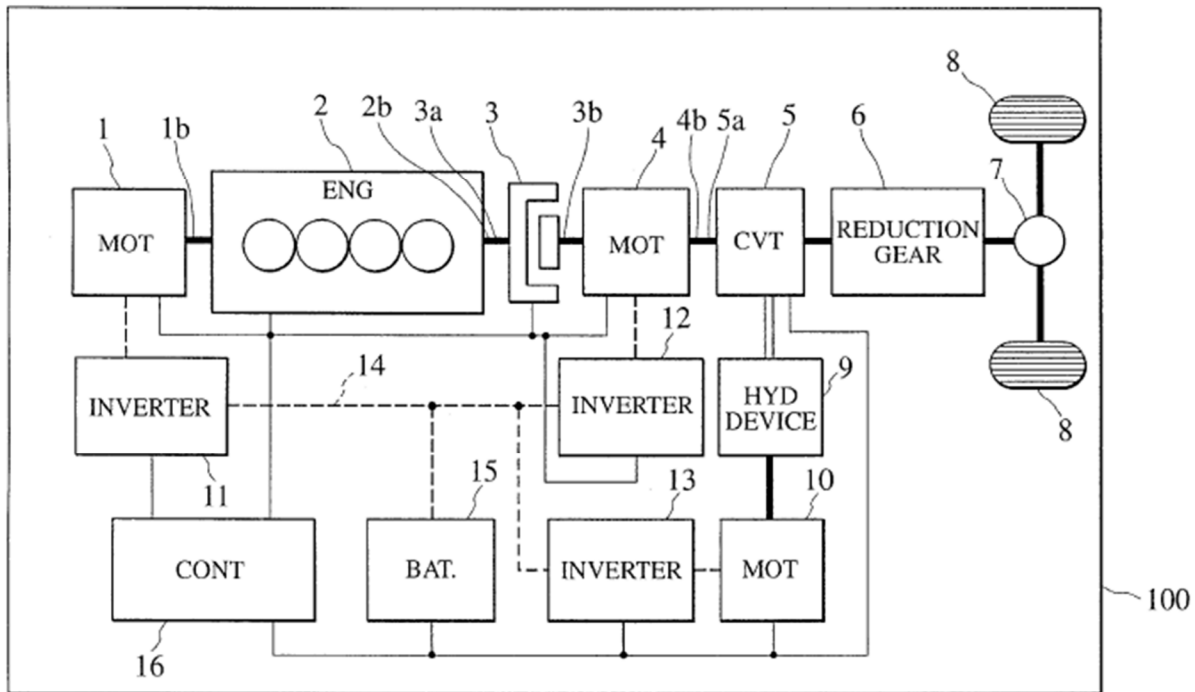
(i) Kuroda

Kuroda discloses a “driving control apparatus of a hybrid vehicle” that can “set an operating schedule of an engine and a motor so as to minimize fuel consumption in accordance with road conditions of a route to a destination.”

TESLA-1011, 1:6-11. Kuroda's vehicle includes a vehicle information communication system (VICS) for "receiv[ing] traffic information and road information by a beacon receiver, and a road map database." TESLA-1011, 4:56-67. Reception of information from a road map database in Kuroda's vehicle is an example of techniques described in the '399 patent of communicating with a remote database. TESLA-1001, 8:17-32 (describing embodiments where "the power management device communicates with one or more such databases to identify the location and surrounding road features," including "traffic patterns"); TESLA-1003, ¶66.

Figure 1 shows an example of a driving control apparatus for a hybrid vehicle 100:

FIG. 1



TESLA-1011, FIG. 1

Kuroda is analogous art to the '399 patent. Kuroda is from the same field of endeavor (e.g., vehicular communications with remote databases) and is reasonably pertinent to the problem the '399 patent was trying to solve (e.g., challenges associated with vehicle operation and control using information obtained from a remote database). TESLA-1003, ¶¶67-68; TESLA-1001, 8:17-32.

(ii) Combination

As discussed in §III.A.1.(i), Hongo describes embodiments in which coefficients used to calculate a target vehicle speed V_0 are based on several types of information, including information received by a “radio” of the vehicle.

TESLA-1005, [0064]. The received information “relates to road conditions,” such as “traffic jams, traffic regulations, etc. during driving.” *Id.* Hongo teaches this information is “very useful” when determining “coefficients α , β , γ ” used in calculating the target vehicle speed V_0 but otherwise lacks specific implementation details regarding the “radio.” A POSITA seeking to implement Hongo’s technique of leveraging traffic information to adapt cruise control would have therefore looked to examples of conventional radios used in vehicles to obtain similar types of traffic information. TESLA-1003, ¶182.

For example, in Kuroda, a vehicle includes a “vehicle roadside communication device” (or “VICS”) for “receiving traffic information and road information by a beacon receiver, and a road map database.” TESLA-1011, 4:56-67. Hongo likewise teaches the acquisition of information in real time from a “radio, beacon, etc.” TESLA-1005, [0064]. Kuroda further describes a process in which information received by a vehicle sensor includes “traffic jam information provided by a VICS or the like.” TESLA-1011, 6:59-64; FIG. 6. It would have therefore been obvious that one implementation of the “radio” in the vehicle implementing Hongo-Obradovich-Niki-Kuroda is a VICS (as described in Kuroda). TESLA-1003, ¶183.

A POSITA would have been motivated to combine the teachings of Hongo-Obradovich-Niki and Kuroda in the manner discussed above since the combination

involves use of known techniques to improve similar devices in the same way.

KSR, 550 U.S. at 415-421; MPEP 2143; TESLA-1003, ¶184. As discussed above, Kuroda's technique to communicate with the remote database to obtain traffic information was a known technique, which would have improved the control/operation capabilities of a vehicle incorporating Hongo-Obradovich-Niki in the same way as disclosed in Kuroda. TESLA-1003, ¶184; TESLA-1011, 6:59-64; FIG. 6.

A POSITA would have expected success in implementing Hongo-Obradovich-Niki-Kuroda. The implementation involves incorporating well-known techniques and elements (use of Kuroda's VICS to obtain traffic jam information) with well-known systems (a hybrid vehicle incorporating componentry enabling Hongo's adaptive cruise control system and Obradovich's information and control system) without invention. TESLA-1003, ¶185.

2. Analysis

(i) Claims 7, 17

[7]

As discussed for [1.b.1], Hongo's means 140 obtains "road environment real-time information X" (*information about an external environment of a vehicle*), including "road surface temperature." TESLA-1005, [0028]. Further, by processing the "road environment real time information X" in calculating the target speed, means 140 *determine[s]* the road environment real time information X.

TESLA-1005, [0011]. In certain embodiments, calculation of the target speed is also based on information received by a “radio” of the vehicle, including traffic information. *Id.*, [0064]. In such embodiments, the information received by the radio (i.e., traffic information) is also an example of ***information about an external environment of a vehicle*** since the information “relates to road conditions,” such as “traffic jams, traffic regulations, etc. during driving.” *Id.*; TESLA-1003, ¶186.

As discussed in §III.C.1.(ii), in Hongo-Obradovich-Niki-Kuroda, a POSITA would have found it obvious to implement the “radio” of Hongo as the VICS described in Kuroda. The VICS enables the vehicle to “receiv[e] traffic information and road information by a beacon receiver, and a **road map database**.” TESLA-1010, 4:56-67. Thus, Hongo-Obradovich-Niki-Kuroda would have led a POSITA to implementations where the determination of “road environment real-time information X” (***the step of determining information about an external environment of a vehicle***) involves the VICS receiving traffic information (e.g., road condition) while also receiving “road information” based on communications with Kuroda’s “road map database” (***communicating with a remote database***). TESLA-1003, ¶187. It would have been obvious that the “road map database” is an example of a remote database (e.g., a database that is remote from a vehicle) because Kuroda describes using the VICS for communications

between a vehicle and the “roadmap database” and a VICS were known by the Critical Date to permit a vehicle to wirelessly communicate with remote systems. TESLA-1010, 4:56-67; TESLA-1003, ¶187 (citing TESLA-1020, 1:16-51, 23:47-4:18).

[17]

See [7], *supra*. TESLA-1003, ¶188.

D. [GROUND 4] – Claims 8 and 18 Are Obvious Over Hongo-Obradovich-Niki-Newstrom

1. Hongo-Obradovich-Niki-Newstrom

(i) Newstrom

Newstrom discloses a geographic information system (GIS) that populates a “geospatial database” that stores “geospatial data relating to a travel path for [a] host vehicle.” TESLA-1012, Abstract. Newstrom’s “geospatial database” is an example of remote databases that the ’399 patent describes is in communication with a power management system. TESLA-1001, 8:17-32 (describing embodiments where “the power management device communicates with one or more such databases to identify the location and surrounding road features”); TESLA-1003, ¶69.

Figure 1 shows an example of a geospatial database management system 10 to be used on a host vehicle 12 with one or more onboard intelligent subsystems 14:

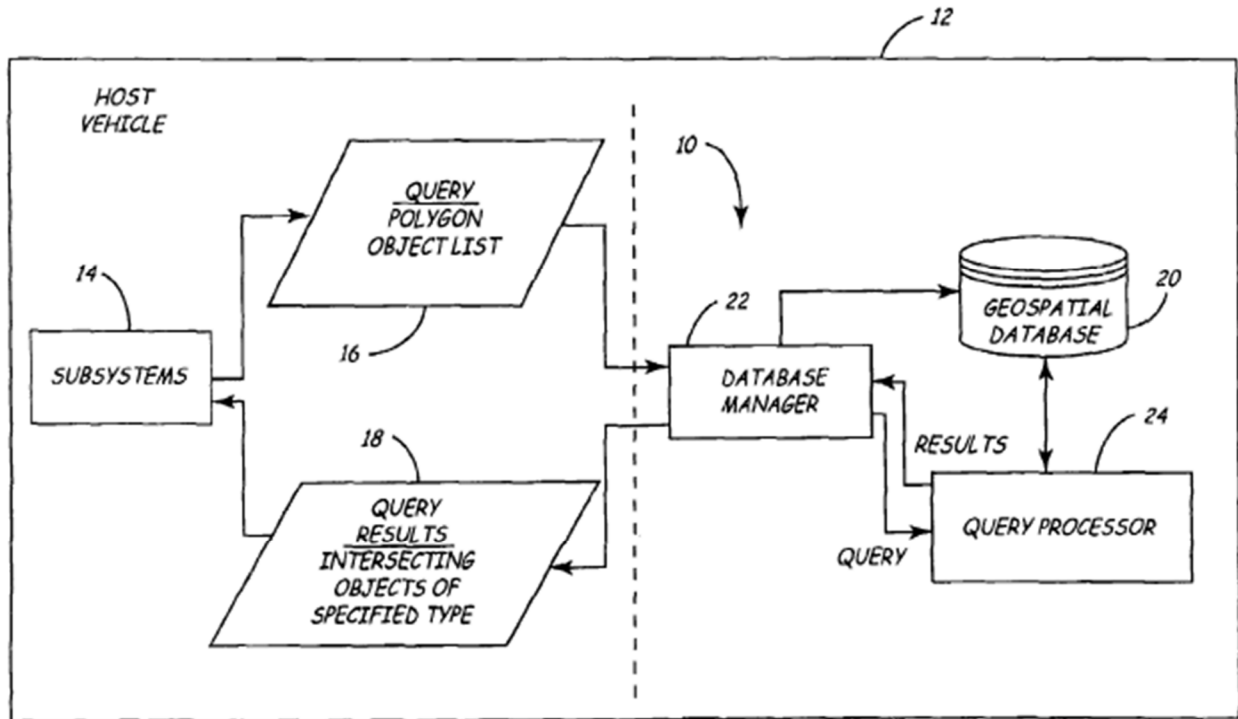


FIG. 1

TESLA-1012, FIG. 1

Subsystems 14 “provide an operator interface which conveys information to the operator indicative of the position of vehicle 12 within a lane of traffic, and also indicate[s] to the driver information about objects around the vehicle.” TESLA-1012, 3:47-58. Road information used by subsystems 14 is stored in geospatial database 20, and retrieved through database manager 22 by query processor 24. *Id.*, 4:12-16; TESLA-1003, ¶¶70-74.

Newstrom is analogous art to the '399 patent. Newstrom is from the same field of endeavor (e.g., vehicular communications with remote databases) and is reasonably pertinent to the problem the '399 patent was trying to solve (e.g.,

challenges associated with vehicle operation and control using information

obtained from a remote database). TESLA-1003, ¶75; *see* TESLA-1001, 8:17-32.

(ii) Combination

Hongo recognizes that “weather and sunlight conditions” may “change naturally over time,” which similarly causes dynamic changes in “road surface conditions and driver visibility.” TESLA-1005, [0005]. Hongo further teaches that “it is desirable to change the target vehicle speed from time to time in response to weather,” which is based on Hongo’s safety concerns in certain weather scenarios. *Id.* Indeed, while “a constant vehicle speed” may be “sufficiently safe for all situations,” such a configuration is discouraged as this would be “relatively slow” during good weather conditions. *Id.*, [0006]; TESLA-1003, ¶189.

As to poor weather conditions, Hongo recognizes “it is possible to estimate the frozen state of the road surface, the snowy state, and the like[,]” but is primarily focused on adapting the target vehicle speed calculation to improve safety. *Id.*, [0013]; *see id.*, [0040]. However, by the Critical Date, poor weather conditions described in Hongo (e.g., “snowy state”) presents safety risks to vehicle operation beyond vehicle travel speed. TESLA-1003, ¶190; TESLA-1015, 10 (noting that, in the United States, “lane departures are the single most frequent causal factor in fatal crashes.”). Thus, a POSITA would have been motivated to seek other techniques to improve safety of vehicle operation when road surface

conditions and driver visibility is poor. *Id.*

As discussed in §III.D.1.(i), Newstrom describes using the lane boundary information in geospatial database 20 to generate “[w]arnings of lane departure” through “use of steering wheel vibrations or oscillations...” TESLA-1012, 7:56-64. Lane departures may be determined using, for example, “the Time to Lane Crossing (TLC) approach,” which is based on “the vehicle’s speed, orientation relative to [a] LaneCenter” or other attributes. *Id.* Newstrom also provides a “virtual rumble strip” that may “generate[] haptic feedback that provides a ‘feel’ of the road to the driver by imposing, for example, a reactive torque as a function of positional change relative to the road geometry.” TESLA-1012, 4:54-5:6; TESLA-1003, ¶191.

It would have been obvious that implementing Newstrom’s techniques into a vehicle incorporating Hongo-Obradovich-Niki would have further improved user safety during poor weather conditions in two ways. TESLA-1003, ¶192. First, using Newstrom’s TLC approach, a vehicle incorporating Hongo-Obradovich-Niki-Newstrom would have leveraged sensor data collected by Hongo’s onboard vehicle sensors to identify lane departures using lane boundary information stored in Newstrom’s database 20. Second, using Newstrom’s “virtual rumble strip,” a steering wheel of the vehicle incorporating Hongo-Obradovich-Niki-Newstrom could be leveraged to provide haptic feedback relating to lane departure

monitoring.

Finally, a POSITA would have also reasonably expected to succeed in combining Hongo, Obradovich, and Newstrom since the combination would have required only routine knowledge well within the skill of a POSITA prior to the earliest effective filing date. TESLA-1003, ¶193. Hongo describes that driving history data 11 may store “lane classifications,” suggesting use of other types of lane information, such as the lane boundary information in Newstrom’s geospatial database 20, would have been within the capabilities of a POSITA without invention. *Id.*; TESLA-1005, [0029]. In this manner, Hongo-Obradovich-Niki-Newstrom would have merely involved combining prior art elements according to known methods to yield predictable results.

Furthermore, the elements of Hongo-Obradovich-Niki-Newstrom would each perform functions they had been known to perform prior to the combination—Hongo’s adaptive cruise control technique would have used environmental information to calculate a target vehicle speed, and Newstrom’s TLC approach would have leveraged lane boundary information specified in a geospatial database to identify lane departures and provide responsive haptic feedback to a user. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415-421, 82 USPQ2d 1385, 1395-97 (2007); MPEP 2143; TESLA-1003, ¶194. The combination involves use of known techniques to improve similar devices in the

same way. As discussed above, Newstrom’s use of lane boundary information was a known technique for improving vehicle operation in certain external conditions (e.g., snowy road conditions), and a vehicle incorporating Hongo-Obradovich-Niki was ready for improvement since Hongo describes use of adaptive cruise control in snowy road conditions. TESLA-1005, [0005], [0006]. A POSITA would have thereby perceived the combination to yield predictable results of using lane boundary information to improve navigation when a vehicle is presently traveling along a snowy route. TESLA-1003, ¶195; TESLA-1015, 10. A POSITA would have also expected success in implementing Hongo-Obradovich-Niki-Newstrom. *Id.*

2. Analysis

(i) Claims 8, 18

[8]

As discussed for [1.b.2], Hongo’s means 140 obtains “current vehicle speed V” (one example of *information about operational status of the vehicle*).

TESLA-1005, [0028]. In Hongo-Obradovich-Niki-Newstrom, a vehicle is configured to perform lane boundary monitoring, and thus, obtain lane departure information (another example of *information about operational status of the vehicle*), which is determined using Newstrom’s “Time to Lane Crossing (TLC) approach” based on “the vehicle’s speed, orientation relative to [a] LaneCenter” or other attributes. TESLA-1012, 7:56-64; TESLA-1003, ¶196.

In performing lane departure monitoring, Hongo-Obradovich-Niki-

Newstrom would have determined lane departures “from the vehicle’s speed, position, and orientation” relative to attributes specified in Newstrom’s geospatial database 20 (e.g., LaneBoundary object) (*database*). TESLA-1012, 7:56-64, FIG.

3. Thus, since the process of determining lane departures (*step of determining information about operational status of a vehicle*) involves using attributes specified in geospatial database 20, lane boundary monitoring involves communicating with geospatial database 20 (*the step of communicating with a...database*). TESLA-1003, ¶197 (citing TESLA-1012, 7:56-64). Further, in Newstrom, database 20 can be loaded by database manager 22 into “solid state memory” located in a vehicle through a “wireless connection to server,” and thus, the geospatial database 20 may be hosted on a server that is remote from a vehicle, and implemented as *a remote database*. TESLA-1012, 8:26-38. Further, because the database manager 22 can also “load new portions [of the database 20]” as a vehicle’s location changes, the vehicle can use a wireless connection to the server as the vehicle is being driven. *Id.*; TESLA-1003, ¶197.

[18]

See [8], *supra*. TESLA-1003, ¶198.

IV. PTAB DISCRETION SHOULD NOT PRECLUDE INSTITUTION

A. 35 U.S.C. §325(d) – Discretionary Denial under 325(d) is not warranted

Discretionary denial under 325(d) is not warranted. *See* IPR2019-01469, Paper 6, 8-9 (PTAB Feb. 13, 2020) (precedential) (“*Advanced Bionics*”).

None of the prior art references advanced in this Petition was previously before the Office, and thus, the same or substantially the same arguments were not previously presented to the Office. TESLA-1002. Indeed, there could be no overlap between the arguments made before the Office because the Examiner issued no prior art rejections during prosecution.

To the extent it is argued that the same or substantially the same art or arguments were previously presented to the Office, the second prong is not met. *Advanced Bionics*, 8-10. The ’399 patent claims were allowed without any indication from the Examiner as to the purportedly allowable features. *See generally* TESLA-1002. Nor did the Examiner issue any prior art rejections or substantive discussion of any prior art reference. *Id.* The Examiner thereby overlooked prior art disclosures of adaptive cruise control (e.g., in Hongo), which, as highlighted in the grounds advanced in this Petition, renders the Challenged Claims obvious in combination with Obradovich, Niki, Kudo, Kuroda and/or Newstrom. Moreover, Tesla has shown a reasonable likelihood that it would prevail that at least one of the Challenged Claims is unpatentable over the applied art based on the current record. *Supra* §III A-E; *see* PGR2022-00010, Paper 9, 8-9 (PTAB June 6, 2022). As such, Tesla has demonstrated material error by the

Office, and discretionary denial is not warranted.

B. 35 U.S.C. §314(a) – The *Fintiv* Factors Favor Institution

Consistent with Congressional intent, the goals of *Fintiv*, and the interim guidance issued by Director Vidal on June 21, 2022 (“Director’s Guidance” or TESLA-1050), Tesla asks the Board to consider the challenges raised in this Petition. IPR2020-00019, Pap. 11, at 6 (PTAB Mar. 20, 2020)(“*Fintiv*”)(precedential). For the reasons noted below, a holistic analysis of the *Fintiv* factors favors institution.⁸

1. Factor 1

Factor 1 is currently neutral because neither Tesla nor iQar have requested a stay in co-pending litigation in the Western District of Texas (*iQar Inc. v. Tesla, Inc.*, 1-23-cv-00694, (W.D. Tex.)(“WDTX Litigation”). Moreover, the Board does “not attempt to predict” how an appeals or district court might adjudicate a future motion to stay. *Fintiv*, 12; IPR2019-01393, Pap. 24, at 7 (PTAB June 16, 2020)

⁸ Apart from Tesla’s showing that *Fintiv* favors institution, the *Fintiv* framework should not be followed because it is legally invalid. The framework (1) exceeds the Director’s authority, (2) is arbitrary and capricious, and (3) was adopted without notice-and-comment rulemaking.

(“*Sand Revolution*”)(informative); IPR2020-01019, Pap. 12, at 14 (PTAB Dec. 1, 2020)(“*Sotera*”)(precedential).

2. Factor 2

Factor 2 favors institution because no trial date is set in the WDTX Litigation, and in any event, any scheduled trial date is speculative since “scheduled trial dates are unreliable and often change.” TESLA-1050, 8. Indeed, as of the filing of this petition, WDTX Litigation is still conducting venue discovery and the parties have agreed to stay all merits-based fact discovery until transfer is decided. Further, the median time-to-trial for WDTX is currently 26 months,⁹ which suggests a likely trial date no sooner than March 2026, and the pending Motion to Transfer Venue (TESLA-1051), if granted, may extend the trial date even further. *See also* TESLA-1052, 5. In contrast, if this proceeding is instituted, the Board will likely issue its Final Written Decision by August 2025.

3. Factor 3

By any objective standard, this petition is being filed at an early stage of the WDTX Litigation, which “has weighed against exercising the authority to deny institution[.]” IPR2020-00156, Pap. 10, 9 & n.8 (June 15, 2020)(“*Seven*”), 11-12 (quoting *Fintiv*, 11). The District Court has yet to expend significant resources on the case, and indeed, a Motion to Transfer Venue is still pending (TESLA-1051).

⁹ Over the past year, according to Docket Navigator.

Seven, 10-13; IPR2020-01019, Pap. 12, 14 (PTAB Dec. 1, 2020)(“*Sotera*”)(precedential), 16-17; IPR2020- 00820, Pap. 15, 11-13 (Oct. 21, 2020)(“*Snap*”)(precedential). By contrast, Tesla has diligently filed this petition roughly four months ahead of the one-year time bar, while the WDTX Litigation is still in its early stages.

4. Factor 4

The WDTX Litigation is still in its infancy, with no due date for initial invalidity contentions. Thus, at present, there is no overlap between issues between the WDTX Litigation and any IPR resulting from this petition. A lack of overlap between the petition and the district court proceeding “has tended to weigh against exercising discretion to deny institution.” *Fintiv*, 12-14. iQar also yet to identify claims asserted of infringement in the district court, while this petition addresses all claims.

5. Factor 5

Tesla’s status as a defendant in the WDTX Litigation is at worst neutral under Factor 5. Indeed, the *Fintiv* decision “says nothing about situations in which the petitioner is the same as, or is related to, the district court defendant.” IPR2020-00122, Pap. 15, at 10 (*Cisco Systems*)(Crumbley, dissenting); *Fintiv*, 13-14. At worst, where the parties are the same, Factor 5 is neutral. *Id.*

6. Factor 6

Neither Tesla nor any other party has previously challenged the '002 Patent in a PTAB post-issuance proceeding. Further, the Board has not previously considered the grounds set forth in this petition or substantively similar grounds. Director Vidal has also explained that “the PTAB will not deny institution...under *Fintiv*...when a petition presents compelling evidence of unpatentability...” TESLA-1050, 3-5, 9; *see also Fintiv*, 14-15.

The merits of this Petition are compelling. As demonstrated in the Petition with reference to Dr. Morellas’ testimony and additional evidence, institution would result in a finding of unpatentability of the Challenged Claims, which are obvious based on prior art references that materially differ from those considered by the Examiner during prosecution. *See generally* TESLA-1003; TESLA-1002, 31.

Even if the WDTX Litigation may be relevant, the strength of the merits alone is enough to outweigh any inefficiencies born of parallel litigation. TESLA-1050, 3-5, 9; *Fintiv*, 14-15 (“if the merits of a ground raised in the petition seem particularly strong...institution of a trial may serve...overall system efficiency and integrity”). Accordingly, Factor 6 strongly favors institution.

V. CONCLUSION AND FEES

The Challenged Claims are unpatentable. Petitioner authorizes charge of fees to Deposit Account 06-1050.

VI. MANDATORY NOTICES UNDER 37 C.F.R § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Tesla, Inc. is the petitioner and real party-in-interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

The '399 patent is the subject of a civil action, *iQar Inc. v. Tesla, Inc.*, 1:23-cv-00694, W.D. Tex., filed June 20, 2023 (TESLA-1004). Tesla is not aware of any other disclaimers, reexamination certificates, or IPR petitions addressing the '399 patent.

C. Lead And Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Tesla provides the following designation of counsel.

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D. Service Information

Please address all correspondence and service to the address listed above.

Petitioner consents to electronic service by email at IPR49649-0022IP1@fr.com
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Respectfully submitted,

Dated 2-2-24

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CERTIFICATION UNDER 37 CFR § 42.24

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for Inter Partes Review totals 13,990 words, which is less than the 14,000 allowed under 37 CFR § 42.24.

Dated 2-2-24

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4)(i) *et seq.* and 42.105(b), the undersigned certifies that on February 2, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and all supporting exhibits were provided by Federal Express, to the Patent Owner, by serving the correspondence address of record as follows:

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